Shobhit University
EDUCATION EMPOWERS

Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail:
U:

SHOBHIT UNIVERSITY GANGOH
School of Engineering and Technology

Date: 19/06/2019

NOTICE

Subject: Meeting of the Board of Studies

All members of the Board of Studies are hereby informed that a meeting will be held as per the following details:

Date: 25/06/2019
Time: 10.00 AM
Venue: meet.google.com/fmj-wbuo-nmt

Agenda:

1. Confirmation of minutes of the previous meeting
2. Approval of Revision in Syllabus of the courses in (1st, 2nd, and 3rd semester) master of Technology (Computer Engineering) w.e.f.2019-20 academic Session
3. New Interdisciplinary courses to be added in BCA, MCA, M.Tech and B.Tech 1st Sem.
4. Approval of Examiners (Theory & Practical) and Paper Setters for the odd semester courses in BCA, MCA, B.Tech and M.Tech for session July **to Dec. 2019.**
5. Any other matter with the permission of the Chair

All members are requested to make it convenient to attend the meeting and come prepared with relevant documents and suggestions.

Prof.(Dr.) Shri Kant Gupta
Chairperson, Board of Studies
Head of the Department
19/06/2019

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U : www.sug.ac.in

SHOBHIT UNIVERSITY GANGOH
School of Engineering and Technology

Date: 19/06/2019

To
Dr. Anil Lamba
Professor and Head
School of Computer Science and Application
Geeta University

Subject: Invitation to Attend the Board of Studies Meeting

Dear Sir

Greetings from School of Engineering and Technology

We are pleased to invite you to participate as an external subject expert in the upcoming meeting of the Board of Studies for the School of Engineering and Technology, scheduled as follows:

Date: 25/06/2019
Time: 10.00 AM
Mode: Online Mode ("meet.google.com/fmj-wbuo-nmt")

The meeting will deliberate on important academic matters including syllabus revision, new course proposals, and academic planning for the upcoming session. Your expert insights and contributions would be invaluable to the academic enrichment of our programs.

We request you to kindly confirm your availability and mode of attendance at your earliest convenience. For online participation, a meeting link will be shared upon confirmation. If attending in person, necessary hospitality arrangements will be made.

We look forward to your positive response and support.

Thank you.

Warm regards,

Prof.(Dr.) Shri Kant Gupta
Chairperson, Board of Studies

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SHOBHIT UNIVERSITY GANGOH

School of Engineering and Technology

Date: 19/06/2019

To
Dr. Amit Goyal
Professor and Head
School of Computer Science and Engineering
Chandigarh University

Subject: Invitation to Attend the Board of Studies Meeting

Dear Sir

Greetings from School of Engineering and Technology

We are pleased to invite you to participate as an external subject expert in the upcoming meeting of the Board of Studies for the School of Engineering and Technology, scheduled as follows:

Date: 25/06/2019
Time: 10.00 AM
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The meeting will deliberate on important academic matters including syllabus revision, new course proposals, and academic planning for the upcoming session. Your expert insights and contributions would be invaluable to the academic enrichment of our programs.

We request you to kindly confirm your availability and mode of attendance at your earliest convenience. For online participation, a meeting link will be shared upon confirmation. If attending in person, necessary hospitality arrangements will be made.

We look forward to your positive response and support.

Thank you.

Warm regards,

Prof.(Dr.) Shri Kant Gupta
Chairperson, Board of Studies

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School of Engineering and Technology (Shobhit University, Gangoh)

Dated: 20th May,2019

Office Note

Sub: Regarding Constitution of Board of Studies (BOS)

School of Engineering and Technology (Shobhit University, Gangoh) requests the pleasure of Hon'ble Vice Chancellor, Shobhit University, Gangoh for the constitution of BOS for a period of three years w.e.f 12th June,2019. As per the schedule 8 of University Ordinance for UG/PG programme of School of Engineering and Technology (Relevant page is attached). The composition of faculty BOS is as follows: -

(i) Director/Principal/HoD of concerned Departments/College/Institute: **Chairperson**
(ii) All Professors of the concerned Departments/College/Institute: **Member(s)**
(iii) Two Associate Professors of the concerned Departments/College/Institute: **Member(s)**
(iv) Two Assistant Professors of the concerned Departments/College/Institute: **Member(s)**
(v) Two to four outside subject experts nominated by the Vice-Chancellor: **Member(s)** (Associate Professor or above or equivalent)

The following names are hereby proposed by the School of Engineering and Technology (Shobhit University, Gangoh) for BOS. Kindly approved it so that the necessary action be taken in due course of time

(i) Dr. Shri Kant Gupta, Professor & Principal Chairman, Board of School of Engineering and Technology, Shobhit University Gangoh **Chairperson**
(ii) All Professor of the concerned Department **Member(s)**
(iii) Two Associate Professor of the concerned Department **Members(s)**
- Dr. Jasvir Singh Rana
- Mr. Varun Bansal

(iv) Two Assistant Professor of the concerned Department **Members(s)**
- Mr. Nitin Kumar
- Mr. Kuldeep Chauhan
- Mr. Anil Kumar

(v) Kindly also approve any two of the following names as External Experts Member(s)

1. Dr. Anil Lamba Professor and Head, School of Computer Science and Application, Geeta University contact no.9416344059, Email- anil.lambain@gmail.com.
2. Dr. Amit Goyal Professor and Head, School of Computer Science and Application, Chandigarh University, contact no.9899979748, Email- athroam@gmail.com.
3. Dr. Abhay Bhatia, Assistant Professor, Roorkee institute of technology, Roorkee, UK Contact no. 9837386973, Email- drabhay@ritroorkee.ac.in
4. Mr. Ankit Sharma, Assistant Professor, Gurukul kangri University, Haridwar, UK Contact no. 9760492192, Email- gurukul.ankit@gmail.com

Submitted for approval please

V/c Approved

Dr. Shri Kant Gupta
Head, Board of School of Engineering and Technology
Shobhit University Gangoh

SHOBHIT UNIVERSITY ★ 247341 ★

Shobhit University
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School of Engineering and Technology

Date: 25.06.2019

Minutes of the Meeting of Board of Studies

13th meeting of the Board of Studies of the School of Engineering and Technology, Shobhit University Gangoh was organized on 25th June 2019 at 10:00 am online through Google meet. The following members were present in the meeting:

1.	Prof.(Dr.) Shri Kant Gupta Head of the Department (Computer Science and Engineering) Shobhit University Gangoh	Chairperson
2.	Prof.(Dr.) Anil Lamba Professor and Head School of Computer Science and Application Geeta University	External expert
3.	Dr. Amit Goyal Professor and Head School of Computer Science and Engineering Chandigarh University	External Expert
4.	Prof. D K Kaushik Professor School of Engineering and Technology Shobhit University Gangoh	Member
5.	Mr. Anil Kumar Assistant Professor School of Engineering and Technology Shobhit University Gangoh	Member

Welcome address by Chairman
The Chairman extended a warm welcome to all the members of Board of Studies and the following information was tabled before the members of the Board of Studies:
Input given by the Subject Experts on the Scheme and syllabi of the ongoing Batches.

The following discussed and approved on Choice Based Credit System:

Item BOS 13.1: Approval of the Minutes of the 12th BOS Meeting held on 24 Dec, 2018 was circulated among the members and the same were notified after the approval of the Board of Studies. {Annexure- 1}

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Item BOS 13.2: Approval of Revision in Syllabus of the courses in (1st, 2nd & 3rd semester) Master of Technology (Computer Engineering) w. e. f. 2019-20 academic Session

- **BOS members approved Syllabus of the courses: CE-503, CE-505, CE-502, CE-506, CE-603 & CE-625 {Annexure-2}**

Item BOS 13.3: New Interdisciplinary Courses to be added in BCA, MCA, M. Tech and B. Tech 1st Sem. {Annexure-3}

- **BOS members approved syllabus of AECC-101D, AECC-151 D, GCAC-101E in BCA 1st Sem.**
- **BOS members approved syllabus of CCA 511 D Theory in MCA 3rd Sem.**
- **BOS members approved syllabus of CE-511A, CE-511B & CE-511C.**
- **BOS members approved syllabus of CMAN 101 D, CMEN 101 D, CESN-101 D, CPCN-101 D Theory in B. Tech 1st Sem.**

Item BOS 13.4: Approval of Examiners (Theory & Practical) and Paper Setters for the odd semester courses in BCA, MCA, B. Tech and M. Tech for session **July to Dec. 2019** . The same is being sent to the Controller of Examinations, Shobhit University Gangoh, in a sealed cover. {Annexure-4}

Item BOS 13.5: Discussion on the Value Added courses offered for students and ratification of the same.

- BOS members approved the list of Value added courses offered to students.

The meeting ended with a vote of thanks to the Chairman, Board of Studies.

The suggestions given by the panel of BOS have been discussed with the Vice Chancellor and Dean Academics. The action taken on the suggestions has been approved by competent authorities.

Signed by:

(Chairman, BOS)

(Dean Academics)

(Vice Chancellor)

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Meeting of BOS (Item No. 13.1 Annexure -1)

School of Engineering and Technology

Date: 24.12.2018

Minutes of the Meeting of Board of Studies

12th meeting of the Board of Studies of the School of Engineering and Technology, Shobhit University Gangoh was organized on 24th Dec. 2018 at 11:00 am online through Google meet. The following members were present in the meeting:

1.	Prof.(Dr.) Shri Kant Gupta Head of the Department (Computer Science and Engineering) Shobhit University Gangoh	Chairperson
2.	Prof.(Dr.) Anil Lamba Professor and Head School of Computer Science and Application Geeta University	Extemal expen
3.	Dr. Amit Goyal Professor and Head School of Computer Science and Engineering Chandigarh University	Extemal Expert
4.	Prof. D K Kaushik Professor School of Engineering and Technology Shobhit University Gangoh	Member
5.	Mr. Anil Kumar Assistant Professor School of Engineering and Technology Shobhit University Gangoh	Member
1.		

Welcome address by Chairman
The Chairman extended a warm welcome to all the members of Board of Studies and the following information was tabled before the members of the Board of Studies:
Input given by the Subject Experts on the Scheme and syllabi of the ongoing Batches.

The following discussed and approved:

Item BOS 12.1: Approval of the Minutes of the 11th BOS Meeting held on 20 June 2018

was circulated among the members and the same were notified after the approval of the Board of Studies. {Annexure- 1}

Item BOS 12.2: Approval of Examiners (Theory & Practical) and Paper Setters for the odd semester courses in BCA, MCA, B. Tech and M. Tech for session **Jan. to June 2018.** The same is being sent to the Controller of Examinations, Shobhit University Gangoh, in a sealed cover. {Annexure-2}

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The meeting ended with a vote of thanks to the Chairman, Board of Studies.

The suggestions given by the panel of BOS have been discussed with the Vice Chancellor and Dean Academics. The action taken on the suggestions has been approved by competent authorities.

Signed by:

SHOBHIT UNIVERSITY 247341

(Chairman BOS)

SHOBHIT UNIVERSITY 247341

(Vice Chancellor)

SHOBHIT UNIVERSITY 247341

(Dean Academics)

Shobhit University
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13th Meeting of BOS (Item No. 13.2 Annexure -2)

Shobhit University
EDUCATION EMPOWERS

Shobhit University, Gangoh

(Established by UP Shobhit University Act No. 3, 2012)

School of School of Engineering and Technology

Ordinances, Regulations & Syllabus

For

Master of Engineering, Two Year Programme

Semester System

(w.e.f. session 2013-14)

Approved and adopted in the year 2019 (13th Meeting, Board of Studies)

Shobhit University, Gangoh, Saharanpur

Department of Computer Engg.

M.Tech. (Computer Engineering)

(Teaching Scheme)

First Semester

Course No	Subject	L T P	Cr
CE- 501	Software Engineering Methodologies	3 – 1 – 0	4
CE- 503	Analysis and Design of Algorithms	3 – 1 – 0	4
CE- 505	Advanced Database Management Systems	3 – 1 – 0	4
CE- 507	Computer Communication and Networks	3 – 1 – 0	4
CE- 509	Fundamental of Computer Programming (Audit)	2 – 1 – 0	0
CE- 511	Fundamental of Mathematics (Audit)	2 – 1 – 0	0
CE- 511 A	Mathematics /		
CE- 511 B	Basic Mathematics /		
CE- 511 C	Mathematics-I		
CE- 551	Algorithms Lab	0 – 0 – 4	2
CE- 581	Seminar-I	0 – 0 – 3	2
		Total: 20	

Second Semester

CE- 502	Resource Management of Computer Systems	3 – 1 – 0	4
CE- 504	Soft Computing	3 – 1 – 0	4
CE- 506	High Performance Computer Architecture	3 – 1 – 0	4
	Elective –I (Choose any one)	3 – 1 – 0	4
CE-522	Mobile & Wireless Communication		
CE-524	Embedded System		
CE-526	Cloud Computing		
CE-552	Operating systems Lab	0 – 0 – 4	2
CE-582	Seminar-II	0 – 0 – 3	2
		Total: 20	

Third Semester

CE- 601	Data Mining and Warehousing	3 – 1 – 0	4
CE- 603	Internet and Web Technology	3 – 1 – 0	4
CE- 605	Medical Image Processing	3 – 1 – 0	4
CE- 607	Software Verification, Validation and Testing	3 – 1 – 0	4
	Elective –II (Choose any one)	3 – 1 – 0	4
CE-623	Security of Information System		
CE-625	Network Security		
CE-671	Minor Project	0 – 0 – 8	2
CE-681	Seminar-III	0 – 0 – 3	2
		Total: 20	

Fourth Semester

CE- 692	Dissertation	0 – 0 – 28	14
		Total: 14	
		Grand Total: 74	

Analysis and Design of Algorithms

CE- 503

L	T	P	Credits
3	1	0	4

Course Objectives:

1. To provide a strong foundation in the principles and techniques of algorithm design and analysis.
2. To explore various algorithmic strategies such as divide-and-conquer, greedy methods, dynamic programming, and backtracking.
3. To develop the ability to evaluate algorithm efficiency using asymptotic analysis.
4. To enhance problem-solving skills through the application of suitable algorithms.
5. To understand the theoretical limits of algorithms and computational problems.

Course Outcomes:

1. Analyze the time and space complexity of algorithms using asymptotic notations.
2. Design efficient algorithms using appropriate algorithmic techniques for given problems.
3. Evaluate and prove the correctness of recursive and iterative algorithms.
4. Apply algorithmic approaches to solve practical and real-world problems.
5. Compare alternative algorithms based on performance and select the most suitable one.

Unit-I: Analyzing Algorithms & Problems

Introduction to algorithms, Time and Space Complexity, Basic elements of data structures like linked lists, stacks and queues, trees, graphs, recursion. Different types of sorting algorithms and their complexities

Unit-II: Dynamic Sets, Searching and Graphs

Introduction, Array, amortized time analysis, red black trees, hashing, heaps, dynamic equivalence relations and union-find programs, priority queues with decrease key operations, traversing graphs, DFS, strongly connected components, biconnected complaints, minimum spanning tree algorithm, single source shortest paths, all pair shortest paths

Unit - III: Greedy and Dynamic Methods

Greedy methods with examples such as Optimal Reliability Allocation, Knapsack, Dynamic programming with examples such as Kanpsack, All pair shortest paths – Warshal's and Floyd's algorithms, Resource allocation problem.

Unit - IV: Backtracking and NP – Hard and NP Complete problems

General backtracking and Branch and Bound Methods, 8 queen, sum of subset, graph coloring, Hamilton cycles, 0/1 knapsack problem, NP – Hard and NP Complete problems: Basic Concepts, cooks theorem, NP – Hard graph problems, NP hard Scheduling.

Unit - V: Parallel Algorithms and Approximation Algorithms

Introduction, parallelism, PRAM and other models, some simple PRAM algorithms, handling write conflicts, Merging and Sorting, Finding Connected Components, Approximation Algorithms: Introduction, Absolute Approximation, e-approximation, polynomial time approximation schemes, fully polynomial time approximation schemes. String matching algorithms.

Suggested Readings:

1. V. Aho , J. E. Hopcroft and J. D. Ullman, "The Design and Analysis of Algorithms", Addison-Wesley, 1974.

2. T. H. Cormen , C. E. Leiserson and R. L. Rivest, "Introduction to Algorithms 2nd edition", PHI. 2009.

3. M. R. Garey and D. S. Johnson, "Computers and Intractability: A Guide to the Theory of NPCompleteness",Freeman, 1979.

4. J. Van Leuween ed, Handbook of Theoretical Computer Science, Vol A., Elsevier, 1990.

Advanced Database Management Systems

CE- 505

L	T	P	Credits
3	1	0	4

Course Objectives:

1. To deepen the understanding of advanced concepts in database management systems.
2. To explore complex data models and database system architectures.
3. To introduce advanced topics such as query optimization, transaction management, and concurrency control.
4. To develop skills for working with distributed and NoSQL databases.
5. To enhance the ability to design and manage large-scale and high-performance database applications.

Course Outcomes:

1. Apply advanced database concepts to design and manage efficient database systems.
2. Optimize SQL queries and understand the underlying query processing techniques.
3. Implement and manage database transactions with concurrency control and recovery mechanisms.
4. Use distributed and NoSQL databases for specific application requirements.
5. Evaluate and select appropriate database solutions based on performance, scalability, and consistency needs.

Unit -I: Introduction

An overview of database management system, database system Vs file system, Architecture, Advantages, Disadvantages, data models, relational algebra, SQL, Normal forms.

Unit-II: Query Processing

General strategies for query processing, transformations, expected size, statistics in estimation, query improvement, query 'evaluation, view processing, query processor

Unit-III: Recovery

Reliability, transactions, recovery in centralized DBMS, reflecting updates, Buffer management, logging schemes, disaster recovery.

Unit - IV: Concurrency

Introduction, serializability, concurrency control,-locking schemes, timestamp based order, optimistic scheduling, multiversion techniques, deadlocks Object Oriented Data base Development: Introduction, Object definition language, creating object instances, Object query language

Unit - V: Distributed Databases and Data Warehousing

Basic concepts, options for distributing a database, distributed DBMS, Data warehousing: Introduction, basic concepts, data warehouse architecture, data characteristics, reconciled data layer, data transformation, derived data layer, user interface, Object Relational Databases: Basic concepts enhanced SQL, advantages of object relational approach.

Suggested Readings:

1. An Introduction to database systems by Bipin C. Desai, Galgolia Publications,1997.
2. Principles of distributed database systems, by M. Tamer & Valduricz, 2" edition, LPE Pearson Education,2009.
3. Database system concepts by Korth,2008.

Resource Management of Computer Systems

CE- 502

L	T	P	Credits
3	1	0	4

Course Objectives:

1. To understand the fundamental principles of managing computer system resources effectively.
2. To study the allocation and scheduling of resources such as CPU, memory, storage, and I/O devices.
3. To explore techniques for optimizing system performance and ensuring fairness in resource distribution.
4. To analyze the role of operating systems in resource management.
5. To introduce emerging trends and technologies in efficient resource utilization.

Course Outcomes:

1. Explain the principles and mechanisms of resource management in computer systems.
2. Analyze and evaluate resource allocation algorithms for CPU, memory, and I/O.
3. Apply scheduling techniques to optimize the performance of computing systems.
4. Demonstrate an understanding of operating system strategies for handling concurrency and resource contention.
5. Assess modern approaches to resource management in cloud and virtualized environments.

Unit -I

Historical perspectives, interrupt mechanism, Loader, linker, assembler, command interpreter, compiler, operating system, interpreters, Hardware Resources, Resource management, Virtual Computers, The Hardware Interface, The CPU, Memory and Addressing, Interrupts, I/O Devices, The Operating System Interface, Information and Meta-Information

Unit -II

Concurrent processes; mutual exclusion and synchronization, system calls and protection, Context switching and the notion of a process and threads; synchronization and protection issues; scheduling.

Unit -III

Memory management including virtual memory and paging techniques; i/o architecture and device management.

Unit -IV

File systems; distributed file systems, Issues in the design of distributed file systems, Examples of distributed systems, deadlock detection and protection.

Unit -V

Protection and Security. Architecture of the UNIX operating system ,Case Study of Unix,, Windows, and Real-Time OS.

Suggested Readings:

1. Andrew S. Tanenbaum, "Modern Operating Systems", Second Edition, Pearson Education, Inc., 2001.
2. Uresh Vahalia, "UNIX Internals: The New Frontiers", PEARSON Education,1996.
3. J. Mauro and R. McDougall, "Solaris Internals: Core Kernel Architecture", Sun Microsystems Press, 2001.
4. Daniel P. Bovet and Marco Cesati, "Understanding the Linux kernel", O'Reilly & Associates, Inc.,1998.

Internet and Web Technology

	L	T	P	Credits
CE- 603	**3**	**1**	**0**	**4**

Course Objectives:

1. To provide a comprehensive understanding of the architecture and functioning of the Internet and web technologies.
2. To introduce core web technologies including HTML, CSS, JavaScript, and client-server models.
3. To explore protocols and standards used in web communication such as HTTP, HTTPS, and DNS.
4. To develop the ability to design and implement dynamic and interactive web applications.
5. To examine security, performance, and scalability issues in web development.

Course Outcomes:

1. Explain the architecture, components, and protocols of the Internet and the World Wide Web.
2. Design static and dynamic web pages using HTML, CSS, and JavaScript.
3. Develop client-server web applications using appropriate web technologies and frameworks.
4. Demonstrate understanding of web communication protocols and data exchange formats.
5. Analyze and implement basic web security practices and performance optimization techniques.

Unit –I : Introduction

Internet Protocol model, Internet Addresses, IP routing concepts, Table Driven and next hop routing, other routing related protocols, Internet Access through PPP, SLIP, WWW, Web servers, Browsers.

Unit –II : Router Technology

Hubs, Bridges, Routers, Routing Protocols, Routing Security, Switch based routing, routing in unicast environment, multicasting, mobile routing.

Unit –III : Web Server Technology

Web's Robot global access to information, HTML, HTTP, Accessing a web server, publishing on web server, secure HTTP, Secure Sockets Layer, WWW Proxies, IIS, Case study of apache web server.

Unit –IV : Browsing Systems

Searching and web casting Technique, Popular web servers, basic features, bookmarks, cookies, progress indicators, customization of browsers, browsing tricks, next generation web browsing, search engines, architecture of search engines, search tools, web crawlers, types of crawlers, scalable web crawler, incremental crawler, parallel crawler, focused crawler, agent based crawler, case study of IE.

Unit –V : Website Development

HTML, XHTML, DHTML, XML, Structuring data, namespaces, XML schema Documents, Document Object Model, DOM methods, Simple API for XML, XSL, SOAP, ASP.Net. Security and management issues for creating a web site

Suggested Readings:

1. Chuck Musciano & Bill Kennedy, HTML & XHTML [SPD],2008.
2. D. Hunter, et. Al. Beginning XML [WROX],2000.
3. Douglas E. Comer; Computer Networks and Internets - PE,2012.
4. Mike Thelwall: Web Crawlers And Search Engines - Emerald Group Publishing Limited,2011.

Network Security

	L	T	P	Credits
CE- 625	**3**	**1**	**0**	**4**

Course Objectives:

1. To introduce the fundamental concepts and principles of network security.
2. To study various types of network threats, vulnerabilities, and attack techniques.
3. To understand cryptographic methods used to secure data transmission.
4. To explore security protocols and tools used to protect network infrastructure.
5. To develop the ability to design and implement secure network systems.

Course Outcomes:

1. Identify and explain common network security threats and vulnerabilities.
2. Apply cryptographic techniques to secure data and communications.
3. Analyze the functioning of security protocols such as SSL/TLS, IPsec, and firewalls.
4. Design strategies to protect networks from unauthorized access and attacks.
5. Evaluate and implement security solutions to ensure confidentiality, integrity, and availability of networked systems.

Unit -I

Introduction: The OSI Security Architecture, Security Attacks, Security Services, Security Mechanisms, A Model for Internetwork Security, Internet Standards the Internet Society, Symmetric Encryption and Message Confidentiality, Symmetric Encryption Principles, Symmetric Encryption Algorithms, Cipher Block Modes of Operation, Location of Encryption Devices, Key Distribution.

Unit -II

Public-Key Cryptography: Public-Key Cryptography and Message Authentication, Approaches to Message Authentication, Secure Hash Functions and HMAC, Public Key Cryptography Principles, Public-Key Cryptography Algorithms , Digital Signatures, Key Management.

Unit -III

Security applications: Authentication Applications, Kerberos, X.509 Directory Authentication Service, Public Key Infrastructure, Electronic Mail Security, Pretty Good Privacy (PGP), S/MIME, IP Security: IP Security Overview, IP Security Architecture, Authentication Header, Encapsulating Security Payload, Combining Security Associations, Key Management Web Security, Web Security Requirements, Secure Sockets Layer (SSL) and Transport Layer Security (TLS), Secure Electronic Transaction (SET).

Unit -IV

Network Management Security: Basic Concepts of SNMP, SNMPv1 Community Facility,8.3

SNMPv3.SYSTEM SECURITY, INTRUDERS, Intruders, Intrusion Detection, Password Management.

Unit -V

Malicious Software, Viruses and Related Threats, Virus Countermeasures Distributed Denial of Service Attacks. FIREWALLS, Firewall Design Principles, Trusted Systems, Common Criteria for Information Technology Security Evaluation.

Suggested Readings:

1. Wenbo Mao, Modern Cryptography: Theory and Practice, Prentice Hall, 2004.

2. William Stallings, "Cryptography and Network Security (4th Edition)", PEARSON Education,2006.

3. Behrouz A. Forouzan, "Cryptography and Network Security", McGraw-Hill Education,2008.

Public Speaking and Presentation I

AECC -151 D

L	T	P	Cr
0	0	2	1

Course Objectives:

1. To develop essential public speaking skills for effective communication.
2. To build confidence and reduce anxiety in speaking before an audience.
3. To teach methods for organizing and structuring clear and engaging presentations.
4. To enhance the use of vocal variety, body language, and visual aids.
5. To improve skills in audience interaction and handling questions confidently.

Course Outcomes:

1. Deliver clear and confident speeches in front of diverse audiences.
2. Organize content logically to create coherent and impactful presentations.
3. Use effective verbal and non-verbal communication techniques.
4. Incorporate visual aids and multimedia tools to support presentations.
5. Engage audiences and respond effectively to questions and feedback.

List of Programs

- **Self-Introduction Speech** – Students deliver a short speech introducing themselves to build confidence and ease into public speaking.

- **Impromptu Speech Practice** – Students are given random topics and a short time to prepare, enhancing their quick thinking and spontaneous speaking.

- **Speech on a Social Issue** – Prepare and present a 3–5 minute informative speech on a relevant social topic.

- **Persuasive Speech Exercise** – Students create and deliver a speech aiming to persuade the audience on a chosen topic.

- **Storytelling Session** – Use storytelling techniques to convey a personal experience or fictional tale effectively.

- **Group Discussion Simulation** – Participate in group discussions to improve collaborative speaking and active listening.

- **Debate Practice** – Students engage in team-based debates to practice argumentation, rebuttal, and confident delivery.

- **Body Language Workshop** – A session focusing on gestures, posture, facial expressions, and movement during speeches.

- **Voice Modulation Drill** – Practice controlling pitch, pace, and volume for expressive and impactful speaking.

- **Using Visual Aids** – Prepare a short presentation using PowerPoint or charts to support a topic visually.

- **Interview Simulation** – Students play the roles of interviewer and interviewee to develop professional speaking and listening skills.

Shobhit University
EDUCATION EMPOWERS

Babu Vijendra Marg, Adarsh Institutional
Area Gangoh, Distt. Saharanpur (U.P.)
247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

Shobhit University, Gangoh (Saharanpur)
Teaching Scheme
Effective form 2016
BCA
I Semester

Course Types	Subject Code and Title	L	P	Total	Cr.
Core Course	CCAC-101 :C Programming Fundamentals	4			4
	CCAC-103:Computer System Architecture	4			4
Ability Enhancement Compulsory Course	AECC-101:Professional Communication AECC-101A: Personality Development- I AECC-101B: Behaviour Skill- I AECC-101C: language Proficiency and English I AECC-101D:Public Speaking and Presentation I	4			2
Generic Elective	GCAC-101Mathematics GCAC- 101 A- Engineering Mathematics I GCAC- 101 B – Discrete Mathematics I GCAC- 101 C- Basic Mathematics I GCAC- 101 D- Mathematical Foundation of Computer Science I GCAC- 101 E- Elementary Mathematics I	4			4
	GCAC-103: Computer Fundamentals				
Practical	CCAC-151: C Programming Fundamentals		2		1
	CCAC-153: Computer System Architecture Lab		2		1
	AECC-151: Professional Communication LAB AECC -151A: Personality Development- I AECC -151 B: Behaviour Skill- I AECC -151 C: language Proficiency and English I AECC -151 D:Public Speaking and Presentation I		2		1
	Total Credits (4 Theory +3 Lab)	16	6	22	17

AECC-101 D Public Speaking and Presentation I

L	T	P	Cr
4	0	0	4

Course Objectives:

1. To develop effective verbal and non-verbal communication skills for public speaking.
2. To build confidence in delivering presentations to diverse audiences.
3. To learn techniques for organizing and structuring speeches and presentations.
4. To enhance the use of visual aids and technology to support presentations.
5. To improve skills in engaging audiences and handling questions or feedback.

Course Outcomes:

1. Demonstrate confident and clear delivery in public speaking situations.
2. Organize and structure presentations logically and coherently.
3. Utilize verbal and non-verbal communication techniques effectively.
4. Incorporate appropriate visual aids to enhance audience understanding.
5. Respond effectively to audience questions and manage interactive sessions.

Unit I introduces the fundamentals of public speaking, focusing on the nature and importance of effective communication. It covers the communication process, the role of the speaker and audience, and the development of self-confidence in speaking situations.

Unit II emphasizes speech preparation, guiding students through topic selection, audience analysis, research, and outlining. It also teaches how to organize speeches clearly with strong openings, structured content, and effective conclusions.

Unit III focuses on speech delivery techniques, including voice modulation, pronunciation, posture, eye contact, and gestures. Students learn how to use visual aids effectively and how to adapt their delivery to different speaking contexts.

Unit IV provides practice in different types of speeches such as informative, persuasive, and special occasion speeches. Emphasis is placed on peer feedback, improvement through rehearsal, and managing time and content during delivery.

Unit V prepares students for professional presentations by teaching advanced presentation skills, handling audience questions, overcoming stage fear, and using multimedia tools. The unit concludes with individual presentations for evaluation.

Elementary Mathematics I

GCAC- 101 E

L	T	P	Cr
4	0	0	4

Course Objectives:

1. To introduce fundamental concepts of algebra and basic mathematical operations.
2. To develop problem-solving skills using arithmetic, equations, and inequalities.
3. To familiarize students with functions, sequences, and series.
4. To build a foundation in coordinate geometry and basic trigonometry.
5. To enhance logical thinking and analytical skills through mathematical reasoning.

Course Outcomes:

1. Apply basic algebraic operations and solve linear and quadratic equations.
2. Solve inequalities and understand their graphical representations.
3. Analyze and work with functions, sequences, and series.
4. Use coordinate geometry to solve problems involving lines and curves.
5. Demonstrate understanding of basic trigonometric ratios and solve related problems.

Unit I focuses on the basic concepts of numbers, including types of numbers, place value, and simple operations like addition, subtraction, multiplication, and division. It builds a strong foundation in numerical understanding and arithmetic skills.

Unit II introduces fractions, decimals, and percentages. Students learn how to convert between them, perform basic operations, and apply these concepts in everyday contexts, enhancing their ability to handle real-life mathematical situations.

Unit III covers basic geometry, including the properties and classification of shapes, perimeter, area, and simple measurements. It helps students understand spatial relationships and use geometric reasoning in practical tasks.

Unit IV deals with basic algebraic concepts such as patterns, simple equations, and the use of variables. This unit develops logical thinking and prepares students for more advanced algebra in future courses.

Unit V introduces data handling and basic statistics. Students learn how to collect, organize, and represent data using charts and graphs, along with understanding mean, median, and mode to interpret data meaningfully.

Public Speaking and Presentation I

AECC -151 D

L	T	P	Cr
0	0	2	1

Course Objectives:

1. To develop essential public speaking skills for effective communication.
2. To build confidence and reduce anxiety in speaking before an audience.
3. To teach methods for organizing and structuring clear and engaging presentations.
4. To enhance the use of vocal variety, body language, and visual aids.
5. To improve skills in audience interaction and handling questions confidently.

Course Outcomes:

1. Deliver clear and confident speeches in front of diverse audiences.
2. Organize content logically to create coherent and impactful presentations.
3. Use effective verbal and non-verbal communication techniques.
4. Incorporate visual aids and multimedia tools to support presentations.
5. Engage audiences and respond effectively to questions and feedback.

List of Programs

- **Self-Introduction Speech** – Students deliver a short speech introducing themselves to build confidence and ease into public speaking.

- **Impromptu Speech Practice** – Students are given random topics and a short time to prepare, enhancing their quick thinking and spontaneous speaking.

- **Speech on a Social Issue** – Prepare and present a 3–5 minute informative speech on a relevant social topic.

- **Persuasive Speech Exercise** – Students create and deliver a speech aiming to persuade the audience on a chosen topic.

- **Storytelling Session** – Use storytelling techniques to convey a personal experience or fictional tale effectively.

- **Group Discussion Simulation** – Participate in group discussions to improve collaborative speaking and active listening.

- **Debate Practice** – Students engage in team-based debates to practice argumentation, rebuttal, and confident delivery.

- **Body Language Workshop** – A session focusing on gestures, posture, facial expressions, and movement during speeches.

- **Voice Modulation Drill** – Practice controlling pitch, pace, and volume for expressive and impactful speaking.

- **Using Visual Aids** – Prepare a short presentation using PowerPoint or charts to support a topic visually.

- **Interview Simulation** – Students play the roles of interviewer and interviewee to develop professional speaking and listening skills.

Shobhit University, Gangoh (Saharanpur)
Teaching Scheme
Effective from 2013 (LE)
MCA
III semester

Code	Course Title	Cr.	L	T	P
CCA 501	Java Programming	4	3	1	0
CCA 503	C# Programming	4	3	1	0
CCA 505	Data Communication and Networking	4	3	1	0
CCA 507	Advanced Operating System	4	3	1	0
CCA XXX	PROFESSIONAL ELECTIVE-I	4	3	1	0
CCA 551	Java Programming Lab	2	0	0	4
CCA 553	C# Programming Lab	2	0	0	4
	Total	24	15	5	8

PROFESSIONAL ELECTIVE-I

1. CCA 509 Theory of Computation
2. CCA 511 Computer Based Numerical & Statistical Techniques
3. CCA 511 A Introduction to Numerical Methods
4. CCA 511 B Statistical Methods for Data Analysis
5. CCA 511 C Linear Algebra and Matrix Computations
6. CCA 511 D Regression Analysis and Modeling
7. CCA 513 Introduction to Programming and Computer Organization

CCA 511 D Regression Analysis and Modeling

L	T	P	Cr
3	1	0	4

Course Objectives:

1. To introduce the fundamental concepts of regression analysis and statistical modeling.
2. To develop an understanding of simple and multiple linear regression techniques.
3. To explore model diagnostics and methods for assessing model adequacy.
4. To teach the application of regression models to real-world data sets.
5. To familiarize students with advanced regression methods and model selection criteria.

Course Outcomes:

1. Understand and apply simple and multiple linear regression models.
2. Perform model diagnostics to evaluate the goodness-of-fit and assumptions.
3. Interpret regression coefficients and make predictions using regression models.
4. Use statistical software to fit and analyze regression models.
5. Select appropriate regression models for complex data using advanced techniques.

Unit 1 introduces the basic concepts of regression analysis, including the relationship between variables, types of regression, and the formulation of simple linear regression models. It covers estimation of model parameters using the least squares method, interpretation of coefficients, and assessment of model fit through R-squared and residual analysis.

Unit 2 focuses on multiple linear regression, extending simple models to include multiple predictors. Topics include estimation of parameters, multicollinearity, model selection techniques such as stepwise regression, and the use of adjusted R-squared and AIC/BIC for comparing models. The unit also covers diagnostics for identifying influential observations and checking model assumptions.

Unit 3 deals with regression diagnostics and model validation. It explores residual plots, leverage and influence measures, variance inflation factor, and methods for detecting heteroscedasticity and autocorrelation. The unit also emphasizes cross-validation and other resampling methods to assess model generalizability and predictive performance.

Unit 4 introduces polynomial and nonlinear regression models, including transformations to linearize relationships and the use of nonlinear least squares estimation. It also covers interaction terms and categorical variables using dummy coding, enabling the modeling of more complex relationships between variables.

Unit 5 focuses on logistic regression and generalized linear models for binary and categorical outcomes. It includes model interpretation, estimation using maximum likelihood, and evaluation metrics such as confusion matrices, ROC curves, and AUC. The unit concludes with practical applications of regression modeling using statistical software for real-world data analysis.

Scheme of Teaching

(According to CBCS Pattern)
TEACHING SCHEME OF B.TECH. 1ST YEAR (1ST SEMESTER)

(COMMON FOR ALL BRANCHES)

CODE	SUBJECT	CREDIT	L	T	P
CMAN-101 CMAN-101 A/ CMAN-101 B/ CMAN-101 C/ CMAN-101 D	MATHEMATICS-I STATISTICAL TECHNIQUES IN COMPUTER SCIENCE I MATHEMATICAL FOUNDATION OF COMPUTER SCIENCE I APPLIED MATHEMATICS I ADVANCED APPLIED MATHEMATICS I	4	3	1	0
CMEN-101 CMEN-101 A/ CMEN-101 B/ CMEN-101 C/ CMEN-101 D	ENGINEERING MECHANICS INTRODUCTION TO ENGINEERING MECHANICS MATERIAL SCIENCE AND ENGINEERING DYNAMICS OF MACHINERY THERMODYNAMICS	4	3	1	0
CECN-101 CECN-101 A/ CECN-101 B/ CECN-101 C/ CECN-101 D	FUNDAMENTALS OF ELECTRONICS INTRODUCTION TO ELECTRONICS OPERATIONAL AMPLIFIERS AND THEIR APPLICATIONS DIGITAL SIGNAL PROCESSING EMBEDDED SYSTEMS	4	3	1	0
CESN-101 CESN-101 A/ CESN-101 B/ CESN-101 C CESN-101 D	ENGINEERING CHEMISTRY AND ENVIRONMENTAL SCIENCE INTRODUCTION TO ENGINEERING CHEMISTRY CHEMICAL THERMODYNAMICS MATERIALS SCIENCE AND ENGINEERING GREEN CHEMISTRY AND SUSTAINABLE PRACTICES	4	3	1	0
CPCN-101 CPCN-101 A/ CPCN-101 B/ CPCN-101 C/ CPCN-101 D	PRESENTATION AND COMMUNICATION SKILLS INTRODUCTION TO COMMUNICATION SKILLS INTERPERSONAL COMMUNICATION TECHNICAL WRITING COMMUNICATION IN DIGITAL MEDIA	3	3	0	0
CMEN-151	ENGINEERING WORKSHOP PRACTICE	1	0	0	2
CMEN-153	ENGINEERING GRAPHICS LAB	1	0	0	2
CPCN-151 CPCN-151 A CPCN-151 B CPCN-151 C CPCN-151 D	ENGLISH LAB INTRODUCTION TO COMMUNICATION SKILLS INTERPERSONAL COMMUNICATION TECHNICAL WRITING COMMUNICATION IN DIGITAL MEDIA	1	0	0	2
TOTAL		22	15	4	6

ADVANCED APPLIED MATHEMATICS I

CMAN-101 D

Course Objectives:

1. To strengthen knowledge of advanced mathematical concepts applicable to engineering and sciences.
2. To develop proficiency in solving differential equations and their applications.
3. To introduce techniques of vector calculus and their practical uses.
4. To explore advanced topics in linear algebra and matrix theory.
5. To enhance problem-solving skills through mathematical modeling and analysis.

Course Outcomes:

1. Solve ordinary and partial differential equations relevant to engineering problems.
2. Apply vector calculus operations in physical and engineering contexts.
3. Utilize linear algebra concepts to solve systems of equations and perform matrix operations.
4. Analyze and interpret mathematical models of real-world phenomena.
5. Demonstrate competence in advanced mathematical techniques to support applied sciences.

Unit 1: Advanced Calculus and Multivariable Analysis

This unit explores advanced topics in multivariable calculus, including partial derivatives, multiple integrals, and vector-valued functions. The theory behind gradients, directional derivatives, and the application of Green's, Stokes', and Gauss's Theorems in higher dimensions is emphasized. It also delves into the concept of higher-order derivatives and the method of Lagrange multipliers.

Unit 2: Ordinary and Partial Differential Equations

Focusing on advanced techniques for solving both ordinary and partial differential equations, this unit includes methods like separation of variables, integral transforms, and the use of Green's function. The theory behind second-order linear differential equations, boundary value problems, and the classification of partial differential equations is also covered.

Unit 3: Complex Analysis and its Applications

This unit examines complex variable theory, focusing on analytic functions, contour integration, residue calculus, and conformal mappings. Applications to fluid dynamics, electrostatics, and potential theory are explored. The unit also includes advanced topics such as Riemann surfaces and complex mappings.

Unit 4: Functional Analysis and Operator Theory

This unit introduces the concepts of normed vector spaces, Banach and Hilbert spaces, and continuous linear operators. The theory of spectral decomposition, compact operators, and Fourier series in function spaces is covered, as well as the application of these concepts in solving integral and differential equations.

Unit 5: Advanced Probability, Stochastic Processes, and Statistical Methods

The final unit delves into advanced probability theory, including stochastic processes, Markov chains, Brownian motion, and applications to queuing theory and reliability analysis. The unit also includes multivariate statistical methods, estimation theory, and large-sample theory, with applications in statistical inference and machine learning.

THERMODYNAMICS

CMEN-101 D

Course Objectives:

1. To introduce the basic principles and laws of thermodynamics.
2. To develop an understanding of energy interactions and thermodynamic systems.
3. To explore properties of pure substances and thermodynamic processes.
4. To analyze the performance of thermodynamic cycles and engines.
5. To apply thermodynamic concepts to practical engineering problems.

Course Outcomes:

1. Explain the fundamental laws of thermodynamics and their applications.
2. Analyze energy transfer and transformation in closed and open systems.
3. Evaluate thermodynamic properties of substances using property tables and charts.
4. Assess the efficiency of thermodynamic cycles and processes.
5. Solve engineering problems involving heat engines, refrigerators, and heat pumps.

Unit 1: Introduction to Thermodynamics

This unit introduces the basic concepts of thermodynamics, including the laws of thermodynamics, energy, and the system-environment relationship. Topics include the classification of systems, properties, and state functions. The unit also covers the concepts of work, heat, and the energy balance in various thermodynamic processes.

Unit 2: First Law of Thermodynamics and Applications

Focusing on the first law of thermodynamics, this unit explores the principle of energy conservation, including internal energy, heat, and work. Applications to engineering systems, such as the analysis of closed and open systems, are discussed. The unit also covers specific heat, thermodynamic processes, and cyclic processes in engines and refrigerators.

Unit 3: Second Law of Thermodynamics and Entropy

This unit delves into the second law of thermodynamics, focusing on entropy and its significance in understanding irreversible processes. The unit includes the concept of entropy change, the Clausius and Kelvin-Planck statements, and the Carnot cycle. The laws are applied to real-world systems, including heat engines and refrigeration cycles, and the limitations imposed by the second law.

Unit 4: Thermodynamic Properties of Pure Substances

This unit focuses on the thermodynamic behavior of pure substances, including phase changes and the use of property tables and Mollier diagrams. Topics include the P-V, T-S, and H-S diagrams and the application of these properties to real-world thermodynamic cycles such as Rankine and Brayton cycles. The unit emphasizes the calculation of work and heat in different phases of the substance.

Unit 5: Power Cycles and Refrigeration Cycles

The final unit explores the working principles of various thermodynamic cycles, including the Rankine, Otto, Diesel, and Brayton cycles. The unit also covers refrigeration cycles, including the vapor-compression cycle and absorption refrigeration systems. Efficiency and performance analysis of these cycles are discussed, along with methods for improving cycle efficiency and minimizing losses in practical systems.

FUNDAMENTALS OF ELECTRONICS

	Cr.	L	T	P
CECN-101	**4**	**3**	**1**	**0**

Unit1:

Electronics and Semiconductor: Electronics: Application, History, Components, Voltage Source and Current Source, Classification of Solids, Forbidden Energy Gap, Insulator, Conductor, and Semiconductor: Types.

Unit 2:

Diodes and Applications covering, Semiconductor Diode – Diode, Operation, Forward Bias, Reverse Bias, Drift and Diffusion, Ideal versus Practical, Resistance Levels, Diode Equivalent Circuits, Load Line Analysis; Half Wave and Full Wave Rectifiers with and without Filters; Breakdown Mechanisms, Zener Diode – Operation and Applications;

Unit 3:

Transistor Characteristics covering, Bipolar Junction Transistor (BJT) –
Construction, Operation, Amplifying Action, Common Base, Common Emitter and Common Collector Configurations, Operating Point, Voltage Divider Bias Configuration

Unit 4:

Operational Amplifiers and Applications covering, Introduction to Op-Amp, Differential Amplifier Configurations, CMRR, PSRR, Slew Rate; Block Diagram, Pin Configuration of 741 Op-Amp, Characteristics of Ideal Op-Amp, Concept of Virtual Ground; Op-Amp Applications – Inverting, Non-Inverting, Summing and Difference Amplifiers, Voltage Follower, Comparator, Differentiator, Integrator;

Unit 5:

Basic Digital Electronics covering, Binary Number Systems and Codes; Basic Logic Gates and Truth Tables, Boolean Algebra, De Morgan's Theorems, Logic Circuits.

Text/Reference Books:

1. R. L. Boylestad& Louis Nashlesky (2007), *Electronic Devices &Circuit Theory*, Pearson Education

GREEN CHEMISTRY AND SUSTAINABLE PRACTICES

CESN-101 D

Course Objectives:

1. To introduce the principles and concepts of green chemistry.
2. To explore sustainable practices in chemical processes and product design.
3. To understand the environmental impact of traditional chemical methods.
4. To promote the development of eco-friendly and energy-efficient technologies.
5. To encourage critical thinking towards minimizing waste and pollution in chemistry.

Course Outcomes:

1. Explain the twelve principles of green chemistry and their significance.
2. Analyze chemical processes for sustainability and environmental impact.
3. Design chemical reactions and products following green chemistry guidelines.
4. Evaluate the use of renewable resources and alternative energy in chemical processes.
5. Apply sustainable practices to reduce hazardous waste and improve resource efficiency.

Unit 1: Introduction to Green Chemistry

This unit provides an introduction to the principles and concepts of green chemistry. It covers the basic philosophy of green chemistry, emphasizing the design of chemical processes that are environmentally benign, economically viable, and energy-efficient. The unit also explores the role of green chemistry in sustainability and its application to the reduction of hazardous substances in chemical products and processes.

Unit 2: Green Chemistry Principles and Practices

In this unit, the core principles of green chemistry are examined in detail, including the design of safer chemicals, the use of renewable resources, and the minimization of waste. Topics such as atom economy, the reduction of toxicity, and energy efficiency in chemical reactions are discussed. Practical examples and case studies illustrating the application of these principles in industrial and laboratory settings are also included.

Unit 3: Sustainable Materials and Alternative Energy Sources

This unit explores the use of sustainable materials in green chemistry and their role in reducing environmental impact. It covers the development and use of biodegradable materials, renewable raw materials, and the role of green chemistry in waste minimization and recycling. Additionally, the unit investigates alternative energy sources, including solar, wind, and biofuels, and their integration into sustainable chemical practices.

Unit 4: Environmental Impact of Chemical Processes

This unit focuses on assessing the environmental impact of chemical processes. Topics include life-cycle analysis, carbon footprint, green solvents, and the concept of "green engineering." The unit also discusses the importance of reducing the environmental footprint of chemical processes through cleaner production technologies, waste treatment methods, and pollution prevention techniques.

Unit 5: Green Synthesis and Industrial Applications

This unit covers the principles and methods of green synthesis, focusing on the design of chemical reactions that minimize environmental and economic costs. Topics include catalytic processes, solvent-free reactions, biocatalysis, and the use of renewable feedstocks in industrial processes. The unit also explores real-world applications in pharmaceuticals, agrochemicals, and materials production, illustrating the integration of green chemistry into industrial practices.

COMMUNICATION IN DIGITAL MEDIA

CPCN-101 D

Course Objectives:

1. To introduce the fundamentals of digital media and its role in modern communication.
2. To explore various digital communication platforms and tools.
3. To develop skills for creating effective digital content for different audiences.
4. To understand the impact of digital media on society and communication practices.
5. To enhance the ability to analyze and evaluate digital media messages critically.

Course Outcomes:

1. Demonstrate understanding of digital media concepts and communication models.
2. Use digital tools to create engaging and appropriate content for various platforms.
3. Analyze the effectiveness of digital communication strategies.
4. Identify ethical and legal issues related to digital media communication.
5. Evaluate the influence of digital media on public opinion and behavior.

Unit 1: Introduction to Digital Media and Communication

This unit introduces the concept of digital media, exploring its evolution and impact on communication in the modern world. It covers the different forms of digital media, including social media, blogs, podcasts, websites, and online video platforms. The unit also discusses the role of digital communication in shaping public discourse, personal interactions, and professional practices.

Unit 2: Digital Communication Tools and Platforms

This unit focuses on the various digital tools and platforms used for communication in the digital age. It covers the functionality, features, and best practices for using social media platforms, messaging apps, email, and collaborative tools. The unit also highlights emerging digital communication technologies such as virtual reality, augmented reality, and artificial intelligence in communication.

Unit 3: Content Creation and Digital Storytelling

In this unit, students learn about creating engaging content for digital media, including text, images, audio, and video. Topics include writing for the web, designing multimedia presentations, and the principles of digital storytelling. The unit explores how to craft compelling narratives that resonate with online audiences and effectively convey messages across different digital platforms.

Unit 4: Digital Media Ethics and Online Behavior

This unit addresses the ethical considerations of digital communication. It covers topics such as privacy,

intellectual property, digital identity, and the challenges of misinformation and online security. The unit also discusses responsible online behavior, including the impact of digital media on mental health, cyberbullying, and the role of digital media in shaping societal norms and values.

Unit 5: Digital Media Strategy and Analytics

This unit focuses on the strategic use of digital media for communication purposes. It covers the planning and execution of digital media campaigns, with an emphasis on targeting specific audiences and achieving measurable outcomes. The unit also explores digital media analytics, including data collection, interpretation, and the use of analytics tools to evaluate the effectiveness of digital communication strategies.

ENGG. WORKSHOP PRACTICE

CMEN-151

Cr.	L	T	P
1	0	0	2

Sr No.	Experiment
1.	To obtain required diameters (steps) on a cylindrical work piece with the given lengths.
2.	To perform tapering and knurling operation on a cylindrical work piece of given length.
3.	To make a single v-butt joint, using the given mild steel pieces by arc welding.
4.	To make a double lap joint, using the given mild steel pieces by arc welding.
5.	To make a T-lap joint from the given reaper of size 50 x 35 x 250 mm.
6.	To make a mortise and tenon joint from the given reaper of size 50 x 35 x 250 mm.
7.	To file the given Mild Steel piece in to a square shape of 48 mm side from original dimension of 50 mm.
8.	To make V- fit from the given two MS plates after drilling and Tapping operations.
9.	To prepare a sheet metal tray using galvanized sheet.
10.	To prepare lap and single cover butt joints using sheet and rivets.

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Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

13th Meeting of BOS (Item No. 13.4 Annexure -4)

SHOBHIT UNIVERSITY GANGOH
SCHOOL OF ENGINEERING AND TECHNOLOGY
List of Examiners (2019-2020)

Sr. No.	Course code with Title	Name, Designation, Institution and Correspondence address of the Paper Setter/Examiner	Contact number with E. Mail ID
1.	CCAC-101 :C Programming Fundamentals	External Examiner	
		1. Dr. Arun Giri	arungiri123@yahoo.com, 9818809053
		2. Dr. Nidhi Tyagi 3. Dr. Maheep Singh	nidhi.tyagi9785@gmail.com, 9927007273 kingmaheep@gmail.com, 9411293327
		Internal Examiner 1. Dr. Tarun Kumar Sharma	Tarun.sharma@shobhituniversity.ac.in, 9456086759
		2. Dr. Varun Bansal	Varun.bansal@shobhituniversity.ac.in, 9411295559
2	CCAC-103:Computer System Architecture	External Examiner 1. Dr. Abahay Bhatia	dr.abhay@ritrookee.ac.in, 9837386973
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com, 97604492192
		3. Dr. Mamta	mamta.bansal345@gmail.com, 9997025606
		Internal Examiner 1. Mr. Kuldeep Chauhan	Kuldeep.chauhan@shobhituniversity.ac.in, 9756997090
		2. Mr. Vinod Kumar	Vinod.kumar@shobhituniversity.ac.in, 9758749227
3	AECC-101:Professional	External Examiner	

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

	Communication M	1. Dr. Abahay Bhatia	dr.abhay@ritrookee.ac.in, 9837386973
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com, 97604492192
		3. Dr. Mamta	mamta.bansal345@gmail.com,9997025606
		Internal Examiner 1.Dr. Varun Bansal	Varun.bansal@shobhituniversity.ac.in, 9411295559
		2.Mr. Nitin Kumar	nitin.kumar@shobhituniversity.ac.in, 9758170029
4	GCAC-101Mathematics	External Examiner 1. Dr. Abahay Bhatia	dr.abhay@ritrookee.ac.in, 9837386973
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com, 97604492192
		3. Dr. Mamta	mamta.bansal345@gmail.com,9997025606
		Internal Examiner 1. Dr. Varun Bansal	Varun.bansal@shobhituniversity.ac.in, 9411295559
		2. Mr. Kuldeep Chauhan	Kuldeep.chauhan@shobhituniversity.ac.in, 9756997090
5	GCAC-103: Computer Fundamentals	External Examiner 1. Dr. Abahay Bhatia	dr.abhay@ritrookee.ac.in, 9837386973
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com, 97604492192
		3. Dr. Mamta	mamta.bansal345@gmail.com,9997025606
		Internal Examiner 1.Dr. Varun Bansal	Varun.bansal@shobhituniversity.ac.in, 9411295559
		2.Sumika Jain	Sumika.jai@shobhituniversity.ac.in, 9456666326
6	CCAC-153: Computer System	External Examiner 1. Dr. Abahay	

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Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

	Architecture Lab	Bhatia	dr.abhay@ritrookee.ac.in, 9837386973
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com, 97604492192
		3. Dr. Mamta	mamta.bansal345@gmail.com,9997025606
		Internal Examiner 1. Dr. Tarun Kumar Sharma	Tarun.sharma@shobhituniversity.ac.in, 9456086759
		2. Mr. Vinod Kumar	Vinod.kumar@shobhituniversity.ac.in, 9758749227
7	AECC-151: Professional Communication LAB	External Examiner 1. Dr. Abahay Bhatia	dr.abhay@ritrookee.ac.in, 9837386973
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com, 97604492192
		3. Dr. Mamta	mamta.bansal345@gmail.com,9997025606
		Internal Examiner 1. Dr. Tarun Kumar Sharma	Tarun.sharma@shobhituniversity.ac.in, 9456086759
		2. Mr. Vinod Kumar	Vinod.kumar@shobhituniversity.ac.in, 9758749227
8	CCAC-201: Database Management Systems	External Examiner 1 Dr. Abahay Bhatia	dr.abhay@ritrookee.ac.in, 9837386973
		3. Dr. Ankit Sharma	gurukul.ankit@gmail.com, 97604492192
		4. Dr. Mamta	mamta.bansal345@gmail.com,9997025606
		Internal Examiner 1. Dr. Tarun Kumar Sharma	Tarun.sharma@shobhituniversity.ac.in, 9456086759
		2. Mr. Vinod Kumar	Vinod.kumar@shobhituniversity.ac.in, 9758749227
9	CCAC-203:	External Examiner	

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

	Operating Systems	1.Dr Mamta	mamta.bansal345@gmail.com 9997025606
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com, 97604492192
		3. Dr. Abahay Bhatia	dr.abhay@ritrookee.ac.in, 9837386973
		Internal Examiner 1. Ms. Sumika Jain	Sumika.jai@shobhituniversity.ac.in, 9456666326
		2. Mr. Vinod Kumar	Vinod.kumar@shobhituniversity.ac.in, 9758749227
10	CCAC-205: Computer Networks	External Examiner 1. Dr. Abahay Bhatia	dr.abhay@ritrookee.ac.in, 9837386973
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com, 97604492192
		3. Dr. Mamta	mamta.bansal345@gmail.com 9997025606
		Internal Examiner 1. Dr. Varun Bansal	Varun.bansal@shobhituniversity.ac.in, 9411295559
		2. Mr. Kuldeep Chauhan	Kuldeep.chauhan@shobhituniversity.ac.in, 9756997090
11	SCAC-201: HTML Programming	External Examiner 1. Dr. Mamta	mamta.bansal345@gmail.com 9997025606
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com, 97604492192
		3. Dr. Abahay Bhatia	dr.abhay@ritrookee.ac.in, 9837386973
		Internal Examiner 1. Mr. Nitin Kumar	nitin.kumar@shobhituniversity.ac.in, 9758170029
		2. Mr. Vinod Kumar	Vinod.kumar@shobhituniversity.ac.in, 9758749227
12	CCAC-301: Internet	External Examiner	

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EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

	Technologies	1. Dr. Ankit Sharma	gurukul.ankit@gmail.com, 97604492192
		2. Dr. Mamta	mamta.bansal345@gmail.com 9997025606
		3. Dr. Abahay Bhatia	dr.abhay@ritrookee.ac.in, 9837386973
		Internal Examiner 1. Mr. Kuldeep Chauhan	Kuldeep.chauhan@shobhituniversity.ac.in, 9756997090
		2. Mr. Nitin Kumar	nitin.kumar@shobhituniversity.ac.in, 9758170029
13	CCAC-303:Software Project Management	External Examiner 1. Dr. Abahay Bhatia	dr.abhay@ritrookee.ac.in, 9837386973
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com, 97604492192
		3. Dr. Mamta	mamta.bansal345@gmail.com 9997025606
		Internal Examiner 1. Mr. Vinod Kumar	Vinod.kumar@shobhituniversity.ac.in, 9758749227
		2. Ms. Sumika Jain	Sumika.jai@shobhituniversity.ac.in, 9456666326
14	DCAC-301: Knowledge Management	External Examiner 1. Dr. Abahay Bhatia	dr.abhay@ritrookee.ac.in, 9837386973
		2. Dr. Mamta	mamta.bansal345@gmail.com 9997025606
		3. Dr. Ankit Sharma	gurukul.ankit@gmail.com, 97604492192
		Internal Examiner 1. Mr. Kuldeep Chauhan	Kuldeep.chauhan@shobhituniversity.ac.in, 9756997090
		2. Mr. Nitin Kumar	nitin.kumar@shobhituniversity.ac.in, 9758170029
15	DCAC-303: Data	External Examiner	

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EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

	Mining	1. Dr. Mamta	mamta.bansal345@gmail.com 9997025606
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com, 97604492192
		3. Dr. Abahay Bhatia	dr.abhay@ritrookee.ac.in, 9837386973
		Internal Examiner 1. Ms. Sumika Jain	Sumika.jai@shobhituniversity.ac.in 9456666326
		2. Mr. Vinod Kumar	Vinod.kumar@shobhituniversity.ac.in 9758749227
16	DCAC-307 Digital Image Processing	External Examiner 1. Dr. Abahay Bhatia	dr.abhay@ritrookee.ac.in, 9837386973
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com, 97604492192
		3. Dr. Mamta	mamta.bansal345@gmail.com 9997025606
		Internal Examiner 3. Mr. Kuldeep Chauhan	Kuldeep.chauhan@shobhituniversity.ac.in 9756997090
		4. Mr. Nitin Kumar	nitin.kumar@shobhituniversity.ac.in 9758170029

MCA (List of Examiners)

Sr. No.	Course code with Title	Name, Designation, Institution and Correspondence address of the Paper Setter/Examiner	Contact number with E. Mail ID
1.	Java Programming (CCA 501)	External Examiner 4. Dr. Abhay Bhatia	Dr.abhay@ritroorkee.ac.in 9837386973 Dr.abhay@ritroorkee.ac.in 9837386973
		5. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		6. Dr. Mamta Singh	Mamta.bansal345@gmail.com 9997025606

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional
Area Gangoh, Distt. Saharanpur (U.P.)
247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

		Internal Examiner 3. Mr. Jitendra K. Saini	Jitendra.saini@shobhituniversity.ac.in 7669110295
		4. Mr. Shahnawaaj	Mohd.shahnawaz@shobhituniversity.ac.in 9536940100
2	C# Programming (CCA 503)	External Examiner 4. Dr. Ankit Sharma	Gurukul.ankit@gmail.com 9760492192
		5. Dr. Arun Giri	Arungiri123@yahoo.com 981880953
		6. Dr. Nidhi Tyagi	Nidhi.tyagi9785@gmail.com 9927007273
		Internal Examiner 3. Dr. Varun Bansal	Varun.bansal@shobhituniversity.ac.in 9675478559
		4. Mr. Shubham Kumar	Shubham.k@shobhituniversity.ac.in 7895408519
3	Data Communication and Networking (CCA 505)	External Examiner 1. Dr. Mamta Bansal	Mamta.bansal345@gmail.com 9997025606
		2. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		3. Dr. Abhay Bhatia	Dr.abhay@ritroorkee.ac.in 9837386973
		Internal Examiner 1. Ms. Sumika Jain	Sumika.jain@shobhituniversity.ac.in 9456666326
		2. Mr. Kuldeep Chauhan	Kuldeep.chauhan@shobhituniversity.ac.in 9756997090
4	Advanced Operating System (CCA 507)	External Examiner 1. Dr. Abhay Bhati	Dr.abhay@ritroorkee.ac.in 9837386973
		2. Dr. Ankit Sharma	Gurukul.ankit@gmail.com 9760492192
		3. Dr. Mamta Bansal	Mamta.bansal345@gmail.com 9997025606
		Internal Examiner	Sumika.jain@shobhituniversity.ac.in

Shobhit University
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Babu Vijendra Marg, Adarsh Institutional
Area Gangoh, Distt. Saharanpur (U.P.)
247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

		1. Ms. Sumika Jain	9456666326
		2. Mr. Kuldeep Chauhan	Kuldeep.chauhan@shobhituniversity.ac.in 9756997090
5	Theory of Computation (CCA 509)	External Examiner 1. Dr. Abhay Bhati	Dr.abhay@ritroorkee.ac.in 9837386973
		2. Dr. Ankit Sharma	Gurukul.ankit@gmail.com 9760492192
		3. Dr. Mamta Bansal	Mamta.bansal345@gmail.com 9997025606
		Internal Examiner 1. Ms. Sumika Jain	Sumika.jain@shobhituniversity.ac.in 9456666326
		2. Mr. Kuldeep Chauhan	Kuldeep.chauhan@shobhituniversity.ac.in 9756997090
6	Computer Based Numerical & Statistical Techniques (CCA 511)	External Examiner 1. Dr. Ankit Sharma	Gurukul.ankit@gmail.com 9760492192
		2. Dr. Arun Giri	Arungiri123@yahoo.com 981880953
		3. Dr. Nidhi Tyagi	Nidhi.tyagi9785@gmail.com 9927007273
		Internal Examiner 1. Dr. Varun Bansal	Varun.bansal@shobhituniversity.ac.in 9675478559
		2. Mr. Shubham Kumar	Shubham.k@shobhituniversity.ac.in 7895408519
7	Advanced DBMS (CCA 601)	External Examiner 1. Dr. Abhay Bhatia	Dr.abhay@ritroorkee.ac.in 9837386973
		2. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		3. Dr. Mamta Bansal	Mamta.bansal345@gmail.com 9997025606
		Internal Examiner 1. Mr. Jitendra K. Saini	Jitendra.saini@shobhituniversity.ac.in 7669110295
		2. Mr. Shahnawaaj	Mohd.shahnawaz@shobhituniversity.ac.in

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional
Area Gangoh, Distt. Saharanpur (U.P.)
247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

			9536940100
8	Advanced DAA (CCA 603)	External Examiner 1. Dr. Nidhi Tyagi	Nidhi.tyagi9785@gmail.com 9927007273
		2. Dr. Mamta Bansal	Mamta.bansal345@gmail.com 9997025606
		3. Dr. Abhay Bhatia	Dr.abhay@ritroorkee.ac.in 9837386973
		Internal Examiner 1. Mr. Jitendra K. Saini	Jitendra.saini@shobhituniversity.ac.in 7669110295
		2. Dr. Tarun Kumar Sharma	Tarun.sharma@shobhituniversity.ac.in 9456086759
9.	Expert Intelligence System (CCA 605)	External Examiner 1. Dr. Ankit Sharma	Gurukul.ankit@gmail.com 9760492192
		2. Dr. Arun Giri	Arungiri123@yahoo.com 981880953
		3. Dr. Nidhi Tyagi	Nidhi.tyagi9785@gmail.com 9927007273
		Internal Examiner 1. Dr. Varun Bansal	Varun.bansal@shobhituniversity.ac.in 9675478559
		2. Ms. Sumika Jain	Sumika.jain@shobhituniversity.ac.in 9456666326
10.	Distributed OS (CCA 607)	External Examiner 1. Dr. Mamta Bansal	Mamta.bansal345@gmail.com 9997025606
		2. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		3. Dr. Abhay Bhatia	Dr.abhay@ritroorkee.ac.in 9837386973
		Internal Examiner 1. Dr. Varun Bansal	Varun.bansal@shobhituniversity.ac.in 9675478559
		2. Ms. Sumika Jain	Sumika.jain@shobhituniversity.ac.in 9456666326
11.	Neural Network	External Examiner	Gurukul.ankit@gmail.com 9760492192

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

	(UCA 601)	1. Dr. Ankit Sharma	
		2. Dr. Arun Giri	Arungiri123@yahoo.com 981880953
		3. Dr. Nidhi Tyagi	Nidhi.tyagi9785@gmail.com 9927007273
		Internal Examiner 1. Mr. Nitin Kumar	Nitin.kumar@shobhituniversity.ac.in 9758170029
		2. Ms. Sumika Jain	Sumika.jain@shobhituniversity.ac.in 9456666326

M.Tech(List of Examiners)

Sr. No.	Course code with Title	Name, Designation, Institution and Correspondence address of the Paper Setter/Examiner	Contact number with E. Mail ID
1.	Software Engineering Methodologies CE- 501	External Examiner 7. Dr. Arun Giri	arungiri123@yahoo.com 9818809053
		8. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		9. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		Internal Examiner 1. Mr. Kuldeep Chauhan	kuldeep.chauhan@shobhituniversity.ac.in 9756997090
		2. Mr. Vinod Kumar	vinod.kumar@shobhituniversity.ac.in 9758749227
2.	Analysis and Design of Algorithms CE-503	External Examiner 7. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		8. Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

		9. Dr. Mamta Bansal	mamta.bansal345@gmail.com 9997025606
		Internal Examiner 5. Ms. Sumika Jain	sumika.jain@shobhituniversity.ac.in 9456666326
		2. Mr. Raveendra Kr. Bharati	raveendra.bharati@shobhituniversity.ac.in 9953328744
3.	Advanced Database Management Systems CE- 505	External Examiner 1. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		2. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		3. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		Internal Examiner 1. Mr. Raveendra Kr. Bharati	raveendra.bharati@shobhituniversity.ac.in 9953328744
		2. Mr. Nitin Kumar	nitin.kumar@shobhituniversity.ac.in 9758170029
4.	Computer Communication and Networks CE- 507	External Examiner 1. Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192
		2. Dr. Mamta Bansal	mamta.bansal345@gmail.com 9997025606
		3. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		Internal Examiner 1. Mr. Raveendra Kr. Bharati	anil.nishad@shobhituniversity.ac.in 8171418088
		2. Mr. Kuldeep Chauhan	kuldeep.chauhan@shobhituniversity.ac.in

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

			9756997090
5.	Fundamental of Computer Programming (Audit) CE- 509	External Examiner 1. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192
		3. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		Internal Examiner 1. Mr. Vinod Kumar	vinod.kumar@shobhituniversity.ac.in 9758749227
		2. Ms. Sumika Jain	sumika.jain@shobhituniversity.ac.in 9456666326
6.	Fundamental of Mathematics (Audit) CE- 511	External Examiner 1. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192
		3. Dr. Mamta Bansal	mamta.bansal345@gmail.com 9997025606
		Internal Examiner 1. Mr. Madhav P. Namdev	Madhav.namdev@shobhituniversity.ac.in 94572731592
		2. Mr. Raveendra Kr. Bharati	raveendra.bharati@shobhituniversity.ac.in 9953328744
7.	Algorithms Lab CE-551	External Examiner 1. Dr. Arun Giri	arungiri123@yahoo.com 9818809053
		2. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		3. Dr. Maheep Singh	kingmaheep@gmail.com

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional
Area Gangoh, Distt. Saharanpur (U.P.)
247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

			9411293327
		Internal Examiner 1. Mr. Vinod Kumar	vinod.kumar@shobhituniversity.ac.in 9758749227
		2. Mr. Raveendra Kr. Bharati	raveendra.bharati@shobhituniversity.ac.in 9953328744
8.	Seminar-I CE- 581	External Examiner 1. Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192
		2. Dr. Mamta Bansal	mamta.bansal345@gmail.com 9997025606
		3. Dr. Arun Giri	arungiri123@yahoo.com 9818809053
		Internal Examiner 1. Mr. Varun Bansal	varun.bansal@shobhituniversity.ac.in 9675478559
		2. Ms. Sumika Jain	sumika.jain@shobhituniversity.ac.in 9456666326
9	Data Mining and Warehousing CE-601	External Examiner	
		1. Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192
		2. Dr. Mamta Bansal	mamta.bansal345@gmail.com 9997025606
		3. Dr. Arun Giri	arungiri123@yahoo.com 9818809053
		Internal Examiner 1. Mr. Vinod Kumar	vinod.kumar@shobhituniversity.ac.in 9758749227
		2. Mr. Raveendra Kr.	raveendra.bharati@shobhituniversity.ac.in

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

		Bharati	9953328744
10	Internet and Web Technology CE- 603	External Examiner	
		1. Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192
		2. Dr. Mamta Bansal	mamta.bansal345@gmail.com 9997025606
		3. Dr. Arun Giri	arungiri123@yahoo.com 9818809053
		Internal Examiner 1. Mr. Varun Bansal	varun.bansal@shobhituniversity.ac.in 9675478559
		2. Ms. Sumika Jain	sumika.jain@shobhituniversity.ac.in 9456666326
11	Medical Image Processing CE- 605	External Examiner	
		1. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192
		3. Dr. Mamta Bansal	mamta.bansal345@gmail.com 9997025606
		Internal Examiner 1. Mr. Madhav P. Namdev	Madhav.namdev@shobhituniversity.ac.in 94572731592
		2. Mr. Raveendra Kr. Bharati	raveendra.bharati@shobhituniversity.ac.in 9953328744
12	Software Verification, Validation and Testing CE- 607	External Examiner	
		1. Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341. India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

		2. Dr. Mamta Bansal	mamta.bansal345@gmail.com 9997025606
		3. Dr. Arun Giri	arungiri123@yahoo.com 9818809053
		Internal Examiner 1. Ms. Sumika Jain	sumika.jain@shobhituniversity.ac.in 9456666326
		2. Mr. Raveendra Kr. Bharati	raveendra.bharati@shobhituniversity.ac.in 9953328744
13	Network Security CE-625	External Examiner	
		1. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192
		3. Dr. Mamta Bansal	mamta.bansal345@gmail.com 9997025606
		Internal Examiner 1. Mr. Vinod Kumar	vinod.kumar@shobhituniversity.ac.in 9758749227
		2. Mr. Raveendra Kr. Bharati	raveendra.bharati@shobhituniversity.ac.in 9953328744
14	Minor Project CE-671	External Examiner	
		1. Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192
		2. Dr. Mamta Bansal	mamta.bansal345@gmail.com 9997025606
		3. Dr. Arun Giri	arungiri123@yahoo.com 9818809053

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

		Internal Examiner 1. Mr. Kuldeep Chauhan	kuldeep.chauhan@shobhituniversity.ac.in 9756997090
		2. Mr. Vinod Kumar	vinod.kumar@shobhituniversity.ac.in 9758749227
B.tech CSE (Examiner)			
Sr. No.	Course code with Title	Name, Designation, Institution and Correspondence address of the Paper Setter/Examiner	Contact number with E. Mail ID
1.	MATHEMATICS-I (CMAN 101)	External Examiner 10. Dr. Arun Giri	arungiri123@yahoo.com 9818809053
		11. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		12. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		Internal Examiner 5. Mr. Raveendra Kr. Bharati	raveendra.bharati@shobhituniversity.ac.in 9953328744
		6. Mr. Abdulla Khan	abdulla.khan@shobhituniversity.ac.in 7454976780
2.	ENGINEERING MECHANICS (CMEN 101)	External Examiner 10. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		11. Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192
		12. Dr. Mamta Bansal	mamta.bansal345@gmail.com 9997025606

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

		Internal Examiner 1. Mr. Shoyab Hussain	shoyab.hussain@shobhituniversity.ac.in 9837446390
		2. Mr. Anil Kumar Joshi	anil.joshi@shobhituniversity.ac.in 9690758787
3.	FUNDAMENTALS OF ELECTRONICS (CECN 101)	External Examiner 4. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		5. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		6. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		Internal Examiner 1. Dr. Jasvir Singh Rana	jasvirsingh.rana@shobhituniversity.ac.in 9759233859
		2. Mr. Hamid Ali	hamid.ali@shobhituniversity.ac.in 9759302770
4.	ENGINEERING CHEMISTRY AND ENVIRONMENTAL (CESN 101)	External Examiner 1. Dr. Arun Giri	arungiri123@yahoo.com 9818809053
		2. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		3. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		Internal Examiner 1. Mr. Y.P Malik	yp.malik@shobhituniversity.ac.in 8650145236
		2. Ms. Abhilasha R. Goel	abhilasha.goel@shobhituniversity.ac.in 6396705043

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional
Area Gangoh, Distt. Saharanpur (U.P.)
247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

5.	PRESENTATION AND COMMUNICATION SKILLS (CPCN 101)	External Examiner 1. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192
		3. Dr. Mamta Bansal	mamta.bansal345@gmail.com 9997025606
		Internal Examiner 1. Ms. Abhilasha R. Goel	abhilasha.goel@shobhituniversity.ac.in 6396705043
		2. Ms. Sumika Jain	sumika.jain@shobhituniversity.ac.in 9456666326
6.	ENGINEERING WORKSHOP PRACTICE (CMEN 151)	External Examiner 7. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		8. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		9. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		Internal Examiner 1. Mr. Shoyab Hussain	shoyab.hussain@shobhituniversity.ac.in 9837446390
		2. Mr. Anil Kumar Joshi	anil.joshi@shobhituniversity.ac.in 9690758787
7.	ENGINEERING GRAPHICS LAB (CMEN 153)	External Examiner 1. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

			9760492192
		3. Dr. Mamta Bansal	mamta.bansal345@gmail.com 9997025606
		Internal Examiner 1. Dr. Jasvir Singh Rana	jasvirsingh.rana@shobhituniversity.ac.in 9759233859
		2. Mr. Hamid Ali	hamid.ali@shobhituniversity.ac.in 9759302770
8.	COMMUNICATION LAB (CPCN 151)	External Examiner 1. Dr. Arun Giri	arungiri123@yahoo.com 9818809053
		2. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		3. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		Internal Examiner 1. Dr. Shri Kant Gupta	shrikant.gupta@shobhituniversity.ac.in 8279909590
		2. Mr. Varun Bansal	varun.bansal@shobhituniversity.ac.in 9675478559
9.	DATA STRUCTURE USING 'C' (CCSN 201)	External Examiner 1. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		2. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		3. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

		Internal Examiner 1. Mr. Varun Bansal	varun.bansal@shobhituniversity.ac.in 9675478559
		2. Ms. Sumika Jain	sumika.jain@shobhituniversity.ac.in 9456666326
10.	DBMS (CCSN 203)	External Examiner 1. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192
		3. Dr. Mamta Bansal	mamta.bansal345@gmail.com 9997025606
		Internal Examiner 1. Dr. Tarun Kumar Sharma	tarun.sharma@shobhituniversity.ac.in 9456086759
		2. Mr. Nitin Kumar	nitin.kumar@shobhituniversity.ac.in 9758170029
11.	OPERATING SYSTEMS (UNIX PROGRAMMING) (CCSN 205)	External Examiner 1. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		2. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		3. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		Internal Examiner 1. Ms. Sumika Jain	sumika.jain@shobhituniversity.ac.in 9456666326
		2. Mr. Nitin Kumar	nitin.kumar@shobhituniversity.ac.in 9758170029

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

12.	JAVA PROGRAMMING (CCSN 207)	External Examiner 1. Dr. Arun Giri	arungiri123@yahoo.com 9818809053
		2. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		3. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		Internal Examiner 1. Mr. Vinod Kumar	vinod.kumar@shobhituniversity.ac.in 9758749227
		2. Mr. Varun Bansal	varun.bansal@shobhituniversity.ac.in 9675478559
13.	DISCRETE MATHEMATICS (CCSN 209)	External Examiner 1. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192
		3. Dr. Mamta Bansal	mamta.bansal345@gmail.com 9997025606
		Internal Examiner 1. Dr. Vishvas Chand	vishvas.chand@shobhituniversity.ac.in 9286093196
		2. Ms. Abhilasha R. Goel	abhilasha.goel@shobhituniversity.ac.in 6396705043
14.	VALUE EDUCATION, HUMAN RIGHTS ANDLEGISLATIVE PROCEDURES	External Examiner 1. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		2. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

	(CBSN 201)	3. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		Internal Examiner 1. Dr. Shri Kant Gupta	shrikant.gupta@shobhituniversity.ac.in 8279909590
		2. Ms. Taruna Pahuja	
15.	DATA STRUCTURE USING 'C' LAB (CCSN 251)	External Examiner 1. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		2. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		3. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		Internal Examiner 1. Mr. Varun Bansal	varun.bansal@shobhituniversity.ac.in 9675478559
		2. Ms. Sumika Jain	sumika.jain@shobhituniversity.ac.in 9456666326
16.	DBMS LAB (CCSN 253)	External Examiner 1. Dr. Arun Giri	arungiri123@yahoo.com 9818809053
		2. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		3. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		Internal Examiner 1. Dr. Tarun Kumar Sharma	tarun.sharma@shobhituniversity.ac.in 9456086759

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

		2. Mr. Nitin Kumar	nitin.kumar@shobhituniversity.ac.in 9758170029
17.	JAVA PROGRAMMING LAB (CCSN 255)	External Examiner 1. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		2. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		3. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		Internal Examiner 1. Mr. Vinod Kumar	vinod.kumar@shobhituniversity.ac.in 9758749227
		2. Mr. Varun Bansal	varun.bansal@shobhituniversity.ac.in 9675478559
18.	SOFTWARE ENGINEERING (CCSN 301)	External Examiner 1. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		2. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		3. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		Internal Examiner 1. Dr. Tarun Kumar Sharma	tarun.sharma@shobhituniversity.ac.in 9456086759
		2. Mr. Varun Bansal	varun.bansal@shobhituniversity.ac.in 9675478559
19.	COMPILER DESIGN	External Examiner 4. Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

	(CCSN 303)	5. Dr. Mamta Bansal	mamta.bansal345@gmail.com 9997025606
		6. Dr. Arun Giri	arungiri123@yahoo.com 9818809053
		Internal Examiner 1. Mr. Varun Bansal	varun.bansal@shobhituniversity.ac.in 9675478559
		2. Mr. Nitin Kumar	nitin.kumar@shobhituniversity.ac.in 9758170029
20.	OBJECT ORIENTED ANALYSIS AND DESIGN (CCSN 305)	External Examiner 1. Dr. Arun Giri	arungiri123@yahoo.com 9818809053
		2. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		3. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		Internal Examiner 1. Mr. Vinod Kumar	vinod.kumar@shobhituniversity.ac.in 9758749227
		2. Ms. Sumika Jain	sumika.jain@shobhituniversity.ac.in 9456666326
21.	CRYPTOGRAPHY & INFORMATION SECURITY (CCSN 307)	External Examiner 1. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		2. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		3. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional
Area Gangoh, Distt. Saharanpur (U.P.)
247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

		Internal Examiner 1. Ms. Sumika Jain	sumika.jain@shobhituniversity.ac.in 9456666326
		2. Mr. Kuldeep Chauhan	kuldeep.chauhan@shobhituniversity.ac.in 9756997090
22.	CLOUD COMPUTING (CUCS 345)	External Examiner 1. Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192
		2. Dr. Mamta Bansal	mamta.bansal345@gmail.com 9997025606
		3. Dr. Arun Giri	arungiri123@yahoo.com 9818809053
		Internal Examiner 1. Dr. Tarun Kumar Sharma	tarun.sharma@shobhituniversity.ac.in 9456086759
		2. Mr. Varun Bansal	varun.bansal@shobhituniversity.ac.in 9675478559
23.	ENERGY STUDIES (CBSN 301)	External Examiner 1.Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		2.Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192
		3. Dr. Mamta Bansal	mamta.bansal345@gmail.com 9997025606
		Internal Examiner 1. Dr. Mahipal Singh	registrargangh@shobhituniversity.ac.in 9759174581
		2. Dr. Shri Kant Gupta	shrikant.gupta@shobhituniversity.ac.in 8279909590

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

24.	SOFTWARE ENGINEERING LAB (CCSN 351	External Examiner 1. Dr. Arun Giri	arungiri123@yahoo.com 9818809053
		2. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		3. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		Internal Examiner 1. Dr. Tarun Kumar Sharma	tarun.sharma@shobhituniversity.ac.in 9456086759
		2. Mr. Varun Bansal	varun.bansal@shobhituniversity.ac.in 9675478559
25.	COMPILER DESIGN LAB (CCSN 353)	External Examiner 1. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		2. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		3. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		Internal Examiner 1. Mr. Varun Bansal	varun.bansal@shobhituniversity.ac.in 9675478559
		2. Mr. Nitin Kumar	nitin.kumar@shobhituniversity.ac.in 9758170029
26.	OBJECT ORIENTED ANALYSIS AND DESIGN LAB (CCSN 355)	External Examiner 1. Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192
		2. Dr. Mamta Bansal	mamta.bansal345@gmail.com 9997025606

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional
Area Gangoh, Distt. Saharanpur (U.P.)
247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

		3. Dr. Arun Giri	arungiri123@yahoo.com 9818809053
		Internal Examiner 1. Mr. Vinod Kumar	vinod.kumar@shobhituniversity.ac.in 9758749227
		2. Ms. Sumika Jain	sumika.jain@shobhituniversity.ac.in 9456666326
27.	ARTIFICIAL INTELLIGENCE (CCSN 401)	External Examiner 1. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192
		3. Dr. Mamta Bansal	mamta.bansal345@gmail.com 9997025606
		Internal Examiner 1. Ms. Sumika Jain	sumika.jain@shobhituniversity.ac.in 9456666326
		2. Mr. Anil Kumar	anil.joshi@shobhituniversity.ac.in 9690758787
28.	DISTRIBUTED COMPUTING SYSTEMS (CCSN 403)	External Examiner 1. Dr. Arun Giri	arungiri123@yahoo.com 9818809053
		2. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		3. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		Internal Examiner 1. Mr. Nitin Kumar	nitin.kumar@shobhituniversity.ac.in 9758170029

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

		2. Mr. Kuldeep Chauhan	kuldeep.chauhan@shobhituniversity.ac.in 9756997090
29.	ADVANCED COMPUTER SYSTEM ARCHITECTURE (CCSN 405)	External Examiner 1. Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192
		2. Dr. Mamta Bansal	mamta.bansal345@gmail.com 9997025606
		3. Dr. Arun Giri	arungiri123@yahoo.com 9818809053
		Internal Examiner 1. Mohd Ahamad	mohd.ahamad@shobhituniversity.ac.in 9548159750
		2. Mr. Hamid Ali	hamid.ali@shobhituniversity.ac.in 9759302770
30.	PYTHON (CCSN 415)	External Examiner 1. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		2. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		3. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		Internal Examiner 1. Mr. Vinod Kumar	vinod.kumar@shobhituniversity.ac.in 9758749227
		2. Mr. Kuldeep Chauhan	kuldeep.chauhan@shobhituniversity.ac.in 9756997090
31.	COMPUTER BASED NUMERICAL &	External Examiner 1. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

	STATISTICAL TECHNIQUES (CUCS 447)	2. Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192
		3. Dr. Mamta Bansal	mamta.bansal345@gmail.com 9997025606
		Internal Examiner 1. Mr. Abdulla Khan	abdulla.khan@shobhituniversity.ac.in 7454976780
		2. Mr. Raveendra Kr. Bharati	raveendra.bharati@shobhituniversity.ac.in 9953328744
32.	LAW FOR ENGINEERS (CBSN 401)	External Examiner 1. Dr. Arun Giri	arungiri123@yahoo.com 9818809053
		2. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		3. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		Internal Examiner 1. Mr. Kuldeep Chauhan	kuldeep.chauhan@shobhituniversity.ac.in 9756997090
		2. Mr. Mahendra Kumar	mahendra.kumar@shobhituniversity.ac.in 9458432303
33.	ARTIFICIAL INTELLIGENCE LAB (CCSN 451)	External Examiner 1. Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192
		2. Dr. Mamta Bansal	mamta.bansal345@gmail.com 9997025606
		3. Dr. Arun Giri	arungiri123@yahoo.com 9818809053

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

		Internal Examiner 1. Ms. Sumika Jain	sumika.jain@shobhituniversity.ac.in 9456666326
		2. Mr. Anil Kumar	anil.joshi@shobhituniversity.ac.in 9690758787
34.	DISTRIBUTED COMPUTING SYSTEMS LAB (CCSN 453)	External Examiner 1. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192
		3. Dr. Mamta Bansal	mamta.bansal345@gmail.com 9997025606
		Internal Examiner 1. Mr. Nitin Kumar	nitin.kumar@shobhituniversity.ac.in 9758170029
		2. Mr. Kuldeep Chauhan	kuldeep.chauhan@shobhituniversity.ac.in 9756997090
35.	SEMINAR & GROUP DISCUSSION (CCSN 481)	External Examiner 1. Dr. Arun Giri	arungiri123@yahoo.com 9818809053
		2. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		3. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		Internal Examiner 1. Dr. Tarun Kumar Sharma	tarun.sharma@shobhituniversity.ac.in 9456086759
		2. Dr. Mahipal Singh	registrargangh@shobhituniversity.ac.in 9759174581

Shobhit University
EDUCATION EMPOWERS

Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U : www.sug.ac.in

SHOBHIT UNIVERSITY GANGOH
School of Engineering and Technology

Date: 18/12/2019

NOTICE

Subject: Meeting of the Board of Studies

All members of the Board of Studies are hereby informed that a meeting will be held as per the following details:

Date: 30/12/2019
Time: 11.00 AM
Venue: "meet.google.com/ljg-fdjh-dey"

Agenda:

1. Confirmation of minutes of the previous meeting
2. New Interdisciplinary courses to be added in BCA, MCA and B.Tech 2nd Sem.
3. Analysis of the Students' feedback & Action taken report and Analysis of the feedback on curriculum from stakeholders
4. Approval of Examiners (Theory & Practical) and Paper Setters for the even semester courses in BCA, MCA, B.Tech for session **Jan. to June. 2020.**
5. Discussion on the value Added courses offered for students and ratification of the same.
6. Any other matter with the permission of the Chair

All members are requested to make it convenient to attend the meeting and come prepared with relevant documents and suggestions.

Prof. (Dr.) Shri Kant Gupta
Chairperson, Board of Studies
Head of the Department
18/12/2019

Shobhit University
EDUCATION EMPOWERS

Babu Vijendra Marg, Adarsh Institutional
Area Gangoh, Distt. Saharanpur (U.P.)
247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.su.ac.in

SHOBHIT UNIVERSITY GANGOH
School of Engineering and Technology

Date: 18/12/2019

To
Dr. Anil Lamba
Professor and Head
School of Computer Science and Application
Geeta University

Subject: Invitation to Attend the Board of Studies Meeting

Dear Sir

Greetings from School of Engineering and Technology

We are pleased to invite you to participate as an external subject expert in the upcoming meeting of the Board of Studies for the School of Engineering and Technology, scheduled as follows:

Date: 30/12/2019
Time: 11.00 AM
Mode: Online Mode ("meet.google.com/ljg-fdjh-dey")

The meeting will deliberate on important academic matters including syllabus revision, new course proposals, and academic planning for the upcoming session. Your expert insights and contributions would be invaluable to the academic enrichment of our programs.

We request you to kindly confirm your availability and mode of attendance at your earliest convenience. For online participation, a meeting link will be shared upon confirmation. If attending in person, necessary hospitality arrangements will be made.

We look forward to your positive response and support.

Thank you.

Warm regards,

Prof. (Dr.) Shri Kant Gupta
Chairperson, Board of Studies

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: reg.srrgangoh@shobhituniversity.ac.in
U : www.s

SHOBHIT UNIVERSITY GANGOH
School of Engineering and Technology

Date: 18/12/2019

To
Dr. Amit Goyal
Professor and Head
School of Computer Science and Engineering
Chandigarh University

Subject: Invitation to Attend the Board of Studies Meeting

Dear Sir

Greetings from School of Engineering and Technology

We are pleased to invite you to participate as an external subject expert in the upcoming meeting of the Board of Studies for the School of Engineering and Technology, scheduled as follows:

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We look forward to your positive response and support.

Thank you.

Warm regards,

Prof. (Dr.) Shri Kant Gupta
Chairperson, Board of Studies

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional
Area Gangoh, Distt. Saharanpur (U.P.)
247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

School of Engineering and Technology

Date: 30.12.2019

Minutes of the Meeting of Board of Studies

14th meeting of the Board of Studies of School of Engineering and Technology, Shobhit University Gangoh was organized on 30th Dec. 2019 at 11:00 am online through Google meet. The following members were present in the meeting:

1.	Prof.(Dr.) Shri Kant Gupta Head of the Department (Computer Science and Engineering) Shobhit University Gangoh	Chairperson
2.	Prof.(Dr.) Anil Lamba Professor and Head School of Computer Science and Application Geeta University	External expert
3.	Dr. Amit Goyal Professor and Head School of Computer Science and Engineering Chandigarh University	External Expert
4.	Prof. D K Kaushik Professor School of Engineering and Technology Shobhit University Gangoh	Member
5.	Mr. Anil Kumar Assistant Professor School of Engineering and Technology Shobhit University Gangoh	Member

Welcome address by Chairman
The Chairman extended a warm welcome to all the members of Board of Studies and the following information was tabled before the members of the Board of Studies:
Input given by the Subject Experts on the Scheme and syllabi of the ongoing Batches.

The following discussed and approved on Choice Based Credit System:

Item BOS 14.1: Approval of the Minutes of the 13th BOS Meeting held on 25 June 2019
Was circulated among the members and the same were notified after the approval of the Board of Studies. {Annexure- 1}

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
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E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

Item BOS 14.2: New Interdisciplinary Courses to be added in BCA, MCA, and B. Tech 2nd Sem. {Annexure-2}

- **Approval of the syllabus of AECC-104 D , GCAC-108 D, CCAC-158 D in BCA 2nd Sem.**
- **Approval of the Syllabus of CCA-506 D in MCA 4th Sem.**
- **Approval of the Syllabus of CMAN-102 D, CEEN-102 D , CPHN-152 D Probability and Statistics, and Classical Mechanics in B. Tech 2nd Sem.**

Item BOS 14.3:Analysis of Students' feedback & Action taken report:

- BOS Chairman has expressed that the student feedback and action taken report process is done at the end of semester. The BOS members noted the same.

Item BOS 14.4: Analysis of the feedback on curriculum from stakeholders:

- The BOS chairman presented the analysis report of stakeholders' feedback on curriculum. The BOS members noted the same and advised to incorporate the suggestions as per the feasibility. The Action Taken Report is enclosed herewith. {Annexure-3}

Item BOS 14.5: Approval of Examiners (Theory & Practical) and Paper Setters for the even semester courses in BCA, MCA, and B.Tech for session **Jan. to June 2020** . The same is being sent to the Controller of Examinations, Shobhit University Gangoh, in a sealed cover. {Annexure-4}

Item BOS 14.6: Discussion on the Value Added courses offered for students and ratification of the same.

- BOS members approved the list of Value added courses offered to students.

The meeting ended with a vote of thanks to the Chairman, Board of Studies.
The suggestions given by the panel of BOS have been discussed with the Vice Chancellor and Dean Academics. The action taken on the suggestions has been approved by competent authorities.

Signed by:

(Chairman, BOS)

(Vice Chancellor)

(Dean Academics)

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.. www.sug.ac.in

Meeting of BOS (Item No. 14.1 Annexure - 1
School of Engineering and Technology

Minutes of the Meeting of Board of Studies **Date: 25.06.2019**

13th meeting of the Board of Studies of the School of Engineering and Technology, Shobhit University Gangoh was organized on 25th June 2019 at 10:00 am online through Google meet. The following members were present in the meeting:

1. Prof.(Dr.) Shri Kant Gupta
   Head of the Department
   (Computer Science and Engineering)
   Shobhit University Gangoh — Chairperson
2. Prof.(Dr.) Anil Lamba
   Professor and Head
   School of Computer Science and Application
   Geeta University — External expert
3. Dr. Amit Goyal
   Professor and Head
   School of Computer Science and Engineering
   Chandigarh University — External Expert
4. Prof. D K Kaushik
   Professor
   School of Engineering and Technology
   Shobhit University Gangoh — Member
5. Mr. Anil Kumar
   Assistant Professor
   School of Engineering and Technology
   Shobhit University Gangoh — Member

Welcome address by Chairman
The Chairman extended a warm welcome to all the members of Board of Studies and the following information was tabled before the members of the Board of Studies:
Input given by the Subject Experts on the Scheme and syllabi of the ongoing Batches.

The following discussed and approved on Choice Based Credit System:

Item BOS 13.1: Approval of the Minutes of the 12th BOS Meeting held on 24 Dec, 2018 was circulated among the members and the same were notified after the approval of the Board of Studies. {Annexure- 1}

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: re
U: www.su.ac.in

Item BOS 13.2: Approval of Revision in Syllabus of the courses in (1st, 2nd & 3rd semester) Master of Technology (Computer Engineering) w. e. f. 2019-20 academic Session

- **BOS members approved Syllabus of the courses: CE-503, CE-505, CE-502, CE-506, CE-603 & CE-625 {Annexure-2}**

Item BOS 13.3: New Interdisciplinary Courses to be added in BCA, MCA, M. Tech and B. Tech 1st Sem. {Annexure-3}

- **BOS members approved syllabus of AECC-101D, AECC-151 D, GCAC-101E in BCA 1st Sem.**
- **BOS members approved syllabus of CCA 511 D Theory in MCA 3rd Sem.**
- **BOS members approved syllabus of CE-511A, CE-511B & CE-511C.**
- **BOS members approved syllabus of CMAN 101 D, CMEN 101 D, CESN-101 D, CPCN-101 D Theory in B. Tech 1st Sem.**

Item BOS 13.4: Approval of Examiners (Theory & Practical) and Paper Setters for the odd semester courses in BCA, MCA, B. Tech and M. Tech for session **July to Dec. 2019** . The same is being sent to the Controller of Examinations, Shobhit University Gangoh, in a sealed cover. {Annexure-4}

Item BOS 13.5: Discussion on the Value Added courses offered for students and ratification of the same

- BOS members approved the list of Value added courses offered to students.

The meeting ended with a vote of thanks to the Chairman, Board of Studies.

The suggestions given by the panel of BOS have been discussed with the Vice Chancellor and Dean Academics. The action taken on the suggestions has been approved by competent authorities.

Signed by:

SHOBHIT UNIVERSITY ★ 247341 ★
(Chairman BOS)

SHOBHIT UNIVERSITY ★ GANGOH ★ 247341 ★
(Vice Chancellor)

SHOBHIT UNIVERSITY ★ 247341 ★
(Dean Academics)

14th Meeting of BOS (Item No. 14.2 Annexure -2)

Shobhit University

EDUCATION EMPOWERS

Shobhit University, Gangoh

(Established by UP Shobhit University Act No. 3, 2012)

School of School of Engineering and Technology

Ordinances, Regulations & Syllabus

For

Bachelor of Computer Application (BCA) Three Year Programme

Semester System

(w.e.f. session 2013-14)

Approved and adopted in the year 2016 (7th Meeting, Board of Studies)

II Semester

Course Types	Subject Code and Title	L	P	Total	Cr.
Core Course	CCAC-102:Java Programming	4			4
	CCAC 104: Data Structures	4			4
Ability Enhancement Compulsory Course	AECC-104 Environmental Science AECC-104 A- Life Skills AECC-104 B- Moral values and Ethics AECC-104 C – Leadership and managerial Skills AECC-104 D - Enterpreneurships	4			2
Generic Elective	GCAC 106: Digital Electronics	4			4
	GCAC:108:Business Communication II GCAC:108A: Personality Development- II GCAC:108 B: Behaviour Skill- II GCAC:108 C: language Proficiency and English II GCAC:108 D:Public Speaking and Presentation II				
Practical	CCAC 152:Java Programming Lab		2		1
	CCAC 154: Data Structures Lab		2		1
	CCAC 156: Digital Electronics Lab		2		1
	CCAC 158: Business Communication Lab CCAC 158 A: Personality Development- II CCAC 158 B: Behaviour Skill- II CCAC 158 C: language Proficiency and English II CCAC 158 D:Public Speaking and Presentation II				
	Total Credits (4 Theory +3 Lab)	16	6	22	17

Entrepreneurships

AECC-104 D

L	T	P	Cr
4	0	0	4

Course Objectives:

1. To introduce the fundamental concepts and principles of entrepreneurship.
2. To develop skills for identifying and evaluating business opportunities.
3. To explore the processes involved in starting and managing a new venture.
4. To understand the role of innovation and creativity in entrepreneurship.
5. To build awareness of financial, marketing, and operational aspects of running a business.

Course Outcomes:

1. Explain the key concepts and characteristics of successful entrepreneurship.
2. Identify viable business opportunities and conduct market analysis.
3. Develop a comprehensive business plan for a startup venture.
4. Apply creative problem-solving and innovation in entrepreneurial activities.
5. Manage essential functions such as finance, marketing, and operations in new businesses.

Unit 1 introduces the concept of entrepreneurship, exploring the characteristics of entrepreneurs, types of entrepreneurship, and its impact on economic development.

Unit 2 focuses on creativity, innovation, and opportunity recognition, teaching how to generate and evaluate business ideas effectively.

Unit 3 covers the essentials of starting a new business, including business planning, legal considerations, and resource acquisition.

Unit 4 addresses the management of entrepreneurial ventures, emphasizing marketing, financial management, and operational strategies.

Unit 5 highlights the challenges faced by entrepreneurs, growth strategies, and the support systems available such as government schemes, funding options, and incubation centers.

GCAC-108 D **Public Speaking and Presentation II**

L	T	P	Cr
4	0	0	4

Course Objectives:

1. To refine advanced public speaking techniques for greater effectiveness.
2. To cultivate skills in persuasive and motivational speaking.
3. To enhance the ability to design and use multimedia and visual aids.
4. To prepare students to handle challenging speaking scenarios with confidence.
5. To develop competence in delivering presentations across various professional environments.

Course Outcomes:

1. Exhibit improved clarity, expression, and confidence in public speaking.
2. Create and deliver compelling persuasive presentations.
3. Utilize multimedia and visual aids effectively to support communication.
4. Manage audience interactions, including handling questions and overcoming anxiety.
5. Deliver polished presentations suited for academic, corporate, and digital platforms.

Unit 1 revisits the fundamentals of public speaking, focusing on advanced techniques to improve speech clarity, voice modulation, and body language for effective communication.

Unit 2 explores the art of persuasive speaking, teaching strategies to influence and motivate audiences through well-structured arguments and emotional appeal.

Unit 3 delves into the use of visual aids and multimedia tools, guiding students on how to enhance presentations with technology to engage audiences better.

Unit 4 emphasizes handling challenging speaking situations, including managing stage fright, answering tough questions, and facilitating interactive discussions.

Unit 5 focuses on delivering professional presentations in various contexts such as business, academic, and virtual environments, preparing students to communicate confidently and effectively across diverse settings.

Public Speaking and Presentation II

CCAC 158 D

L	T	P	Cr
4	0	0	4

Course Objectives:

1. To advance students' public speaking skills with emphasis on clarity, confidence, and engagement.
2. To develop persuasive speaking techniques that effectively influence audiences.
3. To train students in the use of multimedia and visual aids to enhance presentations.
4. To equip students with strategies to manage stage fright and difficult audience interactions.
5. To prepare students for delivering professional and impactful presentations in diverse settings.

Course Outcomes:

1. Demonstrate enhanced vocal delivery and body language in public speaking.
2. Construct and present persuasive speeches tailored to specific audiences.
3. Integrate appropriate multimedia tools and visual aids into presentations effectively.
4. Handle challenging questions and manage speaking anxiety with confidence.
5. Deliver professional presentations suitable for academic, business, and virtual environments.
6. Practice delivering impromptu speeches on random topics to build spontaneity and confidence.
7. Prepare and present a persuasive speech aimed at convincing the audience on a social issue.
8. Design and deliver a presentation using PowerPoint or other multimedia tools to support key points.
9. Conduct a group presentation on a current event, focusing on coordination and effective communication.
10. Practice handling Q&A sessions after presentations, responding to audience questions confidently.
11. Record and review speeches to analyze vocal tone, body language, and overall presentation style.
12. Perform a role-play exercise simulating a professional business presentation.
13. Use storytelling techniques to create engaging and memorable presentations.
14. Conduct a mock debate to develop argumentation and rebuttal skills.
15. Practice techniques to manage public speaking anxiety, including breathing exercises and relaxation methods.

IV semester

Code	Course Title	Cr.	L	T	P
CCA 502	Network Security & Cryptography	4	3	1	0
CCA 504	Compiler Design	4	3	1	0
CCA 506 CCA 506 A CCA 506 B CCA 506 C CCA 506 D	Knowledge Management & Expert System Information Systems Management Enterprise Resource Planning Information Security Management Business Process Management	4	3	1	0
CCA XXX	PROFESSIONAL ELECTIVE-II	4	3	1	0
UCA XXX	OPEN ELECTIVE-I	4	3	1	0
CCA 552	Network Security & Cryptography Lab	2	0	0	4
CCA 554	Compiler Design Lab	2	0	0	4
	Total	24	15	5	8

PROFESSIONAL ELECTIVE-II

1. CCA 508 System Programming
2. CCA 510 Mobile Computing
3. CCA 512 Computer Graphics

OPEN ELECTIVE-I

1. UCA 502 Computing & Its Application
2. UCA 504 Management Information System
3. UCA 506 Software Project Management

CCA-506 D

Business Process Management

L	T	P	Cr
3	1	0	4

Course Objectives:

1. To introduce the fundamental concepts and importance of Business Process Management (BPM).
2. To explore techniques for modeling, analyzing, and improving business processes.
3. To develop skills in using BPM tools and software for process automation.
4. To understand the role of BPM in organizational efficiency and competitiveness.
5. To examine case studies illustrating successful BPM implementations and challenges.

Course Outcomes:

1. Explain key principles and components of Business Process Management.
2. Model and analyze business processes using standard BPM techniques and tools.
3. Identify opportunities for process improvement and redesign.
4. Apply BPM software tools to automate and monitor business processes.
5. Evaluate the impact of BPM initiatives on organizational performance and decision-making.

Unit 1 introduces the fundamentals of Business Process Management, covering the definition, significance, and components of BPM in modern organizations.

Unit 2 focuses on process modeling techniques, teaching students how to represent business processes using tools like flowcharts and BPMN (Business Process Model and Notation).

Unit 3 covers process analysis and redesign methods aimed at identifying inefficiencies and improving process performance.

Unit 4 explores the implementation of BPM through automation, including the use of BPM software and workflow management systems.

Unit 5 discusses the measurement and monitoring of business processes, highlighting performance metrics, continuous improvement, and real-world case studies demonstrating successful BPM initiatives.

TEACHING SCHEME OF B.TECH. 1ST YEAR (2ND SEMESTER)

CODE	SUBJECT	CREDIT	L	T	P
CMAN-102 CMAN-102 A CMAN-102 B CMAN-102 C CMAN-102 D	MATHEMATICS-II STATISTICAL TECHNIQUES IN COMPUTER SCIENCE II MATHEMATICAL FOUNDATION OF COMPUTER SCIENCE II APPLIED MATHEMATICS II ADVANCED APPLIED MATHEMATICS II	4	3	1	0
CPHN -102 CPHN -102 A CPHN -102 B CPHN -102 C CPHN -102 D	ENGINEERING PHYSICS INTRODUCTION TO ENGINEERING PHYSICS ELECTROMAGNETISM MATERIALS SCIENCE AND ENGINEERING WAVES AND VIBRATIONS	4	3	1	0
CCSN-102	COMPUTER FUNDAMENTALS AND PROGRAMMING USING-C	4	3	1	0
CEEN-102 CEEN-102 A CEEN-102 B CEEN-102 C CEEN-102 D	BASICS OF ELECTRICAL ENGINEERING INTRODUCTION TO ELECTRICAL ENGINEERING ELECTRICAL MACHINES ELECTRICAL MEASUREMENTS AND INSTRUMENTATION TRANSMISSION AND DISTRIBUTION SYSTEMS	4	3	1	0
CPCN-102 CPCN-102 A CPCN-102 B CPCN-102 C CPCN-102 D	TECHNICAL COMMUNICATION INTRODUCTION TO TECHNICAL COMMUNICATION TECHNICAL DOCUMENTATION TECHNICAL EDITING AND PROOFREADING TECHNICAL RESEARCH AND ANALYSIS	3	3	0	0
CPHN-152 CPHN-152A CPHN-152B CPHN-152C CPHN-152D	ENGINEERING PHYSICS LAB INTRODUCTION TO ENGINEERING PHYSICS LAB ELECTROMAGNETISM LAB MATERIALS SCIENCE AND ENGINEERING LAB WAVES AND VIBRATIONS LAB	1	0	0	2
CCSN-152	COMPUTER PROGRAMMING USING C LAB	1	0	0	2
CEEN-152 CEEN-152A CEEN-152B CEEN-152C CEEN-152D	BASIC ELECTRICAL ENGINEERING LAB INTRODUCTION TO ELECTRICAL ENGINEERING LAB ELECTRICAL MACHINES LAB ELECTRICAL MEASUREMENTS AND INSTRUMENTATION LAB TRANSMISSION AND DISTRIBUTION SYSTEMS LAB	1	0	0	2
TOTAL		22	15	4	6

ADVANCED APPLIED MATHEMATICS II

CMAN-102 D

L	T	P	Cr
3	1	0	4

Course Objectives:

1. To deepen understanding of advanced mathematical concepts relevant to engineering and sciences.
2. To introduce advanced techniques in differential equations and their applications.
3. To explore topics in complex analysis and transform methods.
4. To develop skills in solving problems using numerical methods and applied linear algebra.
5. To enhance the ability to model and analyze real-world systems using advanced mathematical tools.

Course Outcomes:

1. Solve higher-order differential equations and apply them to engineering problems.
2. Apply complex analysis concepts such as contour integration and analytic functions.
3. Use Laplace and Fourier transforms for solving differential equations and signal analysis.
4. Implement numerical methods for approximating solutions to mathematical problems.
5. Demonstrate proficiency in applying advanced mathematical techniques to model and solve applied science problems.

Unit 1: Advanced Linear Algebra and Matrix Theory

This unit covers advanced topics in linear algebra, focusing on the theory and application of vector spaces, linear transformations, and advanced matrix techniques. Topics include spectral theory, the Jordan canonical form, singular value decomposition, and applications to solving large systems of equations. The unit also explores the use of matrix factorizations in computational methods and their importance in numerical analysis.

Unit 2: Advanced Ordinary Differential Equations

Focusing on higher-order ordinary differential equations, this unit examines methods for solving linear and nonlinear differential equations, including series solutions and special functions. Topics include boundary value problems, Sturm-Liouville theory, and the use of Green's functions in solving linear differential equations. The unit also discusses stability analysis, perturbation methods, and applications to mechanical and electrical systems.

Unit 3: Partial Differential Equations and Fourier Analysis

This unit introduces advanced techniques for solving partial differential equations, including the method of separation of variables, the Fourier transform, and the Laplace transform. Topics include

the wave equation, heat equation, and Poisson's equation, along with their applications in physics and engineering. The unit also covers Fourier series and Fourier transforms, with an emphasis on their role in solving boundary value problems in various coordinate systems.

TRANSMISSION AND DISTRIBUTION SYSTEMS

CEEN-102 D

L	T	P	Cr
3	1	0	4

Course Objectives:

1. To provide a comprehensive understanding of electrical power transmission and distribution systems.
2. To study the design, operation, and components of transmission lines and distribution networks.
3. To analyze the performance and efficiency of various transmission and distribution systems.
4. To explore fault analysis and protection mechanisms in power systems.
5. To introduce emerging technologies and modern practices in power transmission and distribution.

Course Outcomes:

1. Explain the structure and functioning of transmission and distribution systems in electrical power networks.
2. Analyze transmission line parameters and their impact on system performance.
3. Design and evaluate distribution systems for effective power delivery.
4. Perform fault analysis and understand protection schemes in transmission and distribution networks.
5. Assess advancements in transmission and distribution technologies and their applications.

Unit 1: Introduction to Power Transmission and Distribution

This unit introduces the basic concepts of power transmission and distribution systems, including their importance in delivering electrical power from generation sources to consumers. It covers the basic structure of transmission and distribution networks, the components involved, and the role of substations in power systems.

Unit 2: Transmission Lines and Their Performance

This unit focuses on the design and performance of overhead transmission lines. Topics include the calculation of line parameters (resistance, inductance, and capacitance), line constants, and the effect of line length and load on voltage regulation and line losses. It also explores the types of transmission lines used and their practical considerations.

Unit 3: Power Flow and Voltage Control in Transmission Systems

The unit covers the principles of power flow in transmission networks, including the factors that affect power transfer and voltage control. Topics include the calculation of power loss in transmission lines, voltage drop, and methods of controlling voltage through tap-changing transformers and reactive power compensation.

Unit 4: Substations and Distribution Systems

This unit focuses on the role and design of substations in power systems, including the types of substations (e.g., step-up, step-down, and switching stations). It also covers the structure and operation of distribution systems, including the distribution of electrical power to residential, commercial, and industrial consumers, and discusses the types of distribution networks.

Unit 5: Protection and Maintenance of Transmission and Distribution Systems

The unit addresses the protection and maintenance of transmission and distribution systems, focusing on the need for safety and reliability in power delivery. Topics include protective relays, circuit breakers, and fault detection methods. It also covers the maintenance practices for transmission lines and substations to ensure the uninterrupted flow of power.

WAVES AND VIBRATIONS LAB

CPHN-152 D

L	T	P	Cr
2	0	0	2

Course Objectives:

1. To provide hands-on experience with the fundamental concepts of waves and vibrations.
2. To study the behavior of mechanical waves and their properties through experiments.
3. To analyze simple and forced vibrations using practical setups.
4. To understand resonance phenomena and damping effects in vibrating systems.
5. To develop skills in data collection, analysis, and interpretation related to wave and vibration experiments.

Course Outcomes:

1. Demonstrate practical knowledge of wave properties such as frequency, wavelength, and velocity.
2. Analyze different types of vibrations including free, forced, and damped vibrations experimentally.
3. Observe and explain resonance and its impact on vibrating systems.
4. Apply experimental methods to measure and interpret vibration parameters.
5. Prepare detailed lab reports that accurately present experimental data and findings.

List of Programs

1) To study the motion of a simple pendulum and determine the acceleration due to gravity (g).
2) To determine the frequency of a tuning fork using a resonance tube.
3) To determine the speed of sound in air using the Doppler effect.
4) To study the vibration of a cantilever beam and calculate its natural frequency.
5) To observe the formation of standing waves on a string and determine the wavelength.
6) To study the longitudinal vibrations of a spring-mass system.

7) To determine the damping factor for a damped harmonic oscillator.

8) To investigate the relationship between frequency and amplitude in simple harmonic motion.

9) To study the superposition of waves using a ripple tank and observe interference patterns.

10) To determine the wave speed on a stretched string using a frequency generator.

11) To observe the phenomenon of resonance using a mechanical resonator.

12) To study the characteristics of forced oscillations and resonance in a spring-mass system.

13) To measure the time period of a simple pendulum for different lengths and plot the variation.

14) To calculate the speed of sound in a solid using the longitudinal wave method.

15) To study the vibration modes of a metal rod fixed at both ends.

16) To observe and measure the wave reflection and refraction using a slinky or spring.

17) To determine the frequency of a tuning fork by using a Helmholtz resonator.

18) To investigate the formation of beats in sound waves and calculate the beat frequency.

19) To determine the period of oscillation of a compound pendulum.

20) To study the motion of a driven damped harmonic oscillator and determine its quality factor.

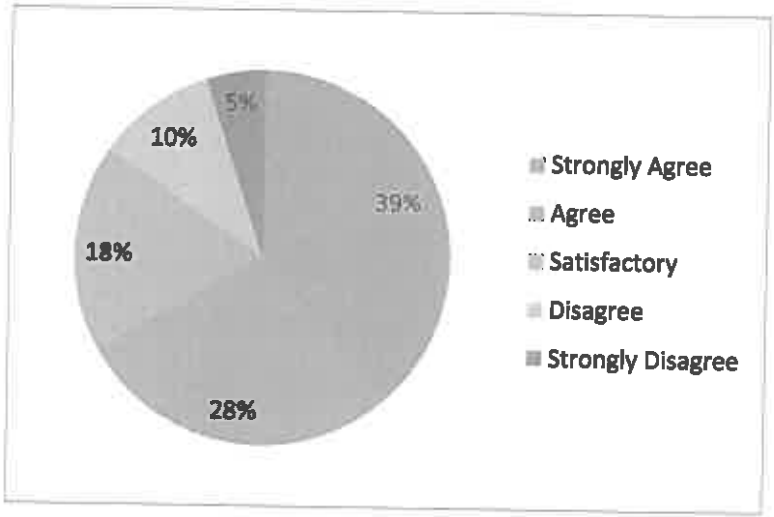
Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

14th Meeting of BOS (Item No. 14.3 Annexure -3)

Analysis of Alumni' Feedback of School of Engineering and Technology through Table and Pie Chart

Q.1 The courses based on state of art trends and recent developments?

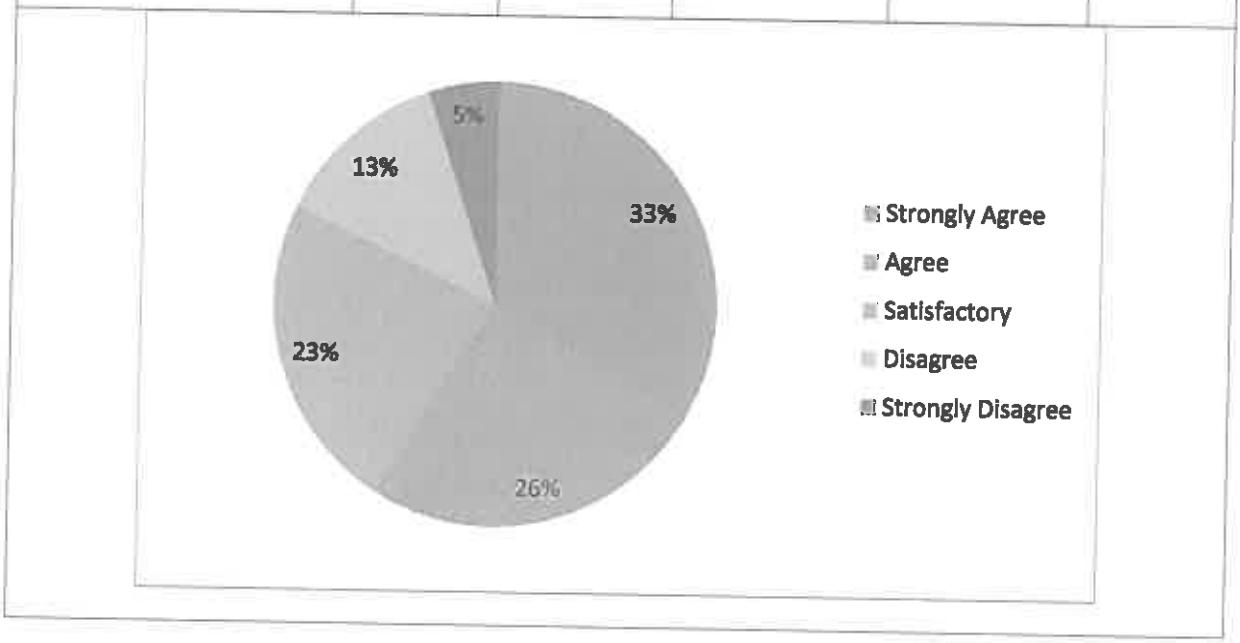
The courses based on state of art trends and recent developments	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	38.46	28.21	17.95	10.26	5.13



Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
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Q.2 The courses found to be helpful in developing skills and knowledge in respective domain?

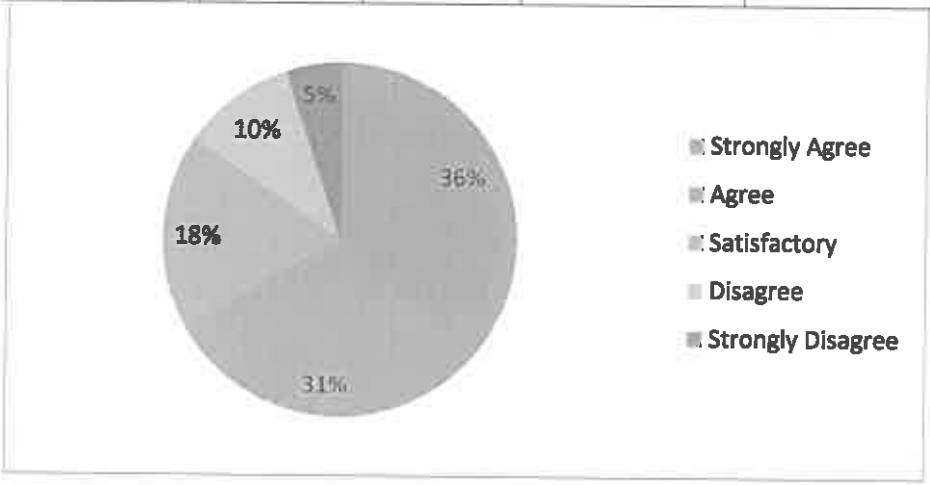
The courses found to be helpful in developing skills and knowledge in respective domain	Strongly Agree	Agree	satisfactory	Disagree	Strongly Disagree
Response (%)	33.33	25.64	23.08	12.82	5.13



Shobhit University
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Q.3 The courses found to be productive in competing professionally at national/international level?

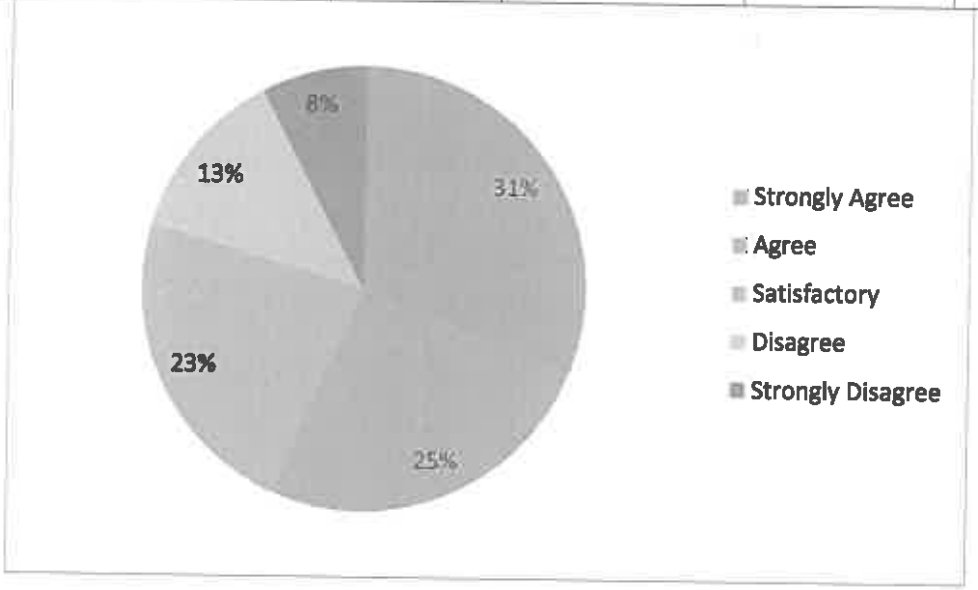
The courses found to be productive in competing professionally at national/international level	Strongly Agree	Agree	satisfactory	Disagree	Strongly Disagree
Response (%)	35.90	30.77	17.95	10.26	5.13



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Q.4 The courses found to be appropriate in motivating students towards nation building by inculcating ethical and professional values?

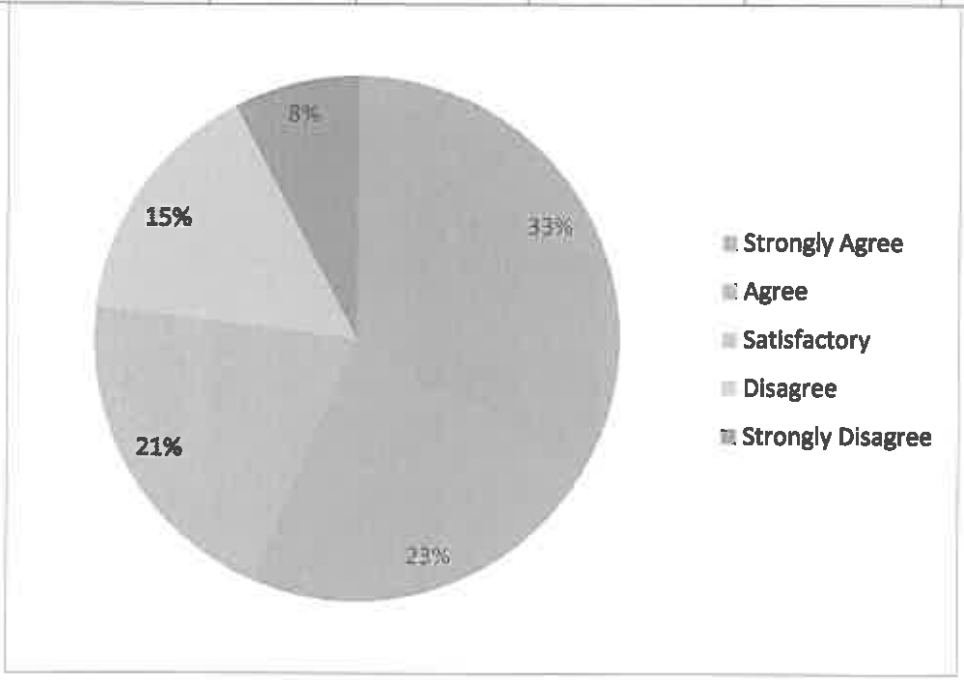
The courses found to be appropriate in motivating students towards nation building by inculcating ethical and professional values	Strongly Agree	Agree	satisfactory	Disagree	Strongly Disagree
Response (%)	30.77	25.64	23.08	12.82	7.69



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Q.5 The programme helped to understand the impact of domain knowledge in social and global context?

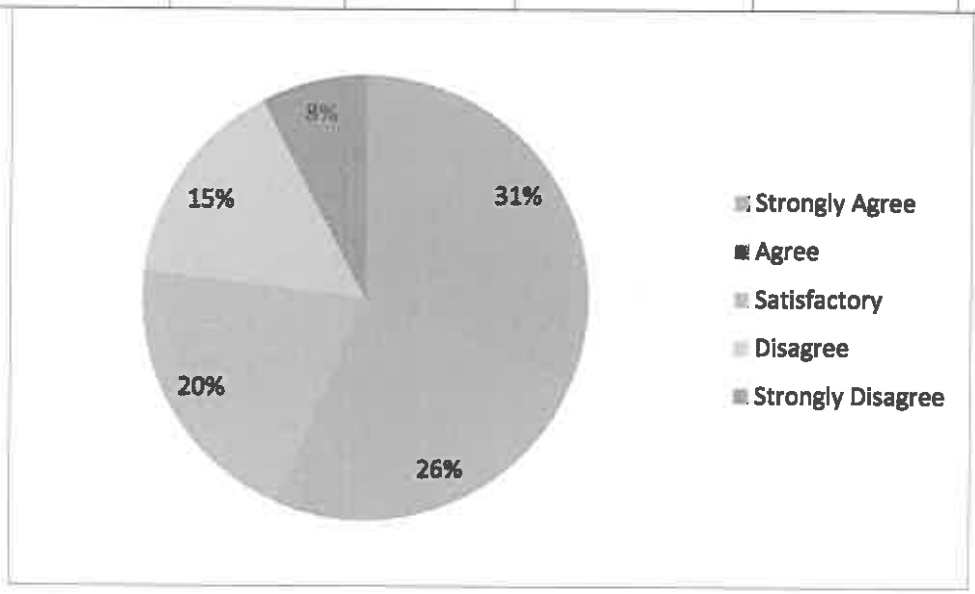
The programme helped to understand the impact of domain knowledge in social and global context	Strongly Agree	Agree	satisfactory	Disagree	Strongly Disagree
Response (%)	33.33	23.08	20.51	15.38	7.69



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Q.6 Theprogramme provided awareness on recent advancements and innovations?

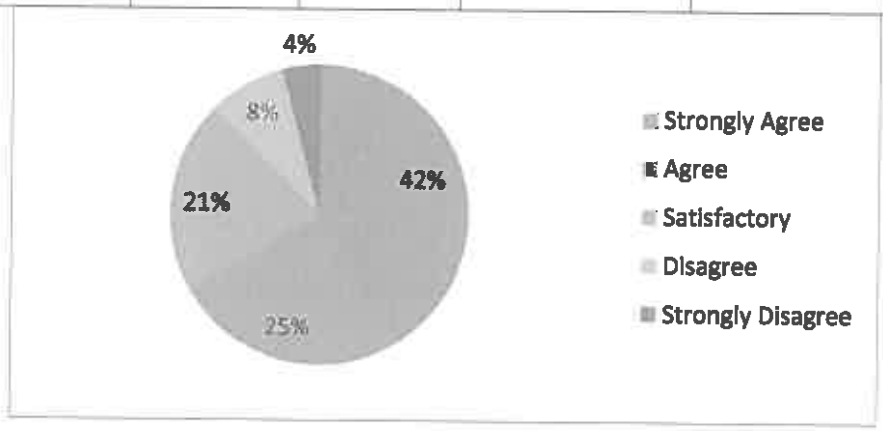
The programme provided awareness on recent advancements and Innovations	Strongly Agree	Agree	satisfactory	Disagree	Strongly Disagree
Response (%)	30.77	25.64	20.51	15.38	7.69



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Q.7 Theprogramme improved critical thinking ability and problem-solving aptitude.

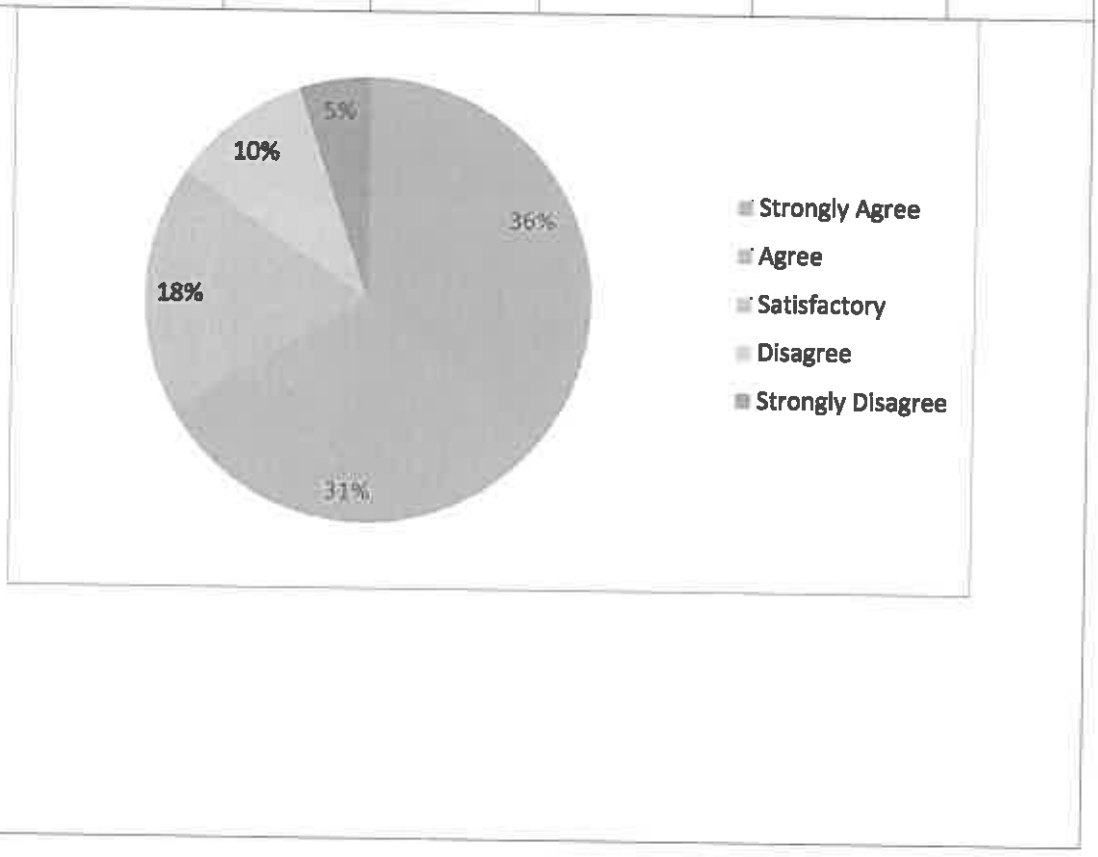
The programme improved critical thinking ability and problem-solving aptitude.	Strongly Agree	Agree	satisfactory	Disagree	Strongly Disagree
Response (%)	41.67	25.00	20.83	8.33	4.17



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Babu Vijendra Marg, Adarsh Institutional
Area Gangoh, Distt. Saharanpur (U.P.)
247341, India
Tel: +91 7830810052
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U.: www.suv.ac.in

Q.8 The programme helped to take independent decisions and perform managerial & administerial functions diligently?

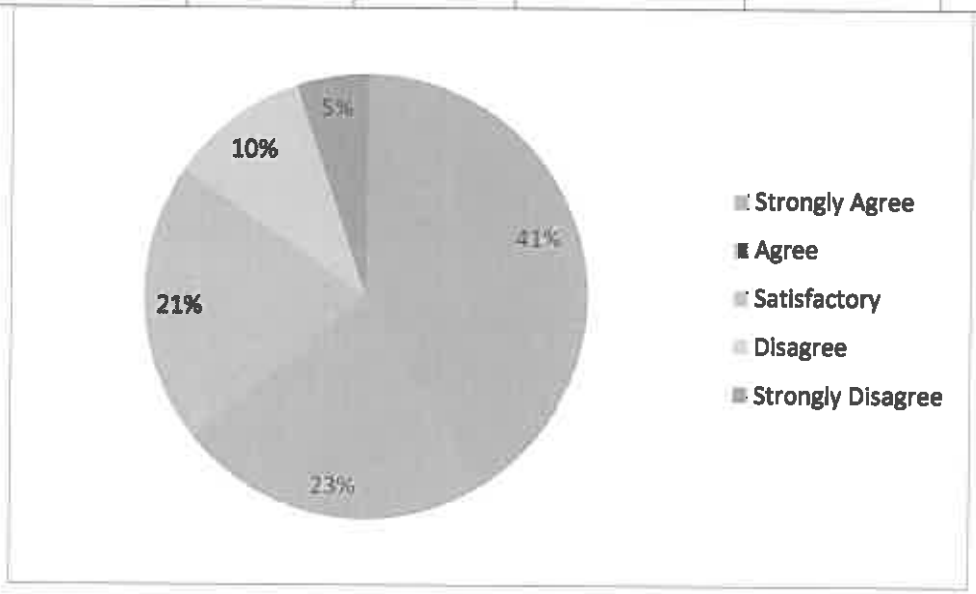
The programme helped to take independent decisions and perform managerial &administerial functions diligently.	Strongly Agree	Agree	satisfactory	Disagree	Strongly Disagree
Response (%)	35.90	30.77	17.95	10.26	5.13



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Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

Q.9 The curriculum was helpful in acquiring advance level knowledge to pursue research and higher studies?

The curriculum was helpful in acquiring advance level knowledge to pursue research and higher studies	Strongly Agree	Agree	satisfactory	Disagree	Strongly Disagree
Response (%)	41.03	23.08	20.51	10.26	5.13



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School of Engineering & Technology (39)

Sr No	Questions	Details	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
1	The courses based on state of art trends and recent developments?	No of Alumni	15	11	7	4	2
		Percentage	38.46	28.21	17.95	10.26	5.13
2	The courses found to be helpful in developing skills and knowledge in respective domain?	No of Alumni	13	10	9	5	2
		Percentage	33.33	25.64	23.08	12.82	5.13
3	The courses found to be productive in competing professionally at national/international level?	No of Alumni	14	12	7	4	2
		Percentage	35.90	30.77	17.95	10.26	5.13
4	The courses found to be appropriate in motivating students towards nation building by inculcating ethical and professional values?	No of Alumni	12	10	9	5	3
		Percentage	30.77	25.64	23.08	12.82	7.69
5	The programme helped to understand the impact of domain knowledge in social and global context?	No of Alumni	13	9	8	6	3
		Percentage	33.33	23.08	20.51	15.38	7.69
6	The programme provided awareness on recent advancements and innovations?	No of Alumni	16	12	6	3	2
		Percentage	41.03	30.77	15.38	7.69	5.13
7	The programme improved critical thinking ability and problem-solving aptitude.	No of Alumni	12	10	8	6	3
		Percentage	30.77	25.64	20.51	15.38	7.69
8	The programme helped to take independent decisions and perform managerial &administerial functions diligently?	No of Alumni	14	12	7	4	2
		Percentage	35.90	30.77	17.95	10.26	5.13
9	The curriculum was helpful in acquiring advance level knowledge to pursue research and higher studies?	No of Alumni	16	9	8	4	2
		Percentage	41.03	23.08	20.51	10.26	5.13

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Babu Vijendra Marg, Adarsh Institutional
Area Gangoh, Distt. Saharanpur (U.P.)
247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

Analysis of the Feedback

The alumni feedback on the curriculum presents a mixed picture, with significant gaps in areas related to current trends and competitiveness, while highlighting strengths in skills development and ethical education. The courses were perceived as only moderately aligned with state-of-the-art trends and recent developments (33%), and similarly, alumni felt the curriculum did not fully prepare them for competing professionally at national or international levels (32%). Additionally, there was a low rating (33%) for the program's ability to help students understand the impact of domain knowledge in a social and global context, as well as for improving critical thinking and problem-solving abilities (31%). On the positive side, 84.62% of alumni found the courses helpful in developing skills and knowledge specific to their domains, while 84.62% also appreciated the program's focus on raising awareness of recent advancements and innovations. The curriculum was also seen as effective in motivating students toward nation-building through ethical and professional values (82.05%) and in preparing them to take independent decisions and perform managerial functions (79.49%). However, the relatively low feedback (30%) on the curriculum's role in preparing students for research and higher studies suggests a need for improvement in this area. Overall, while the program offers solid professional and ethical preparation, it requires stronger alignment with modern trends and a more focused approach to critical thinking, competitiveness, and advanced academic pursuits.

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Babu Vijendra Marg, Adarsh Institutional
Area Gangoh, Distt. Saharanpur (U.P.)
247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sng.ac.in

Action Taken Report

(School of Engineering & Technology)

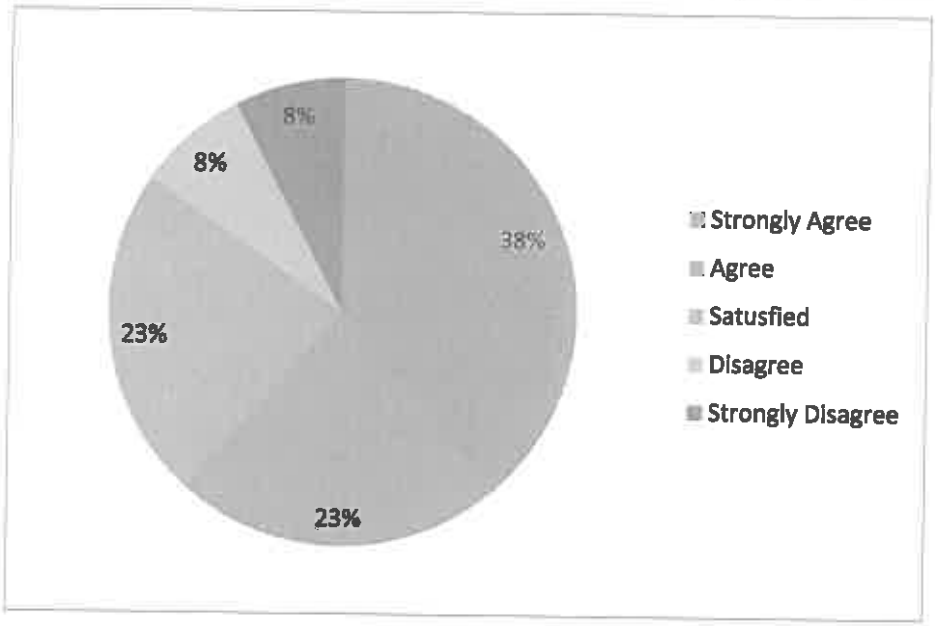
Sr. No.	Suggestions	Action Taken	Outcome
1	Align curriculum more closely with current trends and recent developments	Conducted curriculum revision workshops with academic and industry experts; integrated emerging topics like integrative health and digital tools.	Increased relevance of course content; students exposed to modern practices and evolving trends in naturopathy.
2	Improve student preparedness for national/international competitiveness	Organized coaching sessions for competitive exams, international speaker sessions, and participation in national-level academic events.	Boosted student confidence and readiness for external competitions and career opportunities beyond the local context.
3	Strengthen critical thinking and problem-solving in the curriculum	Embedded clinical case discussions, diagnostic simulations, and reflective exercises into academic modules.	Enhanced student engagement and cognitive skills; students better equipped to make informed clinical and managerial decisions.
4	Increase focus on research orientation and preparation for higher studies	Introduced a structured student research program, workshops on research design, and collaborations with academic journals.	Improved research literacy and a gradual increase in student interest in pursuing postgraduate and research pathways.

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Babu Vijendra Marg, Adarsh Institutional
Area Gangoh, Distt. Saharanpur (U.P.)
247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

Analysis of Employer's Feedback of School of Engineering and Technology through Table and Pie Chart

Q.1 curriculum assists the students to acquire necessary entry level skills in industrial sector.

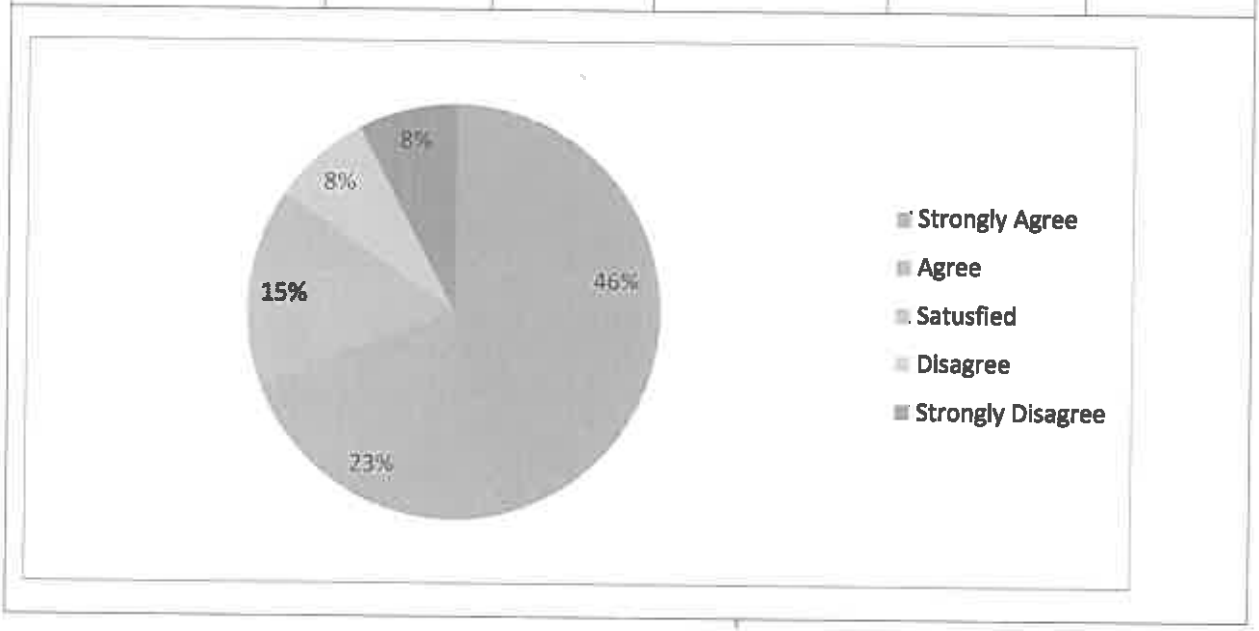
The curriculum assists the students to acquire necessary entry level skills in industrial sector.	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	38.5	23.1	23.1	7.7	7.7



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Tel: +91 7830810052
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Q.2 The curriculum offers adequate scope for life-long learning and higher-level aptitude for new technology/tools.

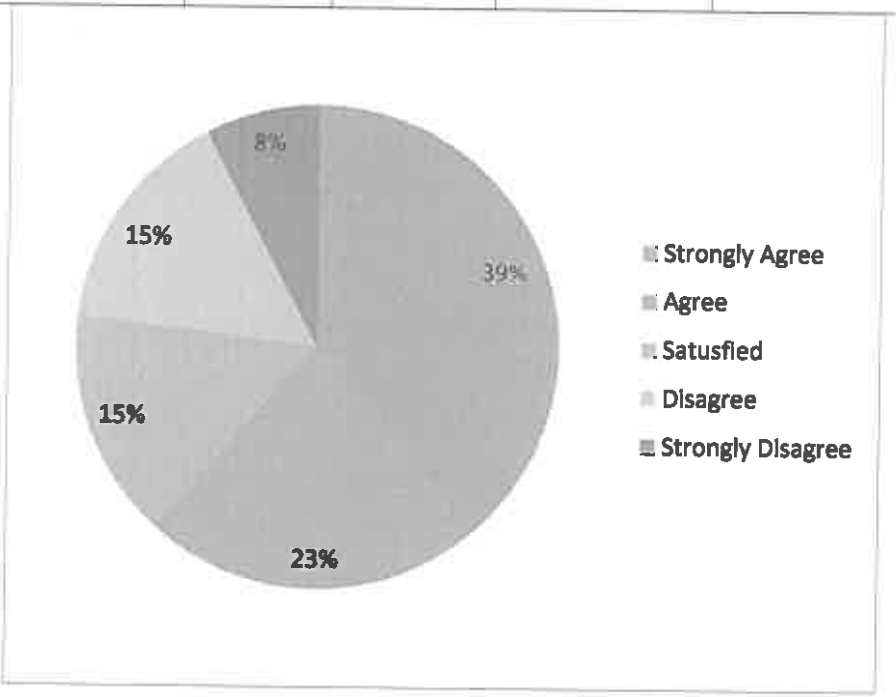
The curriculum offers adequate scope for life-long learning and higher-level aptitude for new technology/tools.	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	46.15	23.08	15.38	7.69	7.69



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Q.3 The curriculum has adequate scope for multidisciplinary knowledge and sufficient number of elective courses.

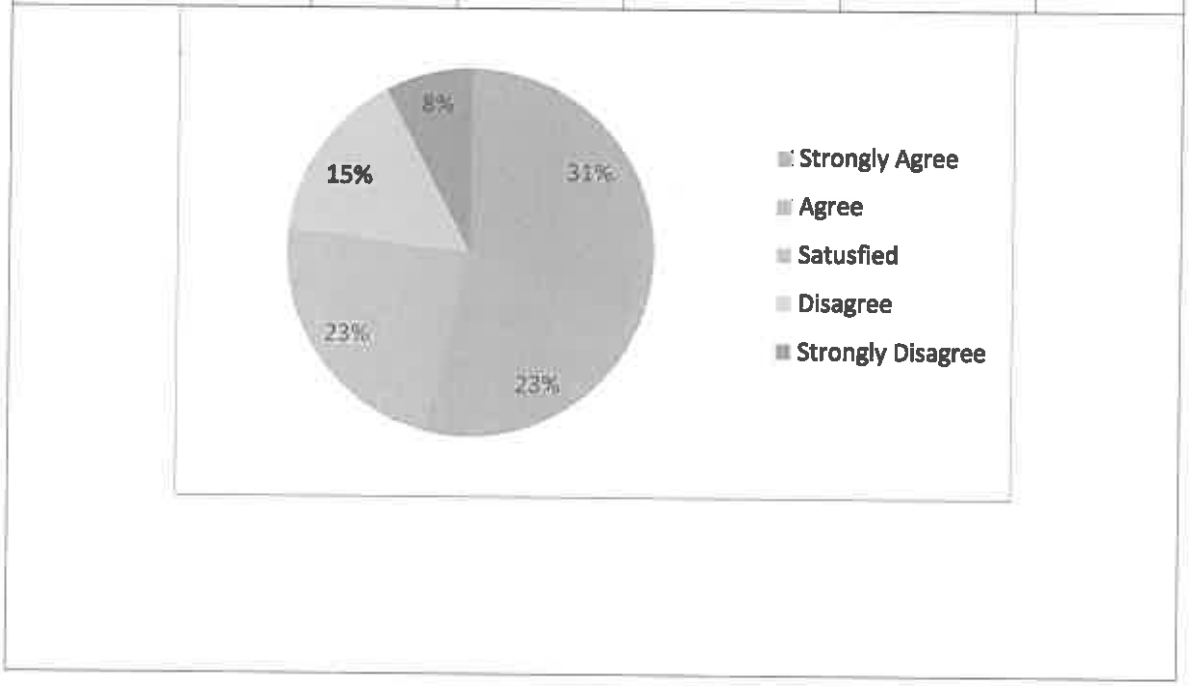
The curriculum has adequate scope for multidisciplinary knowledge and sufficient number of elective courses.	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	38.46	23.08	15.38	15.38	7.69



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Babu Vijendra Marg, Adarsh Institutional
Area Gangoh, Distt. Saharanpur (U.P.)
247341, India
Tel: +91 7830810052
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Q.4 The curriculum has relevant content to assist students to work independently as well in a team with high level of adaptability.

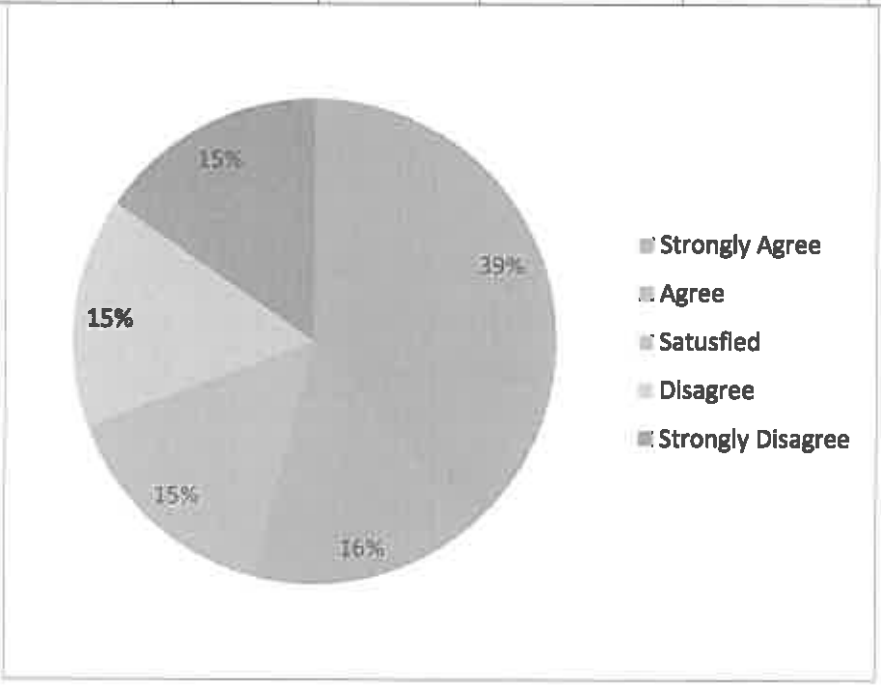
The curriculum has relevant content to assist students to work independently as well in a team with high level of adaptability	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	30.77	23.08	23.08	15.38	7.69



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Babu Vijendra Marg, Adarsh Institutional
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247341, India
Tel: +91 7830810052
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Q.5 The curriculum provides enough scope for improving entrepreneurial skill as well as industry readiness.

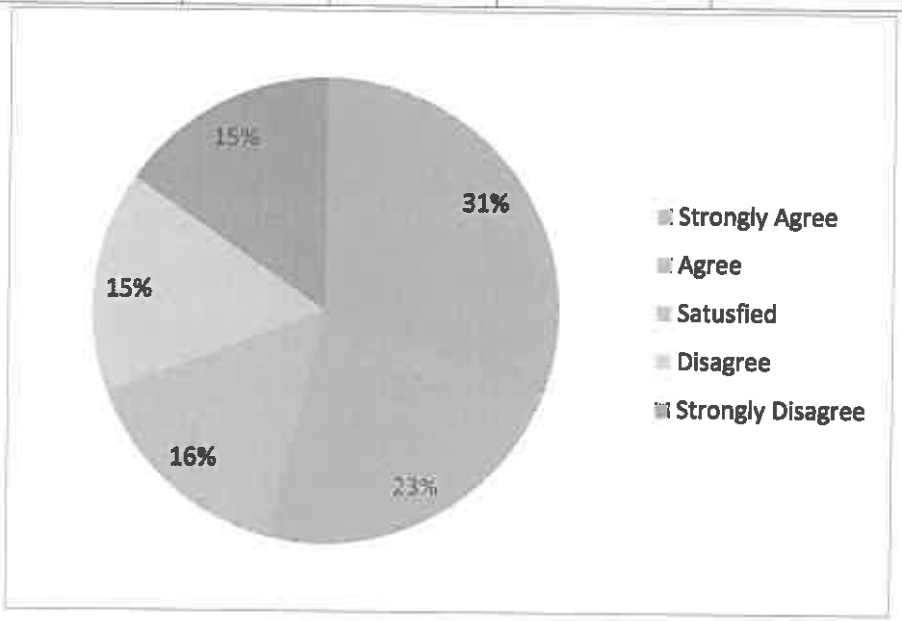
The curriculum provides enough scope for improving entrepreneurial skill as well as industry readiness.	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	38.46	15.38	15.38	15.38	15.38



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Babu Vijendra Marg, Adarsh Institutional
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247341, India
Tel: +91 7830810052
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Q.6 The curriculum provides ample knowledge for increased employability and to promote students for higher education.

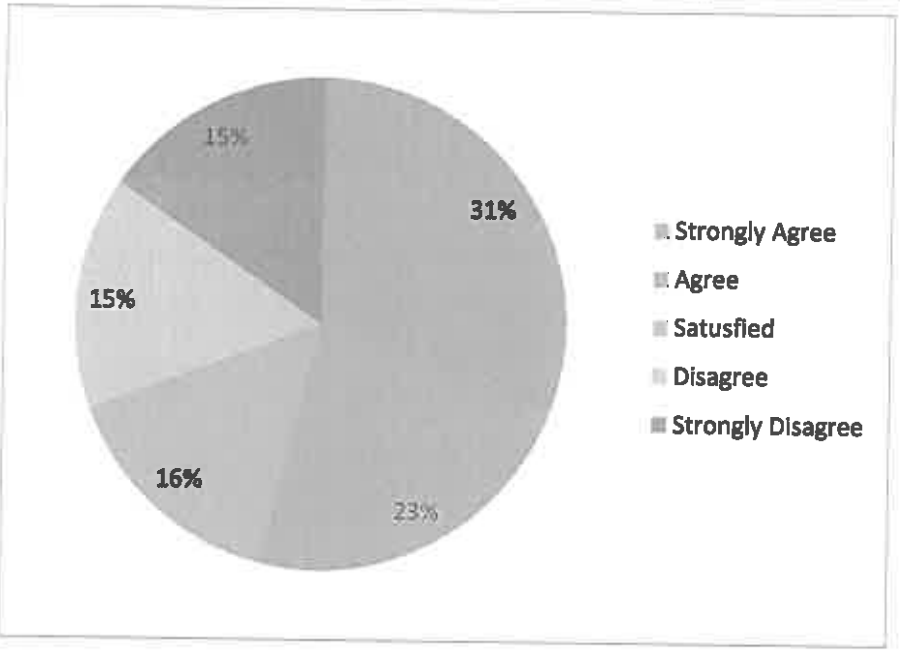
The curriculum provides ample knowledge for increased employability and to promote students for higher education.	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	30.77	23.08	15.38	15.38	15.38



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Q.7 The curriculum has focus on personality development by presence of courses on human values and professional ethics.

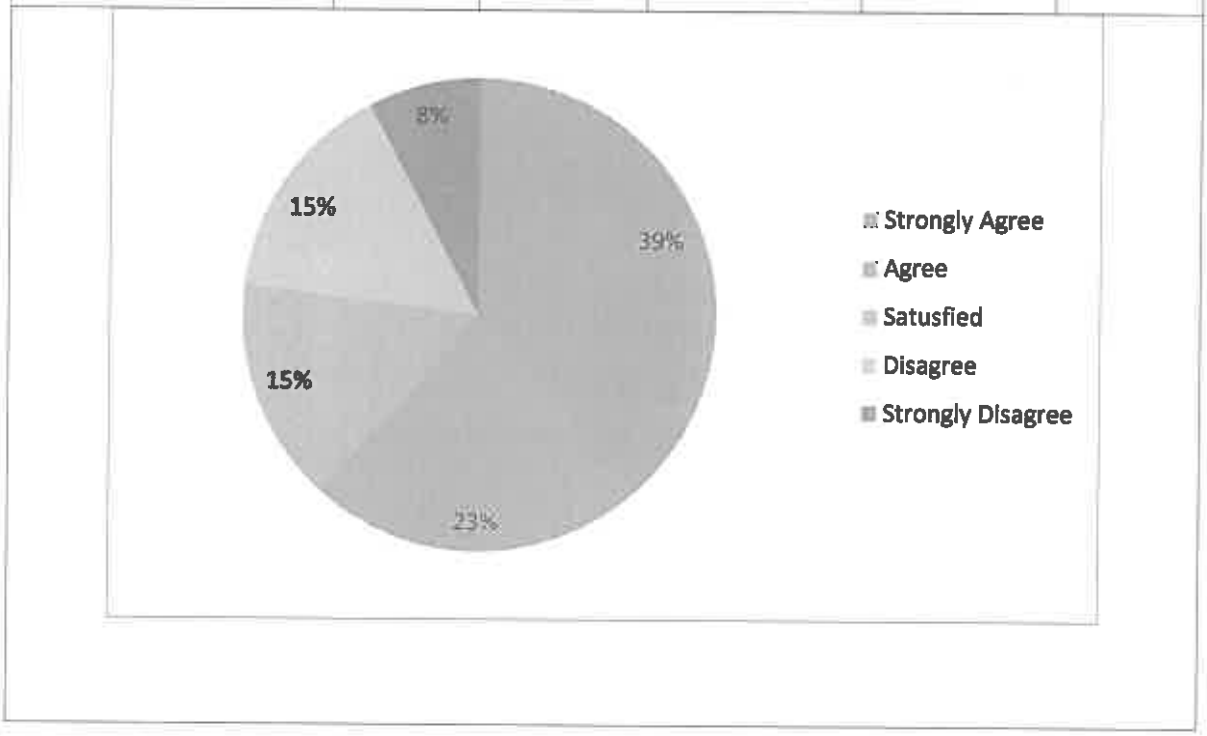
The curriculum has focus on personality development by presence of courses on human values and professional ethics	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	30.77	23.08	15.38	15.38	15.38



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247341, India
Tel: +91 7830810052
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Q.8 The curriculum is well organized and balanced for the programme with proper credit allocation.

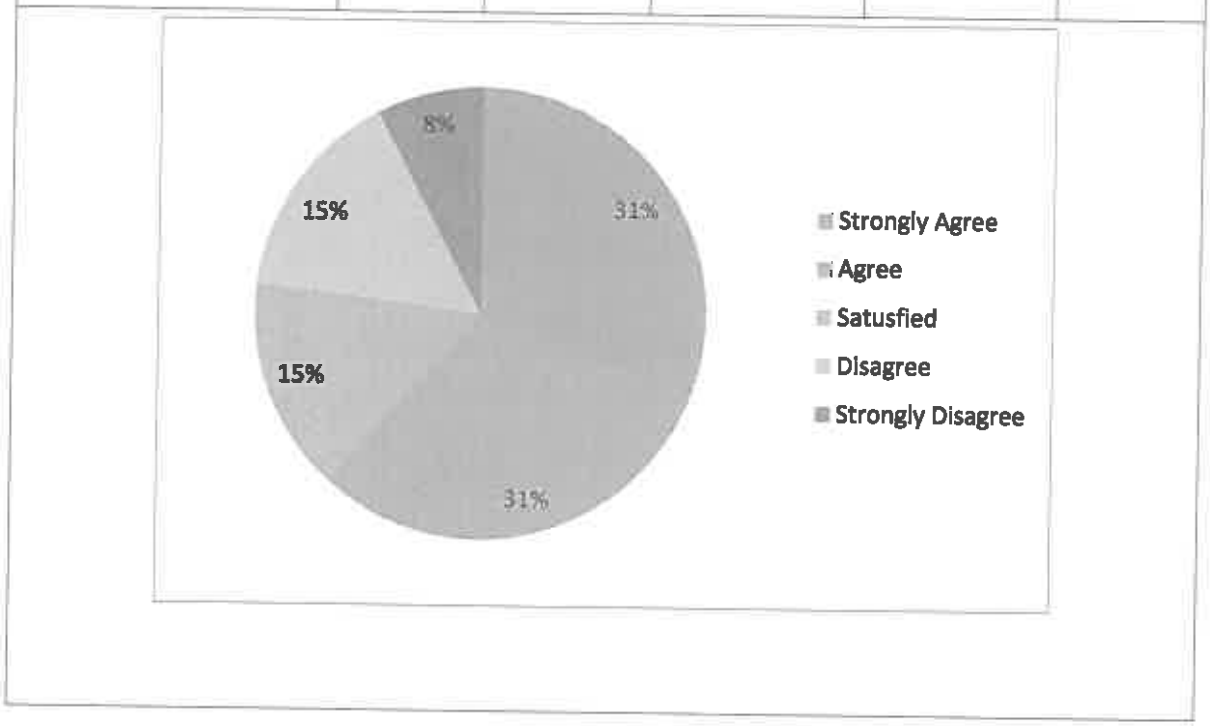
The curriculum is well organized and balanced for the programme with proper credit allocation.	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	38.46	23.08	15.38	15.38	7.69



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Babu Vijendra Marg, Adarsh Institutional
Area Gangoh, Distt. Saharanpur (U.P.)
247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

Q.9 The courses have adequate balance between theory and application for a student's holistic development.

The courses have adequate balance between theory and application for student's holistic development	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	30.77	30.77	15.38	15.38	7.69



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E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

School of Engineering & Technology						
Total no. of Employer: 13		Strongly Agree	Agree	Satisfied	Disagree	Strongly Disagree
The curriculum assists the students to acquire necessary entry level skills in industrial sector.	No. of Academicians	5	3	3	1	1
	Percentage	38.46	23.08	23.08	7.69	7.69
The curriculum offers adequate scope for life-long learning and higher-level aptitude for new technology/tools.	No. of Academicians	6	3	2	1	1
	Percentage	46.15	23.08	15.38	7.69	7.69
The curriculum has adequate scope for multidisciplinary knowledge and sufficient number of elective courses.	No. of Academicians	5	3	2	2	1
	Percentage	38.46	23.08	15.38	15.38	7.69
The curriculum has relevant content to assist students to work independently as well in a team with high level of adaptability	No. of Academicians	4	3	3	2	1
	Percentage	30.77	23.08	23.08	15.38	7.69
The curriculum provides enough scope for improving entrepreneurial skill as well as industry readiness.	No. of Academicians	5	2	2	2	2
	Percentage	38.46	15.38	15.38	15.38	15.38
The curriculum provides ample knowledge for increased employability and to promote students	No. of Academicians	4	3	2	2	2
	Percentage	30.77	23.08	15.38	15.38	15.38

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247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

for higher education.						
The curriculum has focus on personality development by presence of courses on human values and professional ethics	No. of Academicians	4	3	2	2	2
	Percentage	30.77	23.08	15.38	15.38	15.38
The curriculum is well organized and balanced for the programme with proper credit allocation.	No. of Academicians	5	3	2	2	1
	Percentage	38.46	23.08	15.38	15.38	7.69
The courses have adequate balance between theory and application for student's holistic development.	No. of Academicians	4	4	2	2	1
	Percentage	30.77	30.77	15.38	15.38	7.69

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Babu Vijendra Marg, Adarsh Institutional
Area Gangoh, Distt. Saharanpur (U.P.)
247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

Analysis of Feedback:

Employers' feedback on the curriculum highlights a generally positive perception regarding its alignment with industry expectations and student development. A significant majority (84.62%) agree that the curriculum effectively equips students with necessary entry-level skills for the industrial sector and promotes lifelong learning with adaptability to new technologies. Additionally, 76.92% of employers appreciate the curriculum's provision for multidisciplinary knowledge, balanced structure, and an appropriate blend of theory and practical application. The same percentage also acknowledges its role in fostering teamwork and adaptability. However, slightly lower ratings (69.22%) were observed in areas such as entrepreneurship development, employability enhancement, promotion of higher education, and personality development through courses on human values and ethics, indicating potential areas for further improvement. Overall, the feedback reflects a strong endorsement of the curriculum's effectiveness, while also identifying opportunities for enrichment in entrepreneurial and ethical skill-building components.

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Area Gangoh, Distt. Saharanpur (U.P.)
247341, India
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E-mail: registrargangoh@shobhituniversity.ac.in
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Action Taken Report

(School of Engineering and Technology)

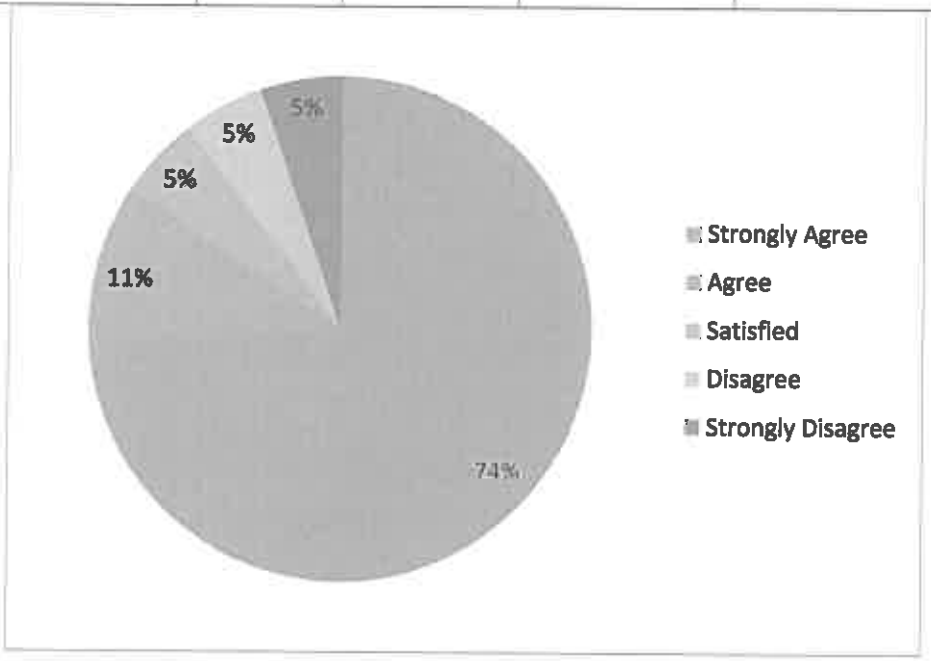
Sr. No.	Suggestions	Action Taken	Outcome
1	Strengthen global awareness and cross-cultural competence	Introduced global case studies, international internships, and cultural exchange programs	Increased students' understanding of global business practices and diverse work environments
2	Foster digital literacy and industry-specific tools	Integrated specialized digital tools and software training (e.g., data analytics, project management software)	Students gained proficiency in the tools and technologies most in demand in their respective industries
3	Integrate sustainability and ethical decision-making into the curriculum	Added courses on sustainability, corporate social responsibility (CSR), and ethics in business	Students became more conscious of sustainability and ethical issues, preparing them for socially responsible careers
4	Develop leadership and management skills	Introduced leadership training programs, management simulations, and mentoring by industry leaders	Improved leadership capabilities among students, preparing them for managerial roles in the future

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Babu Vijendra Marg, Adarsh Institutional
Area Gangoh, Distt. Saharanpur (U.P.)
247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
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Analysis of Peer Academician's Feedback of School of Engineering and Technology through Table and Pie Chart

Q.1 The syllabus of the courses are proper in relation to the competencies expected out of the programme.

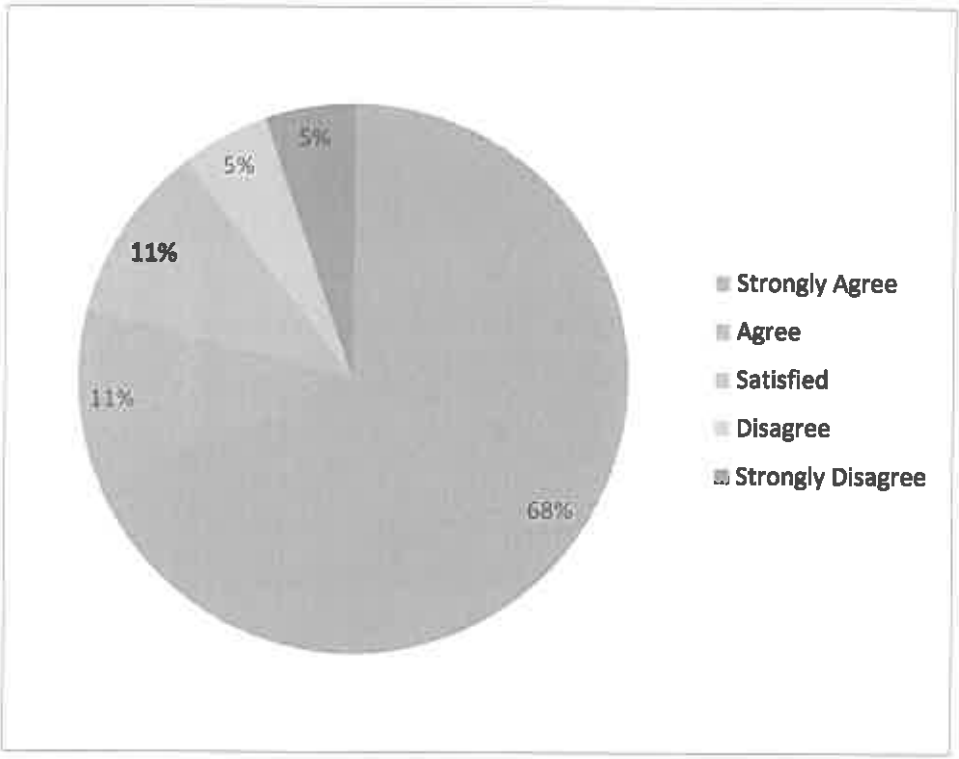
The syllabus of the courses are proper in relation to the competencies expected out of the programme.	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	73.68	10.52	5.26	5.26	5.26



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Babu Vijendra Marg, Adarsh Institutional
Area Gangoh, Distt. Saharanpur (U.P.)
247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.suq.ac.in

Q.2 The sequence and overall organization of the courses is proper in the curriculum.

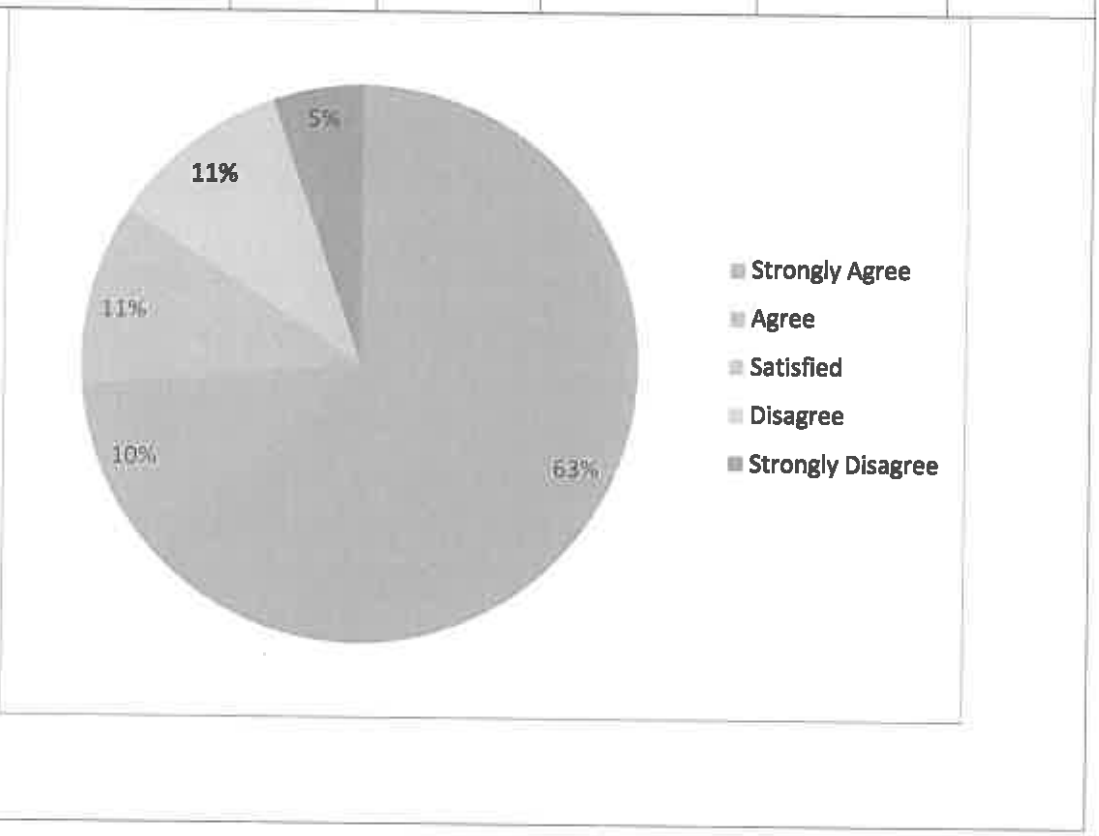
The sequence and overall organization of the courses is proper in the curriculum.	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	68.42	10.52	10.52	5.26	5.26



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EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

Q.3 The curriculum has adequate scope for multidisciplinary knowledge and sufficient number of elective courses.

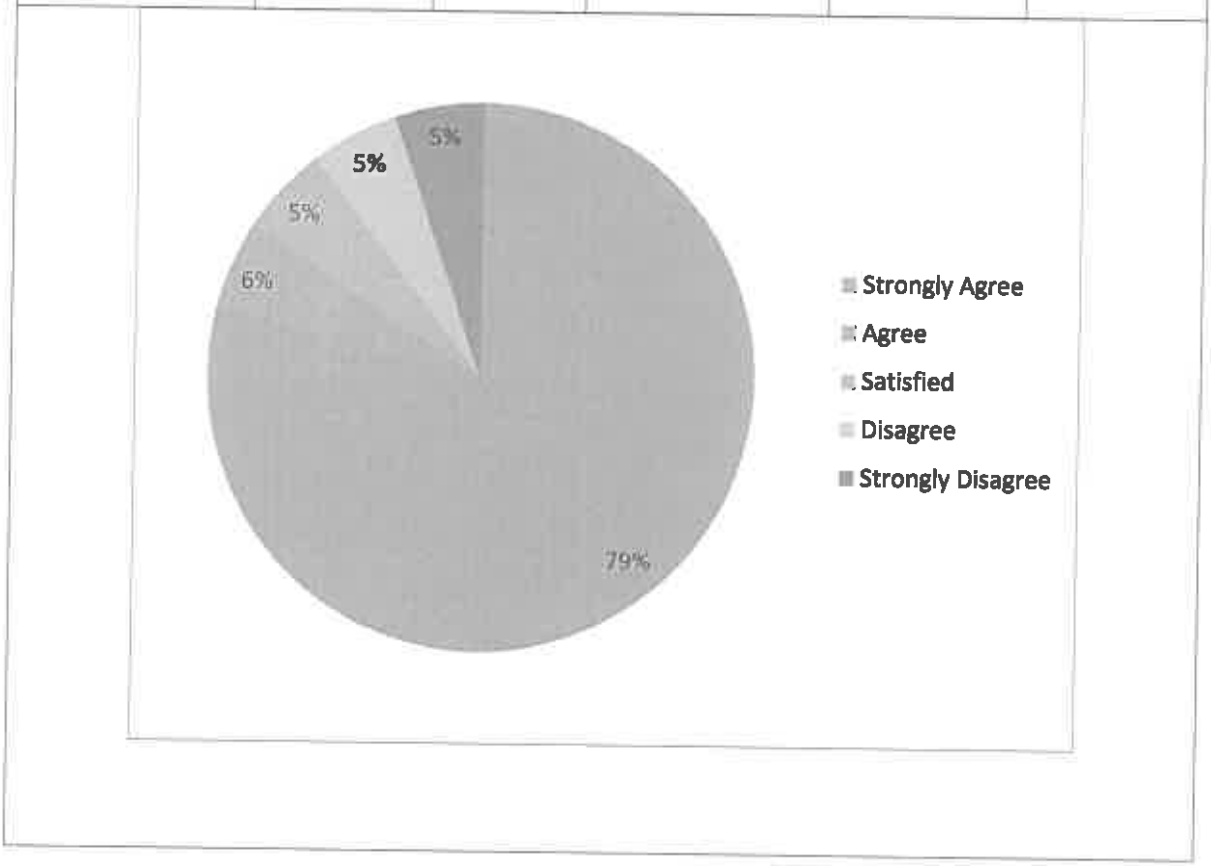
The curriculum has adequate scope for multidisciplinary knowledge and sufficient number of elective courses.	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	63.00	10.52	10.52	10.52	5.26



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Babu Vijendra Marg, Adarsh Institutional
Area Gangoh, Distt. Saharanpur (U.P.)
247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
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Q.4 Extra care has been taken for extra learning or self-learning while designing the courses.

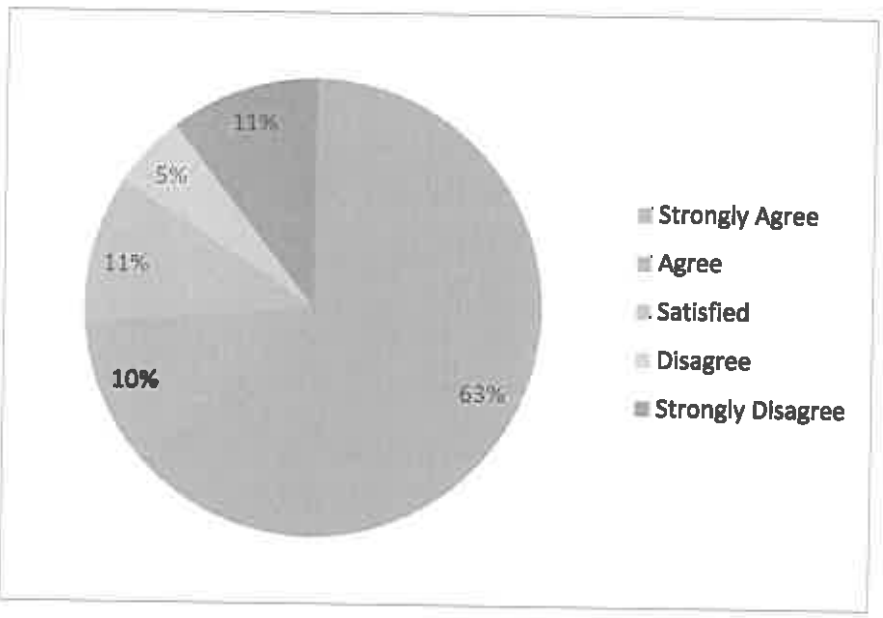
Extra care has been taken for extra learning or self-learning while designing the courses.	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	78.94	5.26	5.26	5.26	5.26



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Tel: +91 7830810052
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Q.5 The curriculum provides enough scope for improving entrepreneurial skill as well as industry readiness.

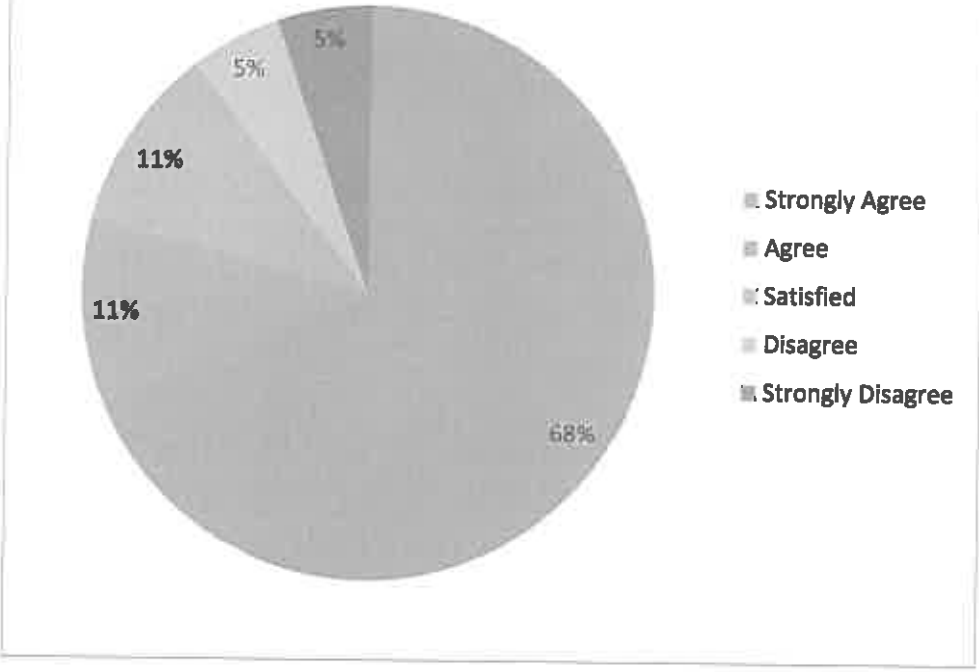
The curriculum provides enough scope for improving entrepreneurial skill as well as industry readiness.	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	63.00	10.52	10.52	5.26	10.52



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Q.6 The curriculum provides ample knowledge for increased employability and to promote students for higher education.

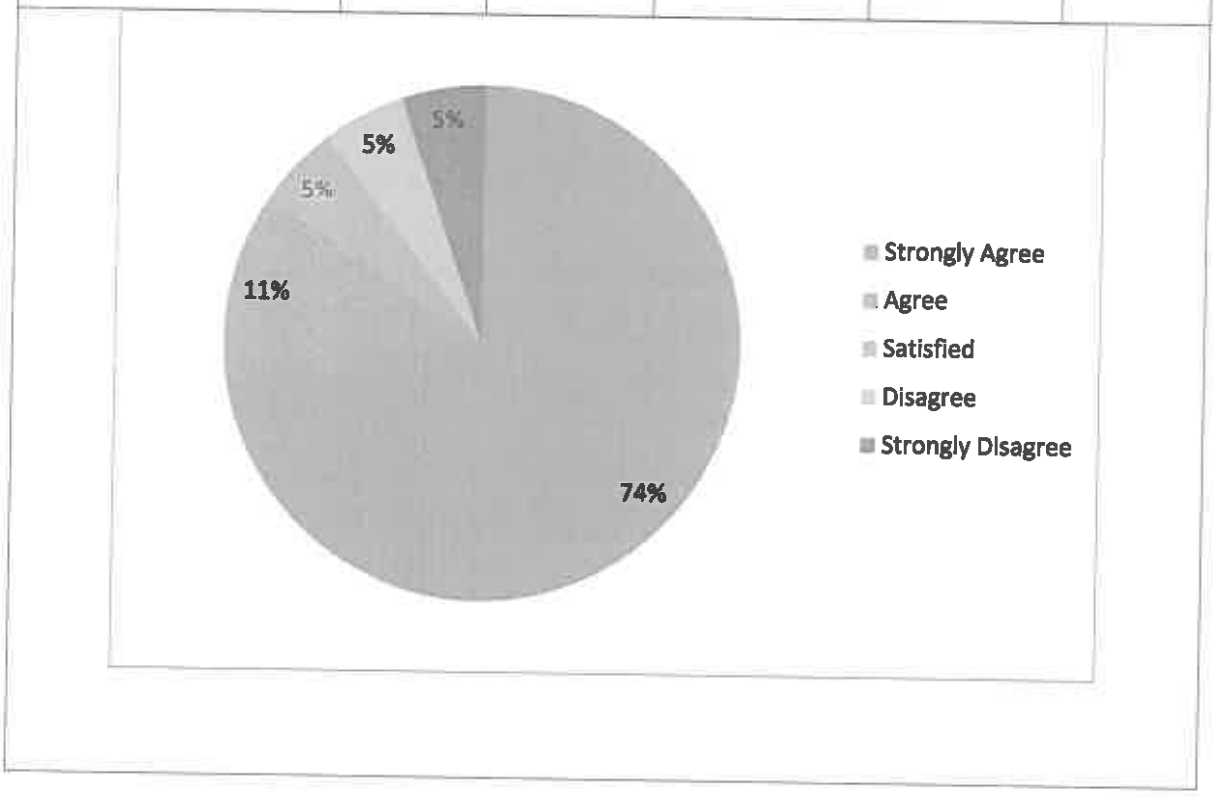
The curriculum provides ample knowledge for increased employability and to promote students for higher education.	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	68.42	10.52	10.52	5.26	5.26



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Q.7 The curriculum has focus on personality development by presence of courses on human values and professional ethics

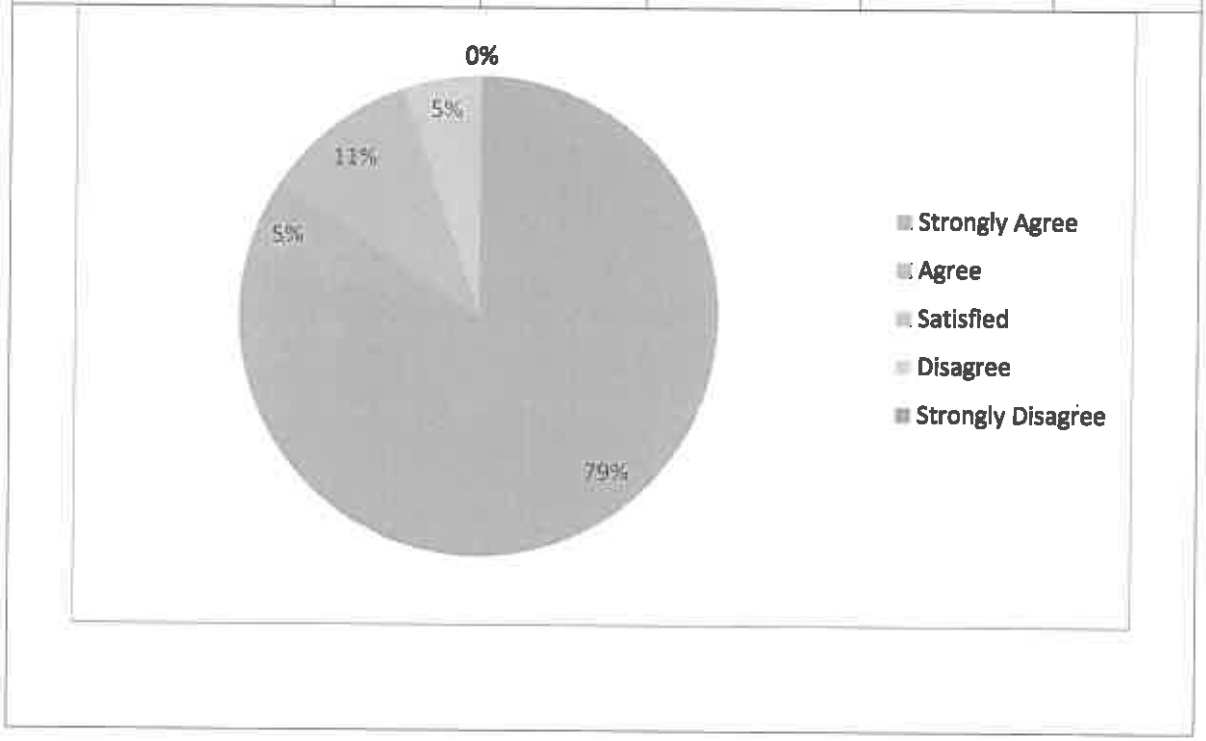
The curriculum has focus on personality development by presence of courses on human values and professional ethics	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	73.68	10.52	5.26	5.26	5.26



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Q.8 The curriculum is well organized and balanced for the programme with proper credit allocation.

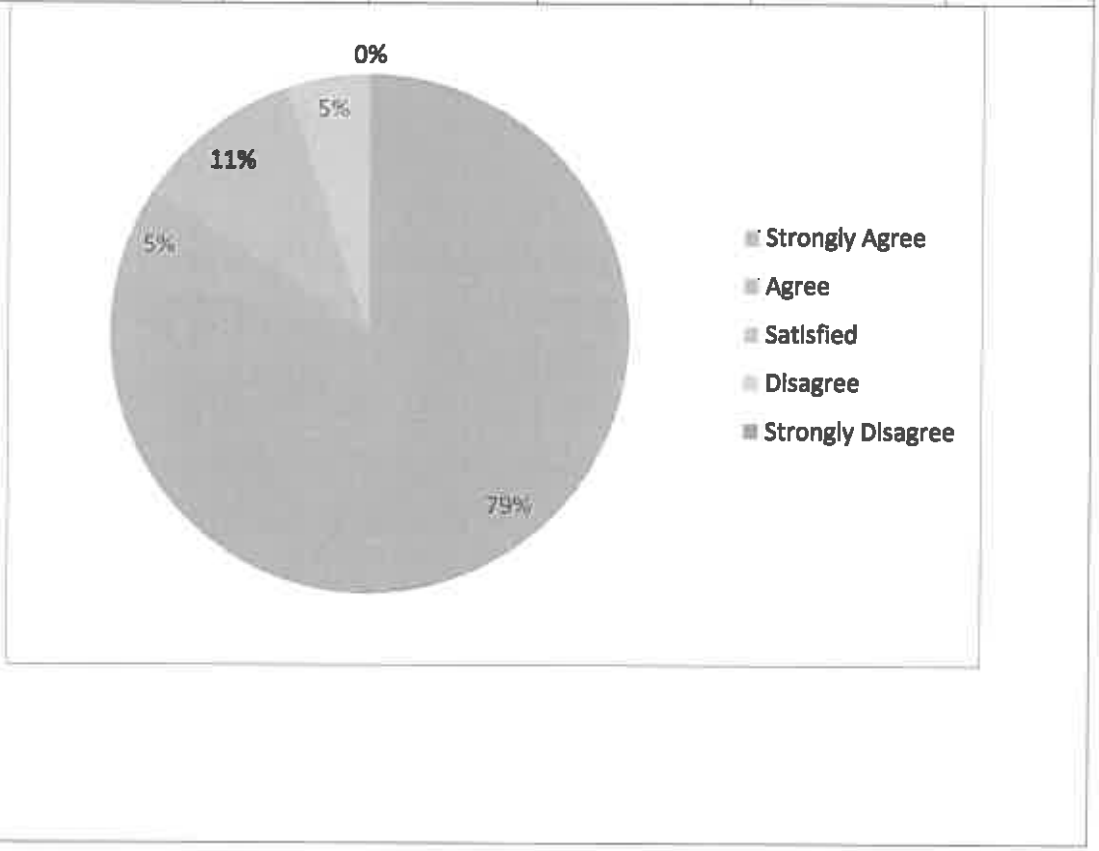
The curriculum is well organized and balanced for the programme with proper credit allocation.	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	78.94	5.26	10.52	5.26	0.00



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Q.9 The courses have adequate balance between theory and application for a student's holistic development.

The courses have adequate balance between theory and application for a student's holistic development.	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	78.94	5.26	10.52	5.26	0.00



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School of Engineering & Technology (19)						
Total no. of Peer Academicians: 19		Strongly Agree	Agree	Satisfied	Disagree	Strongly Disagree
The syllabus of the courses are proper in relation to the competencies expected out of the programme.	No. of Academicians	14.00	2.00	1.00	1.00	1.00
	Percentage	73.68	10.52	5.26	5.26	5.26
The sequence and overall organization of the courses is proper in the curriculum	No. of Academicians	13.00	2.00	2.00	1.00	1.00
	Percentage	68.42	10.52	10.52	5.26	5.26
The curriculum has adequate scope for multidisciplinary knowledge and sufficient number of elective courses	No. of Academicians	12.00	2.00	2.00	2.00	1.00
	Percentage	63.00	10.52	10.52	10.52	5.26
Extra care has been taken for extra learning or self-learning while designing the courses.	No. of Academicians	15.00	1.00	1.00	1.00	1.00
	Percentage	78.94	5.26	5.26	5.26	5.26
The curriculum provides enough scope for improving entrepreneurial skill as well as industry readiness.	No. of Academicians	12.00	2.00	2.00	1.00	2.00
	Percentage	63.00	10.52	10.52	5.26	10.52
The curriculum provides ample knowledge for increased employability and to promote students for higher education.	No. of Academicians	13.00	2.00	2.00	1.00	1.00
	Percentage	68.42	10.52	10.52	5.26	5.26

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The curriculum has focus on personality development by presence of courses on human values and professional ethics	No. of Academicians	14.00	2.00	1.00	1.00	1.00
	Percentage	73.68	10.52	5.26	5.26	5.26
The curriculum is well organized and balanced for the programme with proper credit allocation.	No. of Academicians	15.00	1.00	2.00	1.00	0.00
	Percentage	78.94	5.26	10.52	5.26	0.00
The courses have adequate balance between theory and application for a student's holistic development.	No. of Academicians	15.00	1.00	2.00	1.00	0.00
	Percentage	78.94	5.26	10.52	5.26	0.00

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Analysis of Feedback:

The peer feedback analysis reflects a generally positive perception of the curriculum, with most aspects rated above 89%, indicating that the curriculum is well-aligned with the expected competencies and offers a solid structure for student development. Notably, the organization of the curriculum and the balance between theoretical and practical components received the highest ratings (94.72%), highlighting their effectiveness in supporting holistic learning. Areas with slightly lower ratings, such as multidisciplinary scope and entrepreneurial/industry readiness (84.04%), suggest potential for improvement in integrating more interdisciplinary opportunities and real-world skill development. Overall, the curriculum is seen as comprehensive, balanced, and supportive of academic and professional growth.

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Action Taken Report

(School of Engineering and Technology)

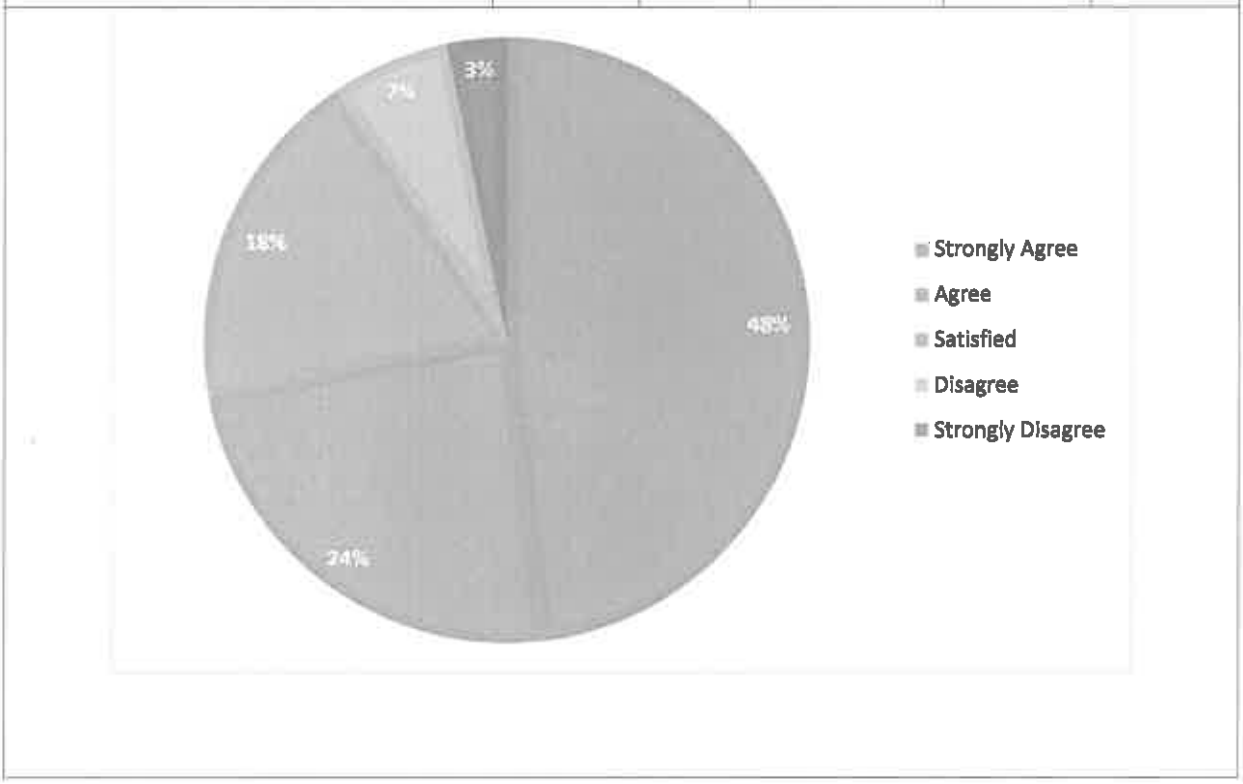
Sr. No.	Suggestions	Action taken	Outcome
1	Strengthen multidisciplinary scope and interdisciplinary opportunities	Introduced new interdisciplinary electives, such as data science, robotics, and AI applications in engineering	Broader student knowledge base, preparing them for evolving cross-disciplinary industry demands
2	Enhance entrepreneurial and industry readiness	Launched entrepreneurship incubators and strengthened industry collaboration for student internships and live projects	Improved student exposure to real-world industry practices and entrepreneurial opportunities
3	Maintain strong balance between theoretical and practical components	Increased hands-on project-based learning, labs, and industry-led workshops aligned with core courses	Strengthened practical skills, making students more industry-ready upon graduation
4	Continue improving organization and sequencing of courses	Conducted curriculum review and realigned course progression to ensure smoother academic flow and integration of new topics	Improved academic coherence, making the learning experience more streamlined and effective

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Analysis of Students' Feedback of School of Engineering and Technology through Table and Pie Chart

Q.1. Whether the curriculum has depth of the subjects and clears the concept?

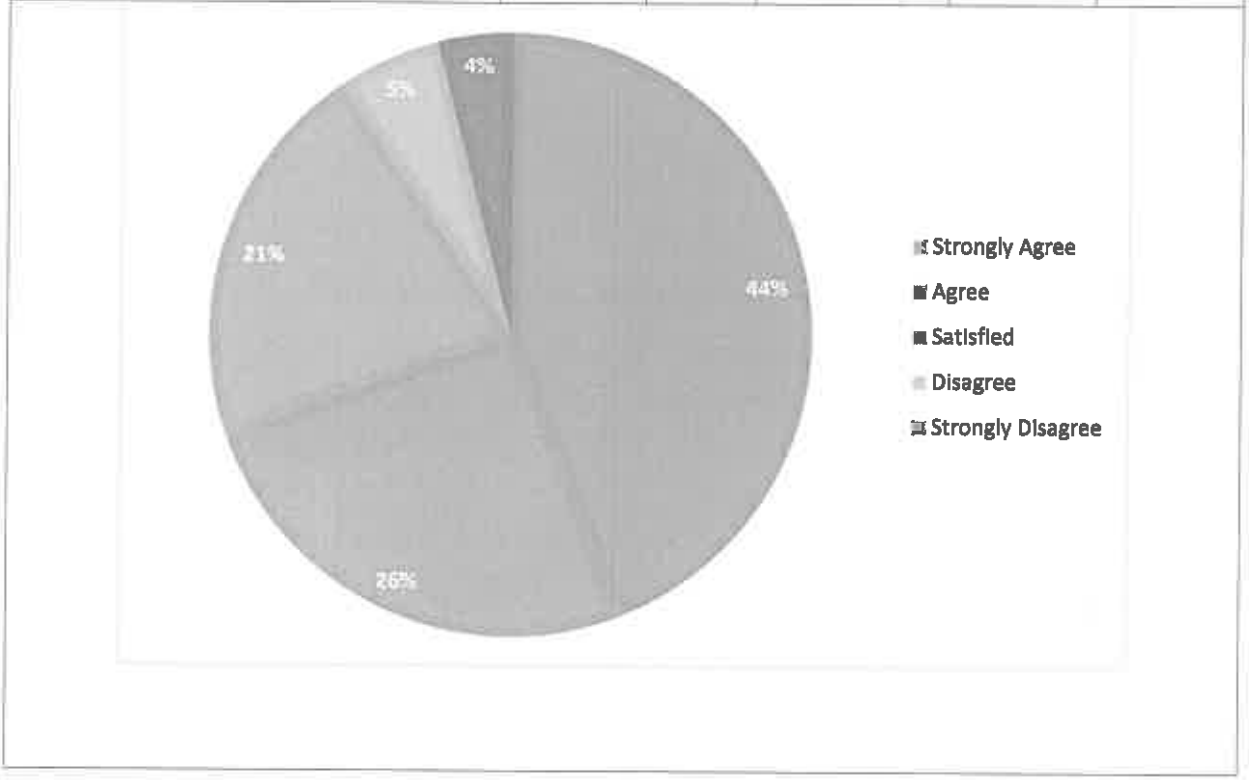
Curriculum has depth of the subjects and clears the concept	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	48	24	18.4	6.4	3.2



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Q.2. How do you rate the course outcomes and relevance to the course content?

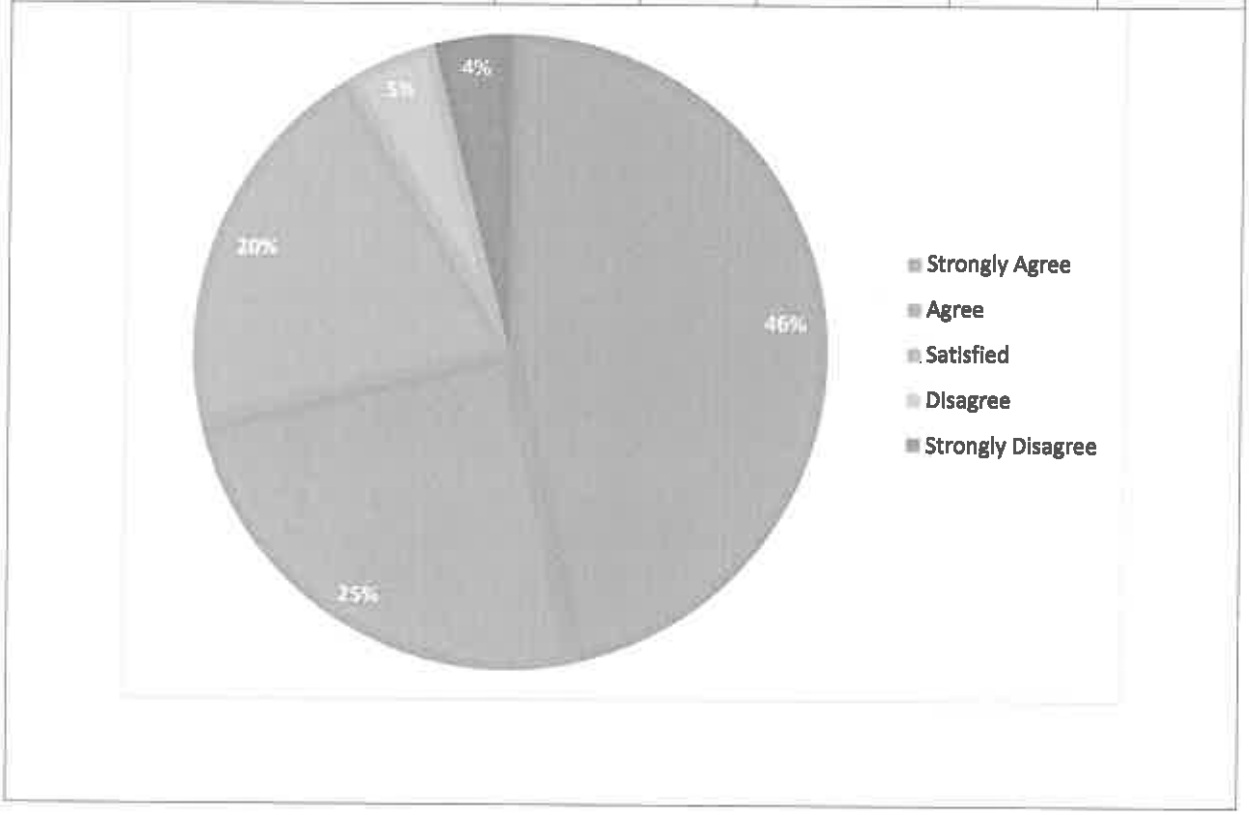
Rate the course outcomes and relevance to the course content	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	44	25.6	20.8	5.6	4



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Q.3. How do you rate the sequence of units in the courses?

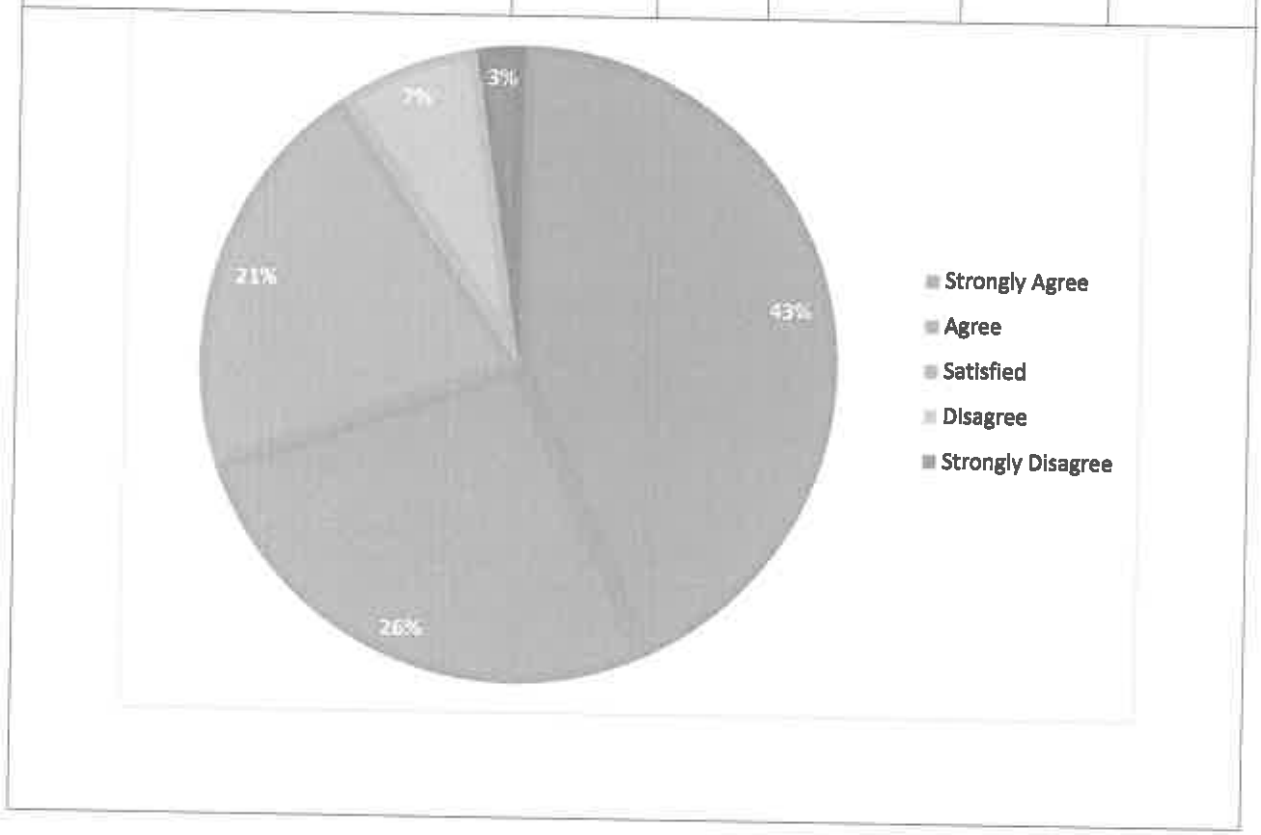
Rate the sequence of units in the courses	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	46.4	24.8	20	4.8	4



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Q.4. How do you rate the credits allotted to individual courses?

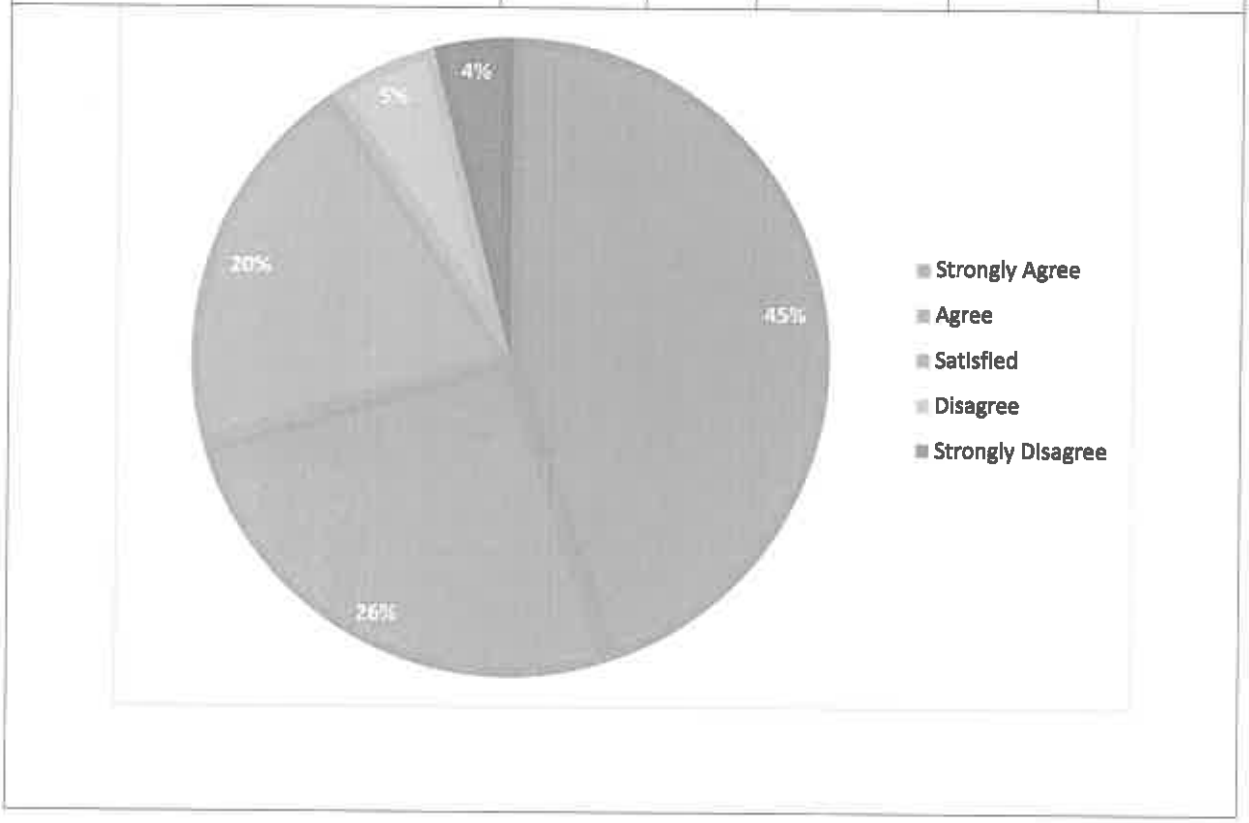
Rate the credits allotted to individual courses	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	43.2	26.4	20.8	7.2	2.4



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Q.5. Does the curriculum focus on employability/career orientation?

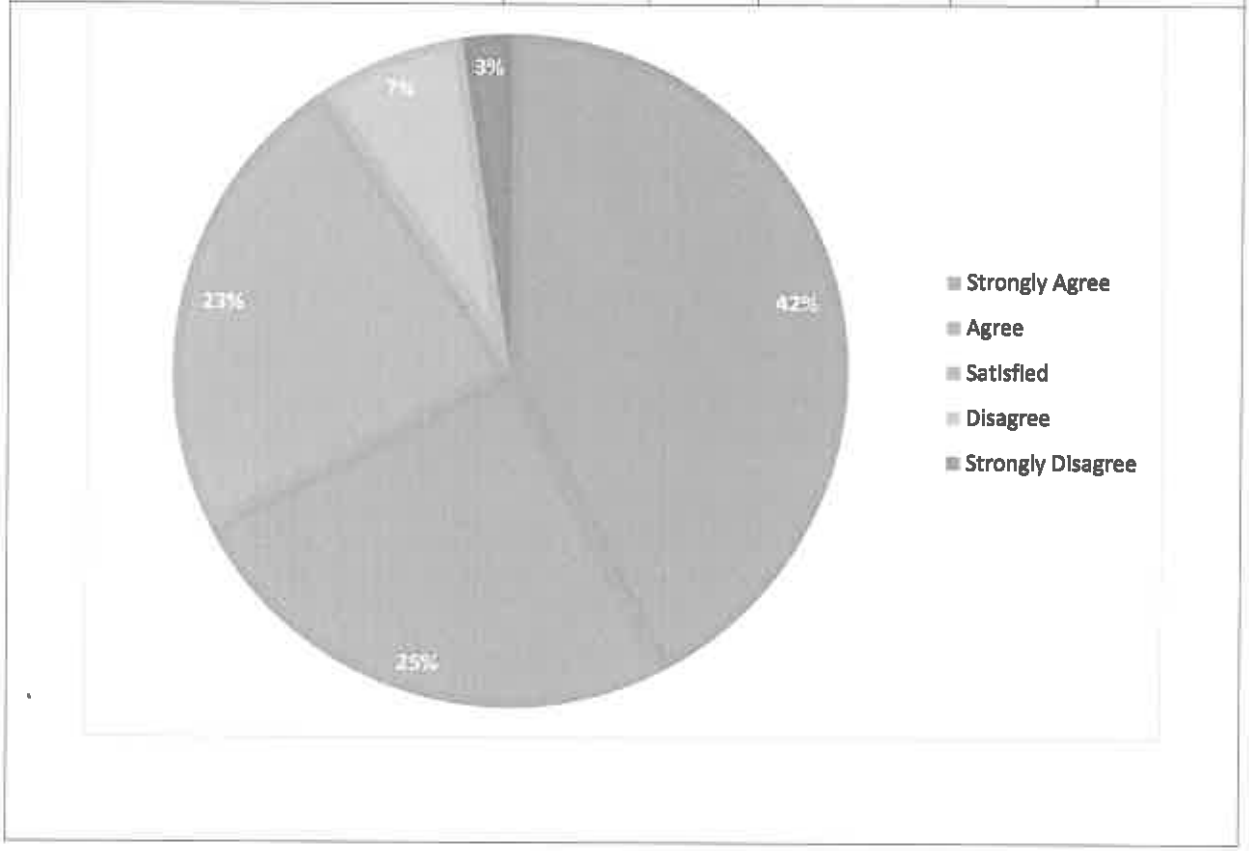
Curriculum focus on employability/career orientation	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	44.8	25.6	20	5.6	4



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Q.6. Does the curriculum focus on skill development/entrepreneurship?

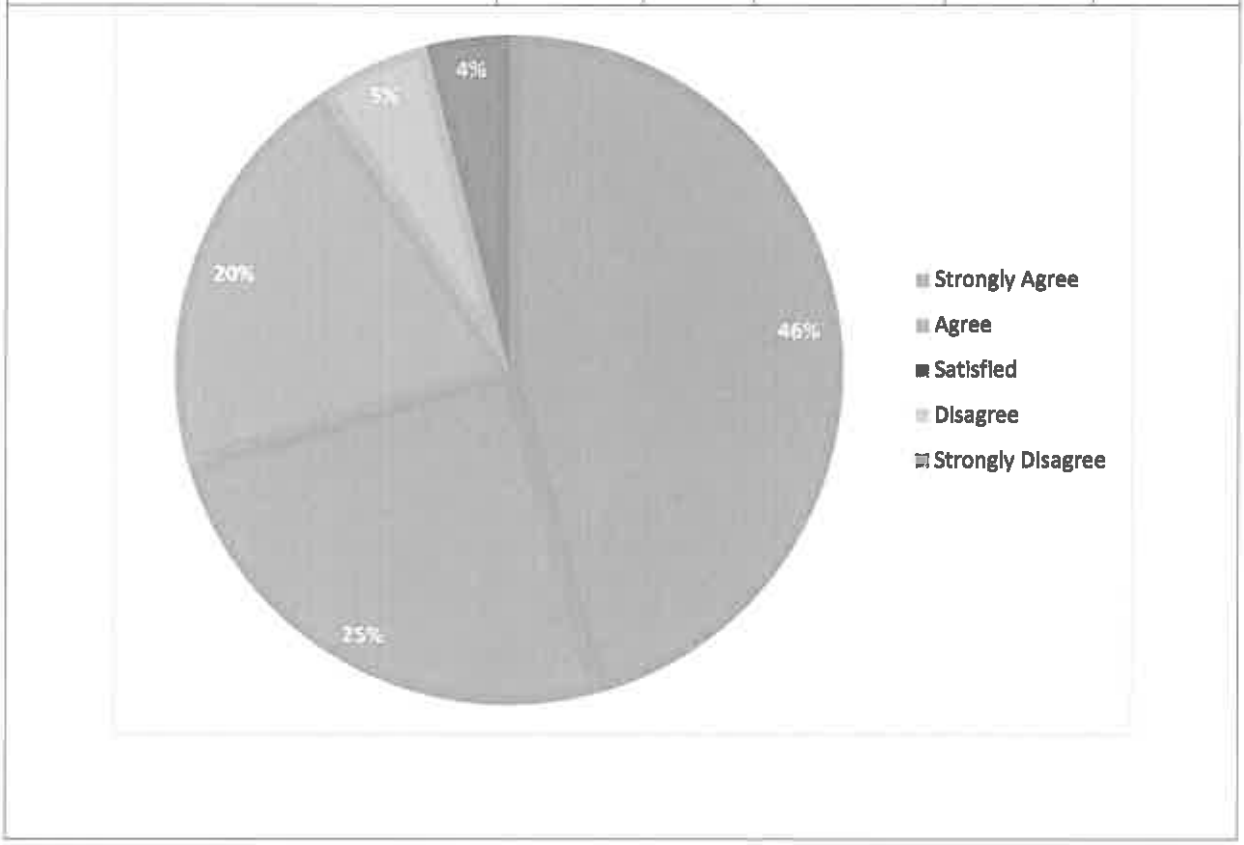
Curriculum focus on skill development/entrepreneurship	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	42.4	24.8	23.2	7.2	2.4



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Q.7. Does the curriculum have satisfactory number of elective courses?

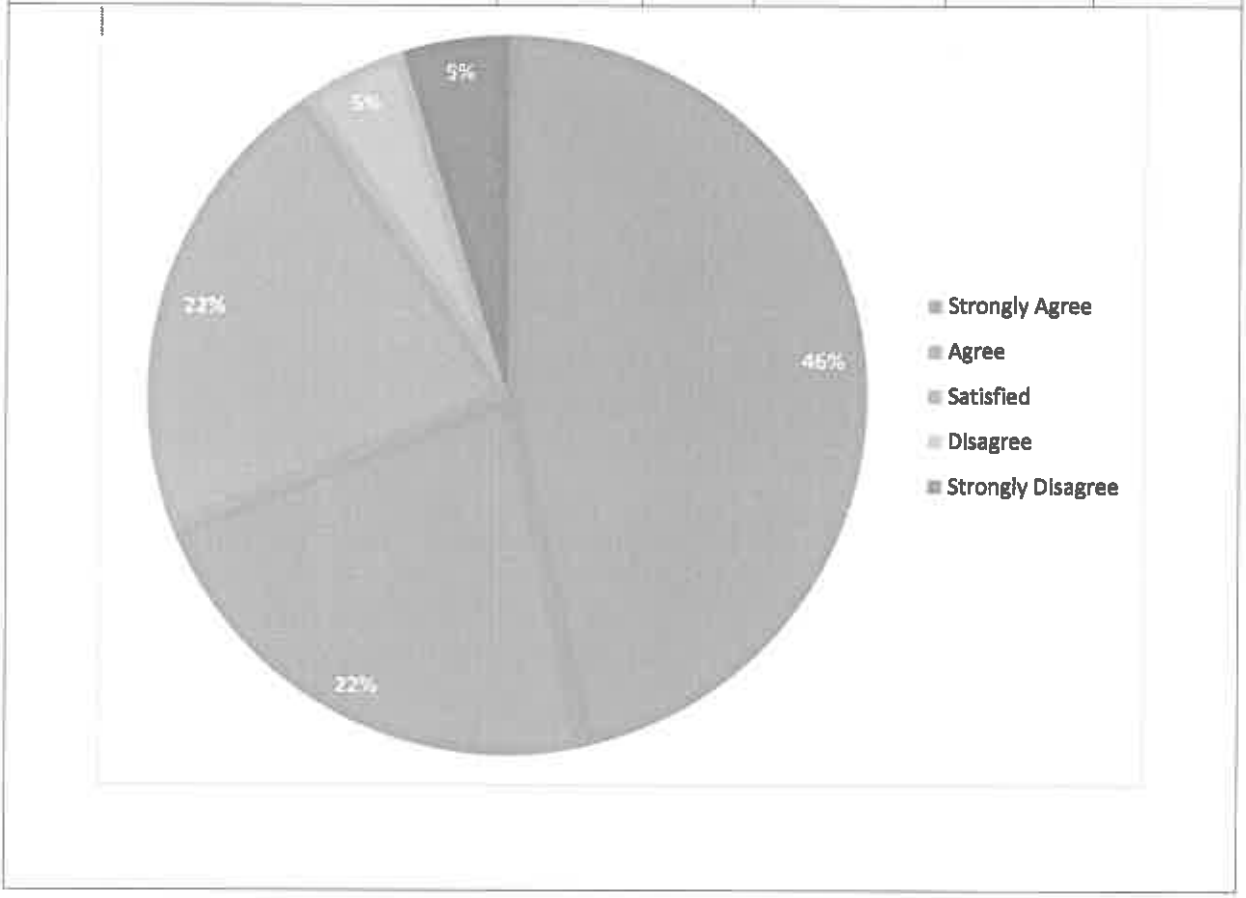
Curriculum have satisfactory number of elective courses	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	45.6	24.8	20	5.6	4



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Q.8. Does the curriculum focus on life skill or help in value addition?

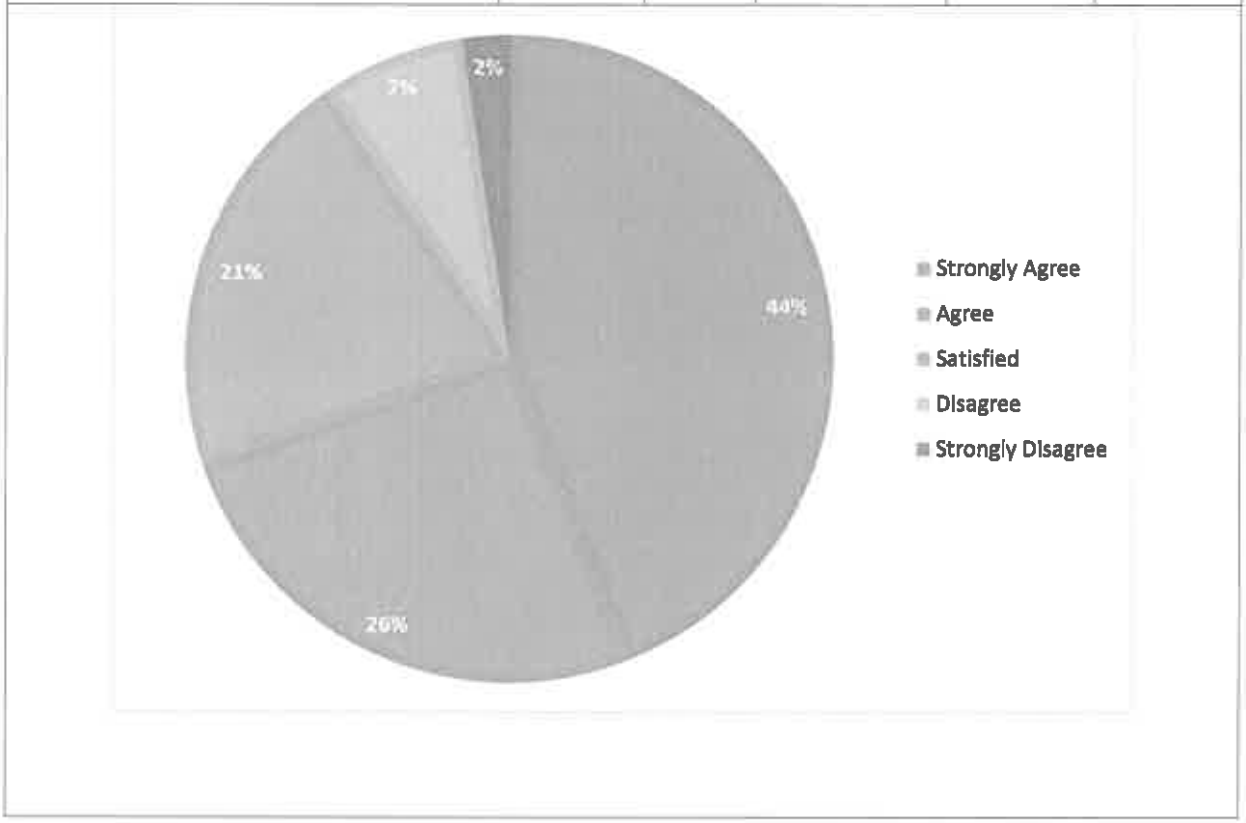
Curriculum focus on life skill or help in value addition	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	46.4	22.4	21.6	4.8	4.8



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Q.9. Do the theory subjects are properly linked to the laboratories/provide real-life exposure?

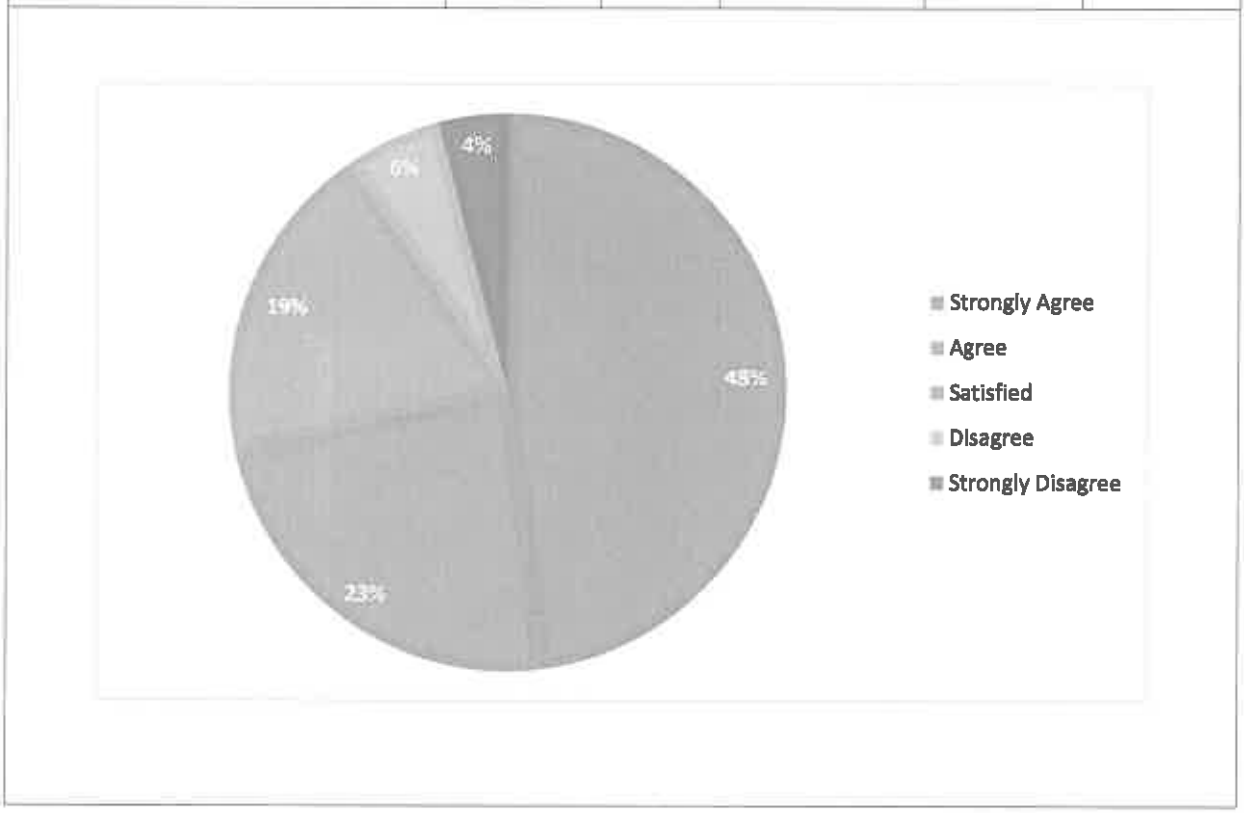
Theory subjects are properly linked to the laboratories/provide real-life exposure	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	44	25.6	20.8	7.2	2.4



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Q.10. Does the curriculum provide multidisciplinary knowledge/information to a student?

Curriculum provide multidisciplinary knowledge/information to a student	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	47.2	23.2	18.4	5.6	4



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School of Engineering & Technology (125)						
Question	**Details**	**Strongly Agree**	**Agree**	**Satisfactory**	**Disagree**	**Strongly Disagree**
Whether the curriculum has depth of the subjects and clears the concept?	No of Students	60	30	23	8	4
	Percentage	48	24	18.4	6.4	3.2
How do you rate the course outcomes and relevance to the course content?	No of Students	55	32	26	7	5
	Percentage	44	25.6	20.8	5.6	4
How do you rate the sequence of units in the courses?	No of Students	58	31	25	6	5
	Percentage	46.4	24.8	20	4.8	4
How do you rate the credits allotted to individual courses?	No of Students	54	33	26	9	3
	Percentage	43.2	26.4	20.8	7.2	2.4
Does the curriculum focus on employability/career orientation?	No of Students	56	32	25	7	5
	Percentage	44.8	25.6	20	5.6	4
Does the curriculum focus on skill development/entrepreneurship?	No of Students	53	31	29	9	3
	Percentage	42.4	24.8	23.2	7.2	2.4
Does the curriculum have satisfactory number of elective courses?	No of Students	57	31	25	7	5
	Percentage	45.6	24.8	20	5.6	4
Does the curriculum focus on life skill or help in value addition?	No of Students	58	28	27	6	6
	Percentage	46.4	22.4	21.6	4.8	4.8
Do the theory subjects are properly linked to the laboratories/provide real-life exposure?	No of Students	55	32	26	9	3
	Percentage	44	25.6	20.8	7.2	2.4
Does the curriculum provide multidisciplinary knowledge/information to a student?	No of Students	59	29	23	7	5
	Percentage	47.2	23.2	18.4	5.6	4

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Analysis of Feedback:

Based on the feedback from students of the School of Engineering & Technology, the curriculum received a generally positive response, though there are areas that could benefit from improvement. 48% of students strongly agreed that the curriculum has sufficient depth and clarifies concepts, with 24% agreeing and 18.4% finding it satisfactory. Regarding course outcomes and their relevance to the content, 44% strongly agreed, while 25.6% agreed, and 20.8% were satisfied. The sequence of units in the courses was positively rated by 46.4%, with 24.8% agreeing and 20% finding it satisfactory. When it comes to the credits allotted to individual courses, 43.2% of students strongly agreed, with 26.4% agreeing and 20.8% finding it satisfactory.

The curriculum's focus on employability and career orientation was endorsed by 44.8% of students, with 25.6% agreeing and 20% satisfied. Skill development and entrepreneurship were positively rated by 42.4% of students, with 24.8% agreeing and 23.2% being satisfied. Satisfaction with the number of elective courses was expressed by 45.6% of students, with 24.8% agreeing and 20% finding it satisfactory. Life skill development and value addition was well-rated by 46.4% of students, with 22.4% agreeing and 21.6% being satisfied.

The integration of theory with laboratory work and real-life exposure received positive feedback from 44% of students, with 25.6% agreeing and 20.8% finding it satisfactory. Finally, the curriculum's ability to provide multidisciplinary knowledge was rated positively by 47.2% of students, with 23.2% agreeing and 18.4% being satisfied. Overall, the feedback suggests that while the curriculum is well-regarded, especially in terms of depth, career orientation, and multidisciplinary knowledge, there are areas like skill development, electives, and practical exposure that could be improved further.

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Action Taken Report

(School of Engineering and Technology)

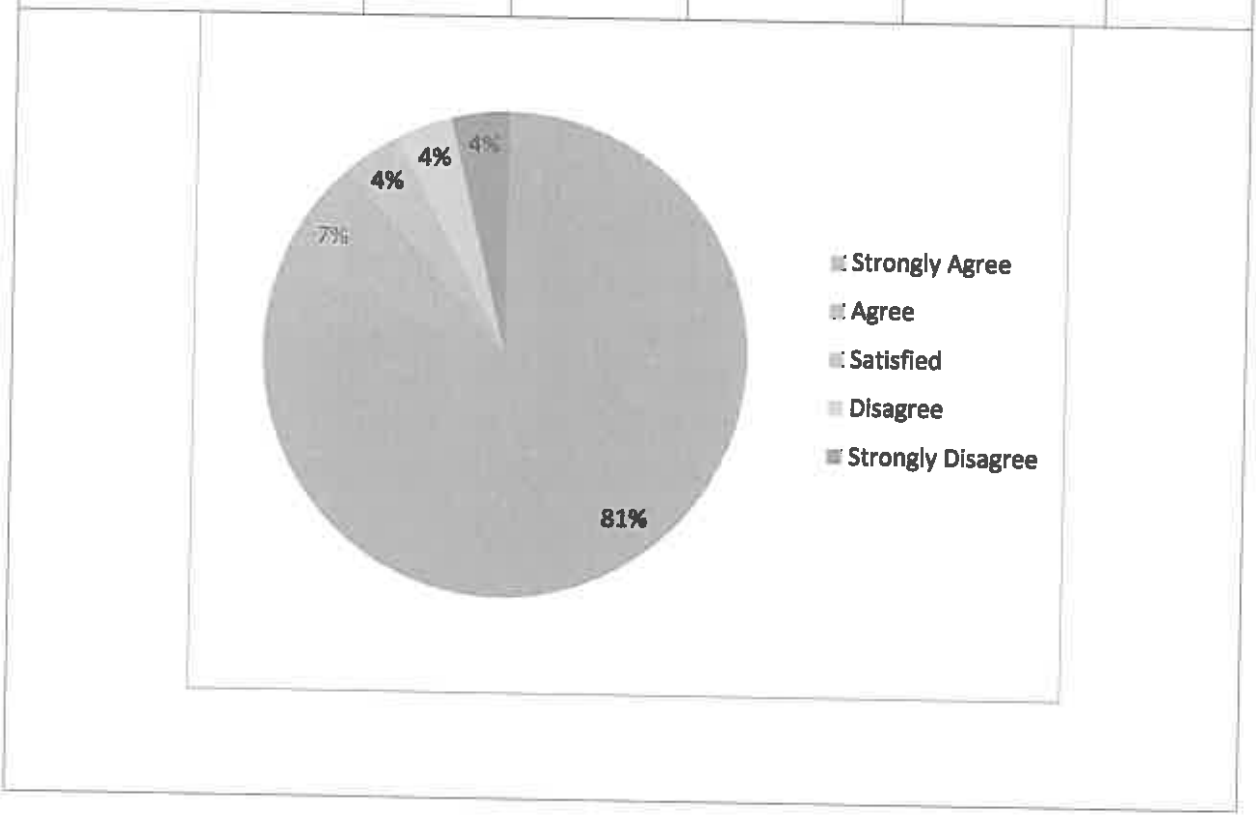
Sr. No.	Suggestions	Action Taken	Outcome
1.	Improve integration of theory with practical/laboratory work	Increase the frequency of practical sessions and ensure they align closely with theoretical lessons	Better application of theoretical knowledge in real-world settings, enhancing understanding
2.	Enhance focus on skill development and entrepreneurship	Introduce more workshops, seminars, and projects focused on skill-building and entrepreneurship	Increased student interest and engagement in entrepreneurship and skill development
3.	Increase the number of elective courses available	Introduce additional electives and allow for more flexibility in course selection	More student choices, leading to better customization of the academic experience based on career interests
4.	Strengthen the curriculum's focus on employability and career orientation	Collaborate with industry professionals for guest lectures, internships, and job placement programs	Improved career outcomes for students, with better industry exposure and employability skills

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Tel: +91 7830810052
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Analysis of Teacher's Feedback of School of Engineering and Technology through Table and Pie Chart

Q.1 The curriculum is well organized and balanced for the programme with proper credit allocation.

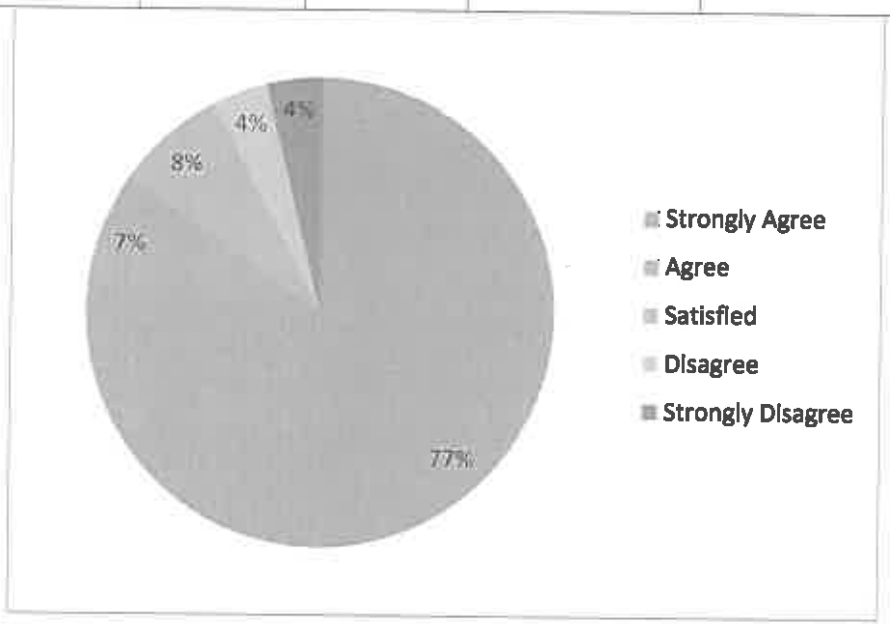
The curriculum is well organized and balanced for the programme with proper credit allocation	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	80.77	7.69	3.85	3.85	3.85



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Q.2 The courses have adequate balance between theory and application for student's holistic development.

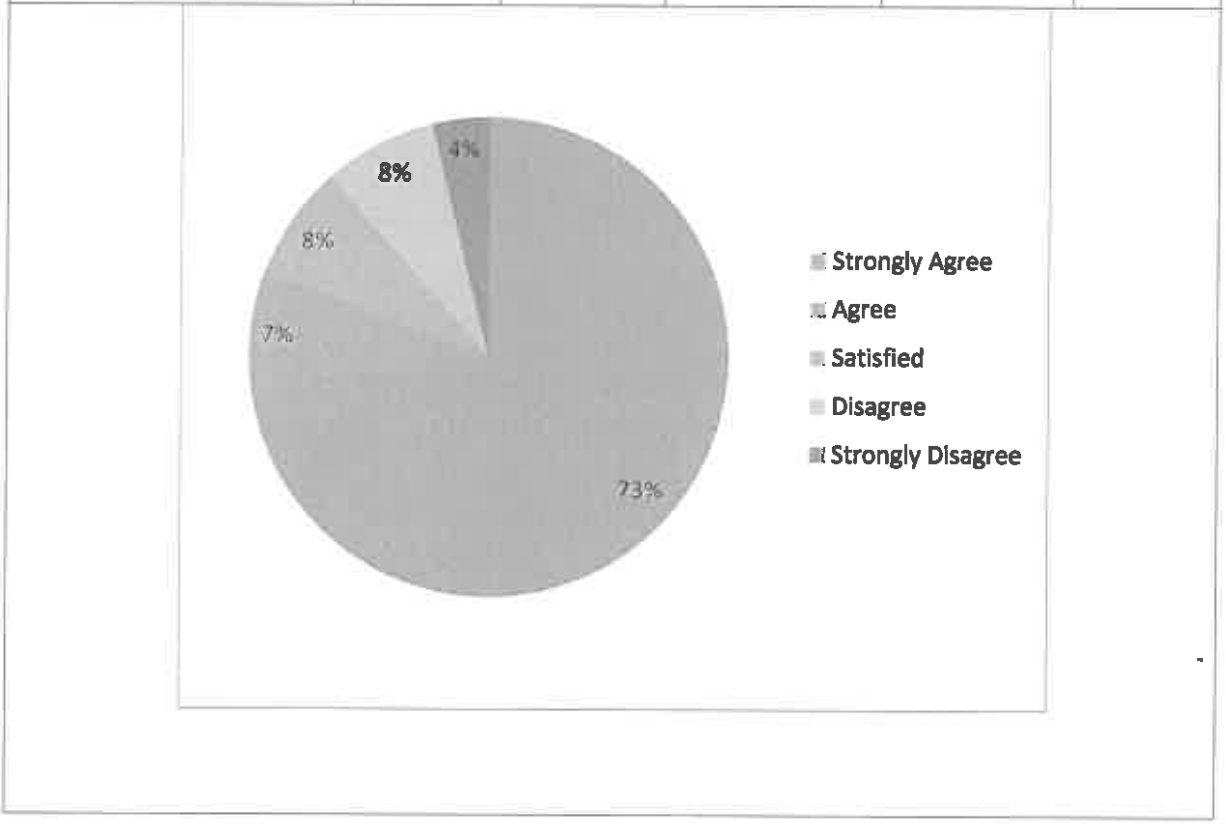
The courses have adequate balance between theory and application for student's holistic development.	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	76.92	7.69	7.69	3.85	3.85



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Q.3 The curriculum has adequate scope for multidisciplinary knowledge and sufficient number of elective courses.

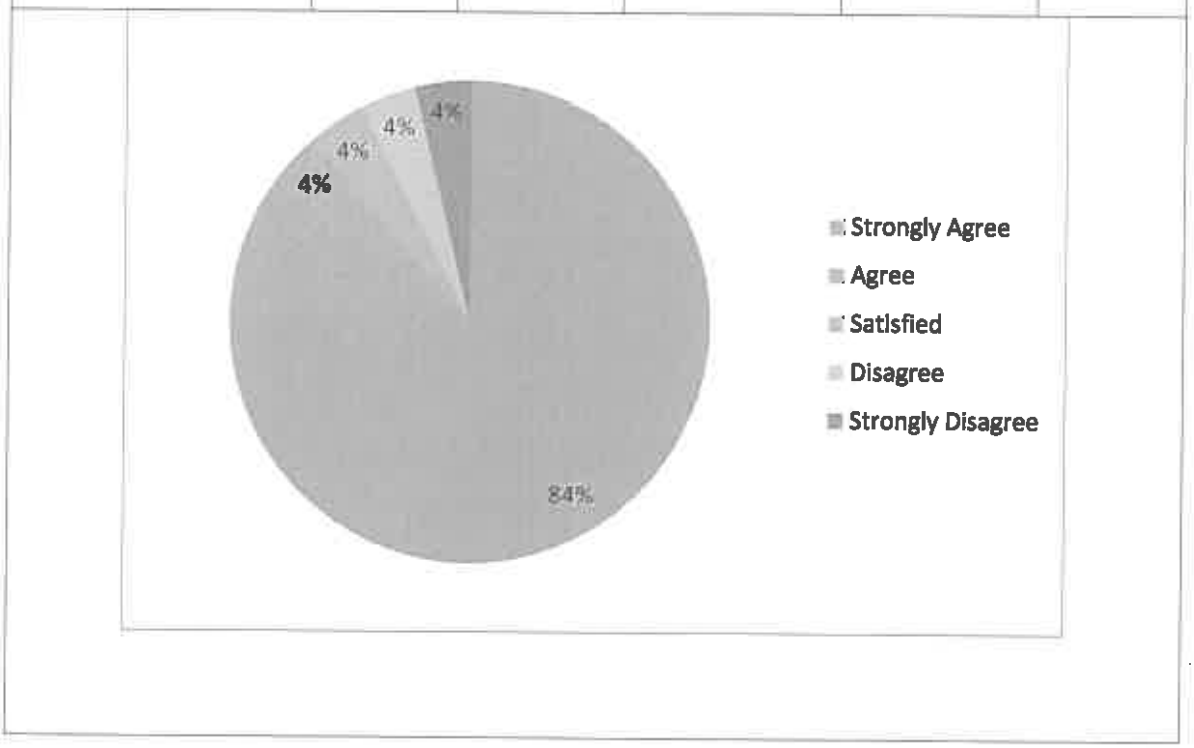
The curriculum has adequate scope for multidisciplinary knowledge and sufficient number of elective courses.	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	73.08	7.69	7.69	7.69	3.85



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Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U: www.sug.ac.in

Q.4 The curriculum has focus on personality development by presence of courses on human values and professional ethics

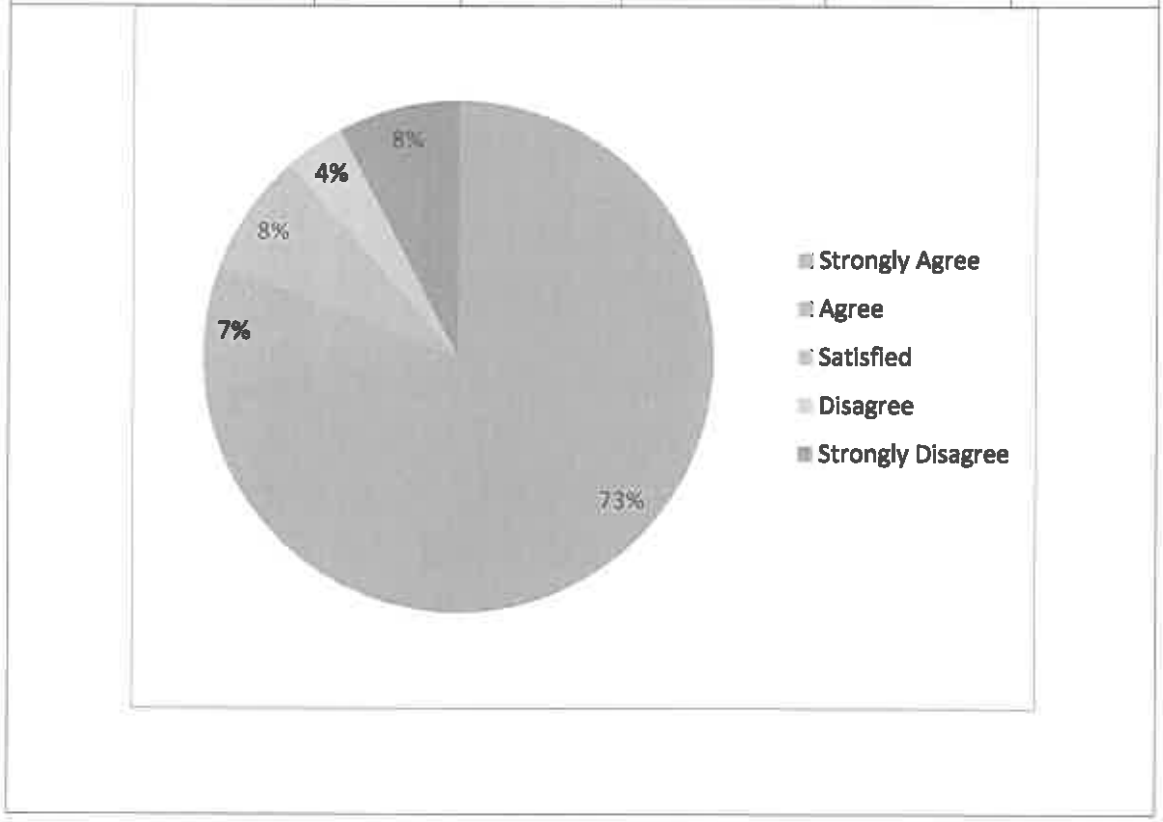
The curriculum has focus on personality development by presence of courses on human values and professional ethics.	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	84.62	3.85	3.85	3.85	3.85



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EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional
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247341, India
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U.: www.sug.ac.in

Q.5 The curriculum provides enough scope for improving entrepreneurial skill as well as industry readiness.

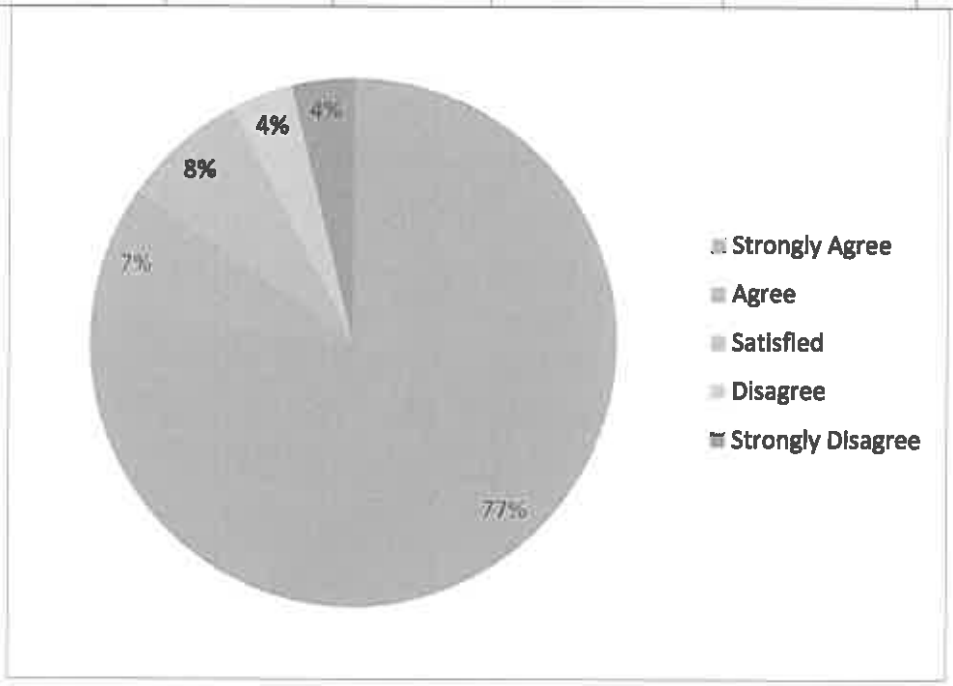
The curriculum provides enough scope for improving entrepreneurial skill as well as industry readiness.	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	73.08	7.69	7.69	3.85	7.69



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Babu Vijendra Marg, Adarsh Institutional
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247341, India
Tel: +91 7830810052
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Q.6 The curriculum provides ample knowledge for increased employability and to promote students for higher education.

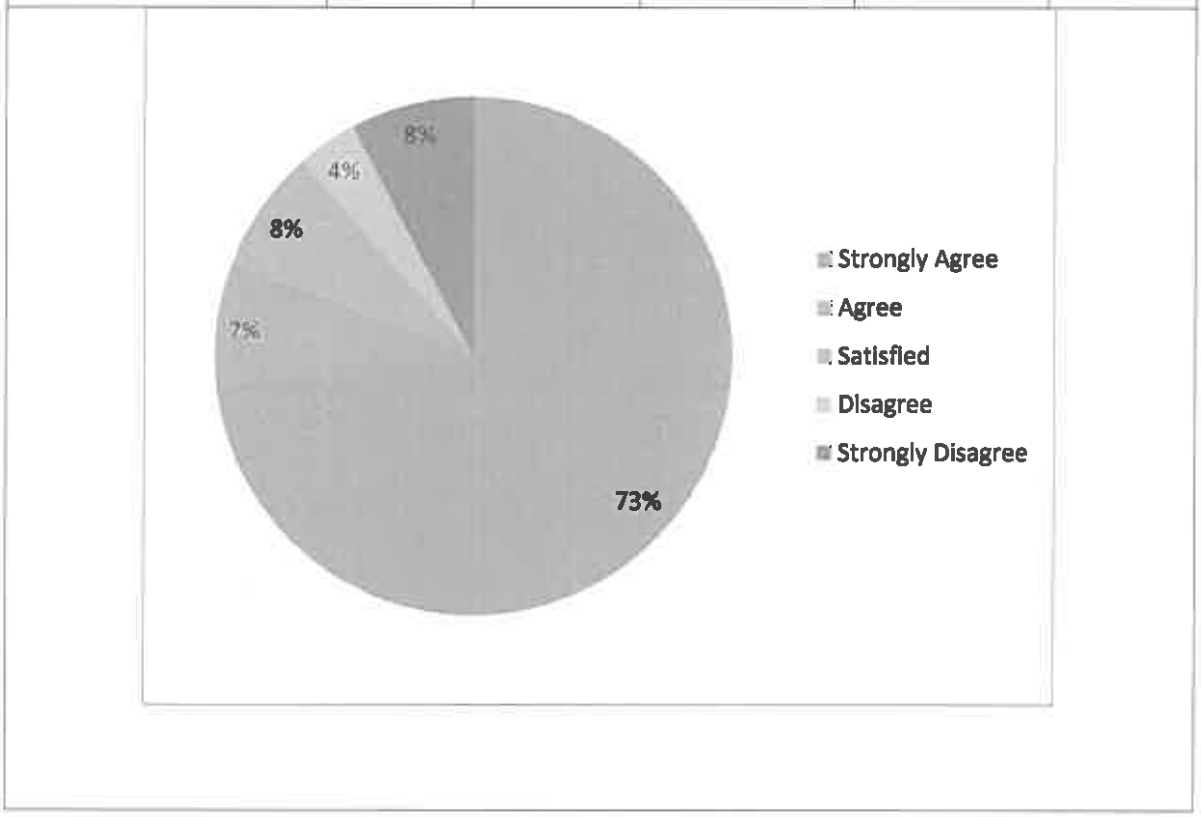
The curriculum provides ample knowledge for increased employability and to promote students for higher education.	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	76.92	7.69	7.69	3.85	3.85



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Babu Vijendra Marg, Adarsh Institutional
Area Gangoh, Distt. Saharanpur (U.P.)
247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U: www.sug.ac.in

Q.7 The curriculum helps in enhancing problem solving capability related to local/global societal issues.

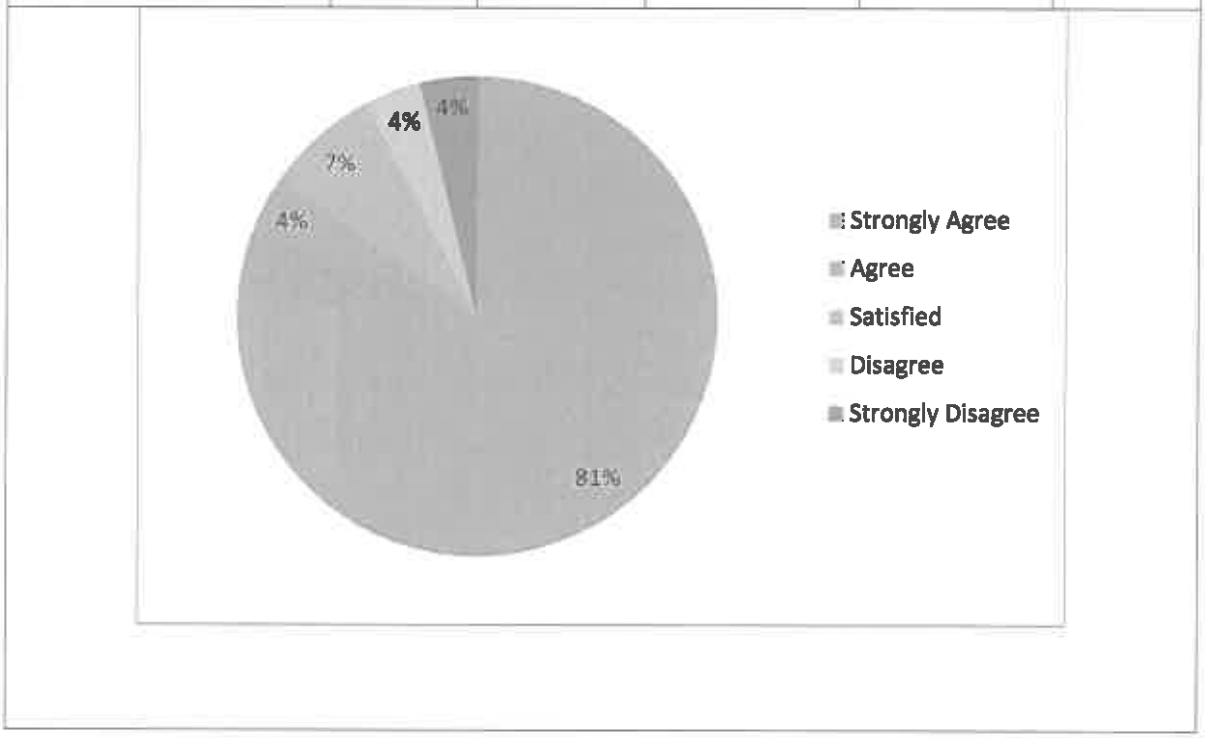
The curriculum helps in enhancing problem solving capability related to local/global societal issues.	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	73.08	7.69	7.69	3.85	7.69



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Babu Vijendra Marg, Adarsh Institutional
Area Gangoh, Distt. Saharanpur (U.P.)
247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

Q.8 Adequate freedom is given to offer opinion on design & development of curriculum.

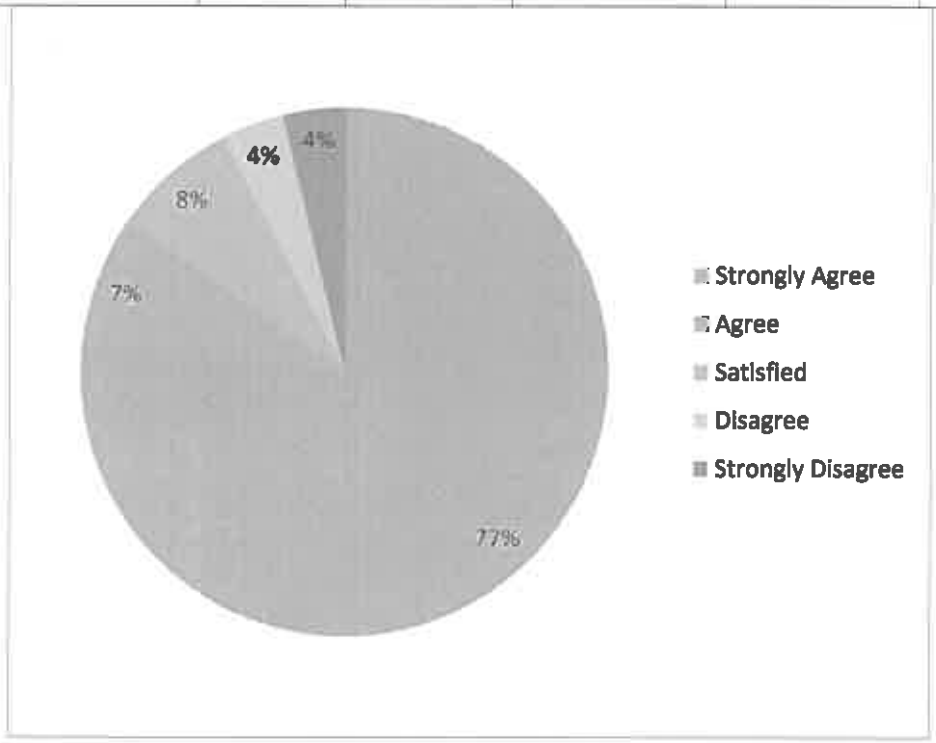
Adequate freedom is given to offer opinion on design & development of curriculum.	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	80.77	3.85	7.69	3.85	3.85



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Babu Vijendra Marg, Adarsh Institutional
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247341, India
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U.: www.sug.ac.in

Q.9 The existing system for curriculum revision is found to be effective.

The existing system for curriculum revision is found to be effective.	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	76.92	7.69	7.69	3.85	3.85



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School of Engineering and Technology (26)

Total no. of Teachers: 26		Strongly Agree	Agree	Satisfied	Disagree	Strongly Disagree
The curriculum is well organized and balanced for the programme with proper credit allocation.	No. of Teachers	21.00	2.00	1.00	1.00	1.00
	Percentage	80.77	7.69	3.85	3.85	3.85
The courses have adequate balance between theory and application for student's holistic development.	No. of Teachers	20.00	2.00	2.00	1.00	1.00
	Percentage	76.92	7.69	7.69	3.85	3.85
The curriculum has adequate scope for multidisciplinary knowledge and sufficient number of elective courses.	No. of Teachers	19.00	2.00	2.00	2.00	1.00
	Percentage	73.08	7.69	7.69	7.69	3.85
The curriculum has focus on personality development by presence of courses on human values and professional ethics	No. of Teachers	22.00	1.00	1.00	1.00	1.00
	Percentage	84.62	3.85	3.85	3.85	3.85
The curriculum provides enough scope for improving entrepreneurial skill as well as industry readiness.	No. of Teachers	19.00	2.00	2.00	1.00	2.00
	Percentage	73.08	7.69	7.69	3.85	7.69
The curriculum provides ample knowledge for	No. of Teachers	20.00	2.00	2.00	1.00	1.00

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Babu Vijendra Marg, Adarsh Institutional
Area Gangoh, Distt. Saharanpur (U.P.)
247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

increased employability and to promote students for higher education.	Percentage	76.92	7.69	7.69	3.85	3.85
The curriculum helps in enhancing problem solving capability related to local/global societal issues	No. of Teachers	19.00	2.00	2.00	1.00	2.00
	Percentage	73.08	7.69	7.69	3.85	7.69
Adequate freedom is given to offer opinion on design & development of curriculum.	No. of Teachers	21.00	1.00	2.00	1.00	1.00
	Percentage	80.77	3.85	7.69	3.85	3.85
The existing system for curriculum revision is found to be effective.	No. of Teachers	20.00	2.00	2.00	1.00	1.00
	Percentage	76.92	7.69	7.69	3.85	3.85

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Babu Vijendra Marg, Adarsh Institutional
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E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

Analysis of Feedback:

The feedback reflects a highly positive perception of the curriculum, with most aspects receiving above 90% satisfaction. The curriculum is considered well-organized and balanced, with 92.31% agreement on proper credit allocation, indicating a well-structured program. Similarly, the balance between theoretical and practical components, and the focus on human values and professional ethics, also scored 92.31%, highlighting strong support for holistic student development.

Multidisciplinary knowledge and the availability of elective courses received a slightly lower rating of 88.46%, suggesting there may be some scope for broadening the academic offerings. The same score was observed for entrepreneurial skills, industry readiness, and the curriculum's role in addressing local and global societal issues, indicating solid but improvable performance in these practical domains.

The curriculum's effectiveness in enhancing employability and promoting higher education is well-regarded, with 92.31% agreement. Additionally, faculty members feel empowered in curriculum design and review processes, with a 92.31% rating for freedom of input and satisfaction with the revision mechanism.

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U.: www.sug.ac.in

Action Taken Report

(School of Engineering and Technology)

Sr. No.	Suggestions	Action taken	Outcome
1	**Broaden multidisciplinary knowledge and increase elective offerings**	- Introduced new elective courses in emerging areas such as Artificial Intelligence, Data Science, and Renewable Energy.	- Enhanced curriculum diversity, allowing students to tailor their education to specific interests.
		- Collaborated with industry experts to design and offer specialized electives.	- Increased student engagement and satisfaction with elective offerings.
2	**Enhance entrepreneurial skills and industry readiness**	- Established an Entrepreneurship Development Cell (EDC) to mentor students on startup ideation and business planning.	- Improved student preparedness for the job market and entrepreneurial ventures.

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14th Meeting of BOS (Item No. 14.4 Annexure -4)

SHOBHIT UNIVERSITY GANGOH
SCHOOL OF ENGINEERING AND TECHNOLOGY
List of Examiners (2019-2020)

Sr. No.	Course code with Title	Name, Designation, Institution and Correspondence address of the Paper Setter/Examiner	Contact number with E. Mail ID
1	CCAC-102:Java Programming	External Examiner 1. Dr. Abahay Bhatia	dr.abhay@ritrookee.ac.in 9837386973
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com, 97604492192
		3. Dr. Mamta	mamta.bansal345@gmail.com,9997025606
		Internal Examiner 1. Dr. Tarun Kumar Sharma	Tarun.sharma@shobhituniversity.ac.in, 9456086759
		2. Mr. Vinod Kumar	Vinod.kumar@shobhituniversity.ac.in, 9758749227
2	AECC-104 Environmental Science	External Examiner 1. Dr. Abahay Bhatia	dr.abhay@ritrookee.ac.in 9837386973
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com, 97604492192
		3. Dr. Mamta	mamta.bansal345@gmail.com,9997025606
		Internal Examiner 1. Mr. Kuldeep Chauhan	Kuldeep.chauhan@shobhituniversity.ac.in, 9756997090
		2. Mr. Nitin Kumar	nitin.kumar@shobhituniversity.ac.in

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional
Area Gangoh, Distt. Saharanpur (U.P.)
247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

			9758170029
3	GCAC 106: Digital Electronics	External Examiner 1. Dr. Abahay Bhatia	dr.abhay@ritrookee.ac.in 9837386973
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com, 97604492192
		3. Dr. Mamta	mamta.bansal345@gmail.com,99970 25606
		Internal Examiner 1. Mr. Nitin Kumar	nitin.kumar@shobhituniversity.ac.in 9758170029
		2. Ms. Sumika Jain	Sumika.jai@shobhituniversity.ac.in 9456666326
4	CCAC202: Software Engineering	External Examiner 1. Dr. Abahay Bhatia	dr.abhay@ritrookee.ac.in 9837386973
		2. Dr. Mamta	mamta.bansal345@gmail.com,99970 25606
		3. Dr. Ankit Sharma	gurukul.ankit@gmail.com, 97604492192
		Internal Examiner 1. Mr. Vinod Kumar	
		2. Mr. Kuldeep Chauhan	Kuldeep.chauhan@shobhituniversity.ac.in, 9756997090
5	CCAC 204: Design and Analysis of Algorithms	External Examiner 1. Dr. Abahay Bhatia	dr.abhay@ritrookee.ac.in 9837386973
		2. Dr. Mamta	mamta.bansal345@gmail.com,99970 25606
		3. Dr. Ankit Sharma	gurukul.ankit@gmail.com, 97604492192

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

		Internal Examiner 1. Mr. Vinod Kumar	Vinod.kumar@shobhituniversity.ac.in, 9758749227
		2. Ms. Sumika Jain	Sumika.jai@shobhituniversity.ac.in 9456666326
6	SCAC-202: UNIX/LINUX Programming	External Examiner 1. Dr. Abahay Bhatia	dr.abhay@ritrookee.ac.in, 9837386973
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com, 97604492192
		3.Dr Mamta	mamta.bansal345@gmail.com,9997025606
		Internal Examiner 1. Mr. Vinod Kumar	Vinod.kumar@shobhituniversity.ac.in, 9758749227
		2. Ms. Sumika Jain	Sumika.jai@shobhituniversity.ac.in 9456666326
7	GCAC-202: Discrete Structure	External Examiner 1. Dr. Ankit Sharma	gurukul.ankit@gmail.com, 97604492192
		2. Dr. Abahay Bhatia	dr.abhay@ritrookee.ac.in 9837386973
		3.dr Mamta	mamta.bansal345@gmail.com,9997025606
		Internal Examiner 1. Mr. Vinod Kumar	Vinod.kumar@shobhituniversity.ac.in, 9758749227
		2. Ms. Sumika Jain	Sumika.jai@shobhituniversity.ac.in 9456666326
8	CCAC-302: Artificial	External Examiner	

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional
Area Gangoh, Distt. Saharanpur (U.P.)
247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

	Intelligence	1. Dr. Abahay Bhatia	dr.abhay@ritrookee.ac.in 9837386973
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com 97604492192
		3. Dr. Mamta	mamta.bansal345@gmail.com 99970 25606
		Internal Examiner 4. Dr. Tarun Kumar Sharma	Tarun.sharma@shobhituniversity.ac.in, 9456086759
		5. Mr. Vinod Kumar	Vinod.kumar@shobhituniversity.ac.in, 9758749227
9	CCAC-304: Computer Graphics	External Examiner 1. Dr. Ankit Sharma	gurukul.ankit@gmail.com, 97604492192
		2. Dr. Mamta	
		3. Dr. Abahay Bhatia	dr.abhay@ritrookee.ac.in 9837386973
		Internal Examiner 1. Dr. Tarun Kumar Sharma	Tarun.sharma@shobhituniversity.ac.in, 9456086759
		2. Mr. Vinod Kumar	Vinod.kumar@shobhituniversity.ac.in, 9758749227
10	SCAC-302: Management Information system	External Examiner 1. Dr. Ankit Sharma	gurukul.ankit@gmail.com, 97604492192
		2. Dr. Abahay Bhatia	dr.abhay@ritrookee.ac.in 9837386973
		3. Dr. Mamta	mamta.bansal345@gmail.com,99970 25606
		Internal Examiner	

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Babu Vijendra Marg, Adarsh Institutional
Area Gangoh, Distt. Saharanpur (U.P.)
247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.shu.ac.in

		1. Mr. Kuldeep Chauhan	Kuldeep.chauhan@shobhituniversity.ac.in, 9756997090
		2. Mr. Nitin Kumar	nitin.kumar@shobhituniversity.ac.in 9758170029
11	SCAC-304 : Software Testing	External Examiner 1. Dr. Abahay Bhatia	dr.abhay@ritrookee.ac.in 9837386973
		2. Dr. Mamta	mamta.bansal345@gmail.com,9997025606
		3. Dr. Ankit Sharma	gurukul.ankit@gmail.com, 97604492192
		Internal Examiner 1. Dr. Tarun Kumar Sharma	Tarun.sharma@shobhituniversity.ac.in, 9456086759
		2. Mr. Vinod Kumar	Vinod.kumar@shobhituniversity.ac.in, 9758749227
12	SCAC-306 Soft Computing	External Examiner 1. Dr. Abahay Bhatia	dr.abhay@ritrookee.ac.in, 9837386973
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com, 97604492192
		3. Dr. Mamta	mamta.bansal345@gmail.com,9997025606
		Internal Examiner 1. 1.Mr. Kuldeep Chauhan	Kuldeep.chauhan@shobhituniversity.ac.in, 9756997090
		2. 2.Mr. Nitin Kumar	nitin.kumar@shobhituniversity.ac.in 9758170029

MCA List of Examiners (2019-2020)

Sr. No.	Course code with Title	Name, Designation, Institution	Contact number with E. Mail ID

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional
Area Gangoh, Distt. Saharanpur (U.P.)
247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

		and Correspondence address of the Paper Setter/Examiner	
1	Network Security & Cryptography (CCA 502)	External Examiner 1. Dr. Abhay Bhatia	Dr.abhay@ritroorkee.ac.in 9837386973
		2. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		3. Dr. Mamta Bansal	Mamta.bansal345@gmail.com 9997025606
		Internal Examiner 1. Mr. Jitendra K. Saini	Jitendra.saini@shobhituniversity.ac.in 7669110295
		2. Mr. Shahnawaaj	Mohd.shahnawaz@shobhituniversity.ac.in 9536940100
2.	Compiler Design (CCA 504)	External Examiner 1. Dr. Ankit Sharma	Gurukul.ankit@gmail.com 9760492192
		2. Dr. Arun Giri	Arungiri123@yahoo.com 981880953
		3. Dr. Nidhi Tyagi	Nidhi.tyagi9785@gmail.com 9927007273
		Internal Examiner 1. Dr. Varun Bansal	Varun.bansal@shobhituniversity.ac.in 9675478559
		2. Mr. Shubham Kumar	Shubham.k@shobhituniversity.ac.in 7895408519
3.	Knowledge Management & Expert System (CCA 506)	External Examiner 1. Dr. Ankit Sharma	Gurukul.ankit@gmail.com 9760492192
		2. Dr. Arun Giri	Arungiri123@yahoo.com 981880953
		3. Dr. Nidhi Tyagi	Nidhi.tyagi9785@gmail.com 9927007273
		Internal Examiner 1. Dr. Tarun Kumar Sharma	Tarun.sharma@shobhituniversity.ac.in 9456086759
		2. Mr. Vinod Kumar	Vinod.kumar@shobhituniversity.ac.in 9758749227
4.	Mobile Computing	External Examiner	Nidhi.tyagi9785@gmail.com

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

	(CCA 510)	1. Dr. Nidhi Tyagi	9927007273
		2. Dr. Mamta Bansal	Mamta.bansal345@gmail.com 9997025606
		3. Dr. Abhay Bhatia	Dr.abhay@ritroorkee.ac.in 9837386973
		Internal Examiner 1. Mr. Jitendra K. Saini	Jitendra.saini@shobhituniversity.ac.in 7669110295
		2. Dr. Tarun Kumar Sharma	Tarun.sharma@shobhituniversity.ac.in 9456086759
5.	Software Project Management (UCA 506)	External Examiner 1. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		2. Dr. Ankit Sharma	Gurukul.ankit@gmail.com 9760492192
		3. Dr. Arun Giri	Arungiri123@yahoo.com 981880953
		Internal Examiner 1. Dr. Varun Bansal	Varun.bansal@shobhituniversity.ac.in 9675478559
		2. Mr. Jitendra K. Saini	Jitendra.saini@shobhituniversity.ac.in 7669110295
6.	Dissertation (CCA 602)	External Examiner 1. Dr. Ankit Sharma	Gurukul.ankit@gmail.com 9760492192
		2. Dr. Arun Giri	Arungiri123@yahoo.com 981880953
		3. Dr. Nidhi Tyagi	Nidhi.tyagi9785@gmail.com 9927007273
		Internal Examiner 1. Dr. Varun Bansal	Varun.bansal@shobhituniversity.ac.in 9675478559
		2. Ms. Sumika Jain	Sumika.jain@shobhituniversity.ac.in 9456666326
7.	Seminar and Progress Reports (CCA 604)	External Examiner 1. Dr. Nidhi Tyagi	Nidhi.tyagi9785@gmail.com 9927007273
		2. Dr. Mamta Bansal	Mamta.bansal345@gmail.com 9997025606

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

		3. Dr. Abhay Bhati	Dr.abhay@ritroorkee.ac.in 9837386973
		Internal Examiner 1. Mr. Jitendra K. Saini	Jitendra.saini@shobhituniversity.ac.in 7669110295
		2. Mr. Shahnawaj	Mohd.shahnawaz@shobhituniversity.ac.in 9536940100

M.Tech List of Examiners (2019-2020)

Sr. No.	Course code with Title	Name, Designation, Institution and Correspondence address of the Paper Setter/Examiner	Contact number with E. Mail ID
1.	Resource Management of Computer Systems CE- 502	External Examiner 1. Dr. Arun Giri	arungiri123@yahoo.com 9818809053
		2. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		3. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		Internal Examiner 1. Ms. Sumika Jain	sumika.jain@shobhituniversity.ac.in 9456666326
		2. Mr. Raveendra Kr. Bharati	raveendra.bharati@shobhituniversity.ac.in 9953328744
2.	Soft Computing CE-504	External Examiner 1. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192
		3. Dr. Mamta Bansal	mamta.bansal345@gmail.com

Shobhit University
EDUCATION EMPOWERS
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Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

			9997025606
		Internal Examiner 1. Mr. Raveendra Kr. Bharati	anil.nishad@shobhituniversity.ac.in 8171418088
		2. Mr. Kuldeep Chauhan	kuldeep.chauhan@shobhituniversity.ac.in 9756997090
3.	High Performance Computer Architecture CE- 506	External Examiner 1. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		2. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		3. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		Internal Examiner 1. Mr. Varun Bansal	varun.bansal@shobhituniversity.ac.in 9675478559
		2. Mr. Nitin Kumar	nitin.kumar@shobhituniversity.ac.in 9758170029
4.	Mobile & Wireless Communication CE-522	External Examiner 1. Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192
		2. Dr. Mamta Bansal	mamta.bansal345@gmail.com 9997025606
		3. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		Internal Examiner 1. Mr. Raveendra Kr. Bharati	anil.nishad@shobhituniversity.ac.in 8171418088
		2. Mr. Kuldeep Chauhan	kuldeep.chauhan@shobhituniversity.ac.in 9756997090

Shobhit University
EDUCATION EMPOWERS
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Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

5.	Operating systems Lab CE-552	External Examiner 1. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192
		3. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		Internal Examiner 1. Mr. Vinod Kumar	vinod.kumar@shobhituniversity.ac.in 9758749227
		2. Ms. Sumika Jain	sumika.jain@shobhituniversity.ac.in 9456666326
6.	Seminar-II CE-582	External Examiner 1. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192
		3. Dr. Mamta Bansal	mamta.bansal345@gmail.com 9997025606
		Internal Examiner 1. Mr. Madhav P. Namdev	Madhav.namdev@shobhituniversity.ac.in 94572731592
		2. Mr. Raveendra Kr. Bharati	raveendra.bharati@shobhituniversity.ac.in 9953328744
7.	Dissertation CE- 692	External Examiner 1. Dr. Arun Giri	arungiri123@yahoo.com 9818809053
		2. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		3. Dr. Maheep Singh	kingmaheep@gmail.com

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional
Area Gangoh, Distt. Saharanpur (U.P.)
247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

			9411293327
		Internal Examiner 1. Mr. Varun Bansal	varun.bansal@shobhituniversity.ac.in 9675478559
		2. Mr. Nitin Kumar	nitin.kumar@shobhituniversity.ac.in 9758170029

B.tech CSE (Examiner)

Sr. No.	Course code with Title	Name, Designation, Institution and Correspondence address of the Paper Setter/Examiner	Contact number with E. Mail ID
1.	MATHEMATICS-II (CMAN 102)	External Examiner 4. Dr. Arun Giri	arungiri123@yahoo.com 9818809053
		5. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		6. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		Internal Examiner 1. Dr. Vishvas Chand	vishvas.chand@shobhituniversity.ac.in 9286093196
		2. Mr. Abdulla Khan	abdulla.khan@shobhituniversity.ac.in 7454976780
2.	ENGINEERING PHYSICS (CPHN 102)	External Examiner 4. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		5. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327

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Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

		6. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		Internal Examiner 1. Mohd Ahamad	mohd.ahamad@shobhituniversity.ac.in 9548159750
		2. Mr. Hamid Ali	hamid.ali@shobhituniversity.ac.in 9759302770
3.	COMPUTER FUNDAMENTALS AND PROGRAMMING USING-C (CCSN 102)	External Examiner 4. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		5. Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192
		6. Dr. Mamta Bansal	mamta.bansal345@gmail.com 9997025606
		Internal Examiner 1. Mr. Varun Bansal	varun.bansal@shobhituniversity.ac.in 9675478559
		2. Mr. Kuldeep Chauhan	kuldeep.chauhan@shobhituniversity.ac.in 9756997090
4.	BASICS OF ELECTRICAL ENGINEERING (CEEN 102)	External Examiner 1. Dr. Arun Giri	arungiri123@yahoo.com 9818809053
		2. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		3. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		Internal Examiner	jasvirsingh.rana@shobhituniversity.

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

		1. Dr. Jasvir Singh Rana	ac.in 9759233859
		2. Mr. Shoyab Hussain	shoyab.hussain@shobhituniversity.ac.in 9837446390
5.	TECHNICAL COMMUNICATION (CPCN 102)	External Examiner 1. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		2. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		3. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		Internal Examiner 1. Mr. Dhruv Joshi	dhruv.joshi@shobhituniversity.ac.in 7302702677
		2. Ms. Abhilasha R. Goel	abhilasha.goyal@shobhituniversity.ac.in 8392821112
6.	ENGINEERING PHYSICS LAB (CPHN 152)	External Examiner 1. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192
		3. Dr. Mamta Bansal	mamta.bansal345@gmail.com 9997025606
		Internal Examiner 1. Mohd Ahamad	mohd.ahamad@shobhituniversity.ac.in 9548159750

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

		2. Mr. Hamid Ali	hamid.ali@shobhituniversity.ac.in 9759302770
7.	COMPUTER PROGRAMMING USING C LAB (CCSN 152)	External Examiner 1. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		2. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		3. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		Internal Examiner 1. Mr. Varun Bansal	varun.bansal@shobhituniversity.ac.in 9675478559
		2. Mr. Kuldeep Chauhan	kuldeep.chauhan@shobhituniversity.ac.in 9756997090
8.	BASIC ELECTRICAL ENGINEERING LAB (CEEN 152)	External Examiner 1. Dr. Arun Giri	arungiri123@yahoo.com 9818809053
		2. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		3. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		Internal Examiner 1. Dr. Jasvir Singh Rana	jasvirsingh.rana@shobhituniversity.ac.in 9759233859
		2. Mr. Shoyab Hussain	shoyab.hussain@shobhituniversity.ac.in 9837446390

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U: www.sug.ac.in

9.	OBJECT ORIENTED PROGRAMMING USING C++ (CCSN 202)	External Examiner 1. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192
		3. Dr. Mamta Bansal	mamta.bansal345@gmail.com 9997025606
		Internal Examiner 1. Dr. Tarun Kumar Sharma	tarun.sharma@shobhituniversity.ac.in 9456086759
		2. Mr. Vinod Kumar	vinod.kumar@shobhituniversity.ac.in 9758749227
10.	DESIGN AND ANALYSIS OF ALGORITHMS (CCSN 204)	External Examiner 1. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		2. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		3. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		Internal Examiner 1. Mr. Varun Bansal	varun.bansal@shobhituniversity.ac.in 9675478559
		2. Mr. Nitin Kumar	nitin.kumar@shobhituniversity.ac.in 9758170029
11.	INTERNET AND WEB	External Examiner 1. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

	TECHNOLOGY (CCSN 206)	2. Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192
		3. Dr. Mamta Bansal	mamta.bansal345@gmail.com 9997025606
		Internal Examiner 1. Mr. Varun Bansal	varun.bansal@shobhituniversity.ac.in 9675478559
		2. Mr. Kuldeep Chauhan	kuldeep.chauhan@shobhituniversity.ac.in 9756997090
12.	COMPUTER NETWORKS (CCSN 208)	External Examiner 1. Dr. Arun Giri	arungiri123@yahoo.com 9818809053
		2. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		3. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		Internal Examiner 1. Mr. Varun Bansal	varun.bansal@shobhituniversity.ac.in 9675478559
		2. Mr. Kuldeep Chauhan	kuldeep.chauhan@shobhituniversity.ac.in 9756997090
13.	FORMAL LANGUAGES & AUTOMATION THEORY (CCSN 210)	External Examiner 1. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		2. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

		3. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		Internal Examiner 1. Mr. Nitin Kumar	nitin.kumar@shobhituniversity.ac.in 9758170029
		2. Ms. Sumika Jain	sumika.jain@shobhituniversity.ac.in 9456666326
14.	TECHNICAL ENGLISH (CBSN 202)	External Examiner 1. Dr. Arun Giri	arungiri123@yahoo.com 9818809053
		2. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		3. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		Internal Examiner 1. Dr. Jasvir Singh Rana	jasvirsingh.rana@shobhituniversity.ac.in 9759233859
		2. Mr. Shoyab Hussain	shoyab.hussain@shobhituniversity.ac.in 9837446390
15.	OBJECT ORIENTED PROGRAMMING USING C++ LAB (CCSN 252)	External Examiner 1. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192
		3. Dr. Mamta Bansal	mamta.bansal345@gmail.com 9997025606

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

		Internal Examiner 1. Dr. Tarun Kumar Sharma	tarun.sharma@shobhituniversity.ac.in 9456086759
		2. Mr. Vinod Kumar	vinod.kumar@shobhituniversity.ac.in 9758749227
16.	DESIGN AND ANALYSIS OF ALGORITHMS LAB (CCSN 254)	External Examiner 1. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		2. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		3. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		Internal Examiner 1. Mr. Varun Bansal	varun.bansal@shobhituniversity.ac.in 9675478559
		2. Mr. Nitin Kumar	nitin.kumar@shobhituniversity.ac.in 9758170029
17.	INTERNET AND WEB TECHNOLOGY LAB (CCSN 256)	External Examiner 1. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192
		3. Dr. Mamta Bansal	mamta.bansal345@gmail.com 9997025606
		Internal Examiner 1. Mr. Varun Bansal	varun.bansal@shobhituniversity.ac.in

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

			9675478559
		2. Mr. Kuldeep Chauhan	kuldeep.chauhan@shobhituniversity.ac.in 9756997090
18.	COMPUTER GRAPHICS (CCSN 302)	External Examiner 1. Dr. Arun Giri	arungiri123@yahoo.com 9818809053
		2. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		3. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		Internal Examiner 1. Dr. Tarun Kumar Sharma	tarun.sharma@shobhituniversity.ac.in 9456086759
		2. Ms. Sumika Jain	sumika.jain@shobhituniversity.ac.in 9456666326
19.	DATA WAREHOUSING & DATA MINING (CCSN 304)	External Examiner 1. Dr. Abhay Bhatia	dr.abhav@itroorkee.ac.in 9837386973
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192
		3. Dr. Mamta Bansal	mamta.bansal345@gmail.com 9997025606
		Internal Examiner 1. Mr. Varun Bansal	varun.bansal@shobhituniversity.ac.in 9675478559
		2. Ms. Sumika Jain	sumika.jain@shobhituniversity.ac.i

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

			n 9456666326
20.	MOBILE COMPUTING (CCSN 306)	External Examiner 1. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		2. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		3. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		Internal Examiner 1. Ms. Sumika Jain	sumika.jain@shobhituniversity.ac.in 9456666326
		2. Mr. Nitin Kumar	nitin.kumar@shobhituniversity.ac.in 9758170029
21.	KNOWLEDGE MANAGEMENT & EXPERT SYSTEM (CCSN 308)	External Examiner 1. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192
		3. Dr. Mamta Bansal	mamta.bansal345@gmail.com 9997025606
		Internal Examiner 1. Dr. Mahipal Singh	registrargangh@shobhituniversity.ac.in 9759174581
		2. Dr. Shri Kant Gupta	shrikant.gupta@shobhituniversity.ac.in 8279909590

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91-7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

22.	SOFTWARE PROJECT MANAGEMENT (CUCS 342)	External Examiner 1. Dr. Arun Giri	arungiri123@yahoo.com 9818809053
		2. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		3. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		Internal Examiner 1. Mr. Kuldeep Chauhan	kuldeep.chauhan@shobhituniversity.ac.in 9756997090
		2. Ms. Sumika Jain	sumika.jain@shobhituniversity.ac.in 9456666326
23.	ENVIRONMENTAL STUDIES (CBSN 302)	External Examiner 1. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192
		3. Dr. Mamta Bansal	mamta.bansal345@gmail.com 9997025606
		Internal Examiner 1. Dr. Jasvir Singh Rana	jasvirsingh.rana@shobhituniversity.ac.in 9759233859
		2. Mr. Shoyab Hussain	shoyab.hussain@shobhituniversity.ac.in 9837446390
24.	COMPUTER	External Examiner	dr.abhay@ritroorkee.ac.in

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U: www.sug.ac.in

	GRAPHICS LAB (CCSN 352)	1. Dr. Abhay Bhatia	9837386973
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192
		3. Dr. Mamta Bansal	mamta.bansal345@gmail.com 9997025606
		Internal Examiner 1. Dr. Tarun Kumar Sharma	tarun.sharma@shobhituniversity.ac.in 9456086759
		2. Ms. Sumika Jain	sumika.jain@shobhituniversity.ac.in 9456666326
25.	DATA WAREHOUSING & DATA MINING LAB (CCSN 354)	External Examiner 1. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		2. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		3. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		Internal Examiner 1. Mr. Varun Bansal	varun.bansal@shobhituniversity.ac.in 9675478559
		2. Ms. Sumika Jain	sumika.jain@shobhituniversity.ac.in 9456666326
26.	MINI PROJECT (CCSN 356)	External Examiner 1. Dr. Arun Giri	arungiri123@yahoo.com 9818809053
		2. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

			9927007273
		3. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		Internal Examiner 1. Dr. Tarun Kumar Sharma	tarun.sharma@shobhituniversity.ac.in 9456086759
		2. Mr. Varun Bansal	varun.bansal@shobhituniversity.ac.in 9675478559
27.	INTERNSHIP AND Report Presentation (CCSN 462)	External Examiner 1. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		2. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		3. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		Internal Examiner 1. Dr. Mahipal Singh	registrargangh@shobhituniversity.ac.in 9759174581
		2. Dr. Tarun Kumar Sharma	tarun.sharma@shobhituniversity.ac.in 9456086759

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830610052
E-mail: registrargangoh@shobhituniversity.ac.in
U: www.sug.ac.in

SHOBHIT UNIVERSITY GANGOH
School of Engineering and Technology

Date: 12/06/2020

NOTICE

Subject: Meeting of the Board of Studies

All members of the Board of Studies are hereby informed that a meeting will be held as per the following details:

Date: 26/06/2020
Time: 10.00 AM
Venue: "meet.google.com/ohw-pcvo-ind"

Agenda:

1. Confirmation of minutes of the previous meeting
2. New Interdisciplinary courses to be added in B.Tech Semester w. e. f. the academic session 2020-21
3. Approval of Examiners (Theory & Practical) and Paper Setters for the odd semester courses in BCA, MCA, B.Tech for session **July to Dec. 2020.**
4. Discussion on the value Added courses offered for students and ratification of the same.
5. Any other matter with the permission of the Chair

All members are requested to make it convenient to attend the meeting and come prepared with relevant documents and suggestions.

Prof. (Dr.) Tarun Kumar Sharma
Chairperson, Board of Studies
Head of the Department
12/06/2020

Shobhit University
EDUCATION EMPOWERS

Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810952
E-mail: [redacted]
U: www.[redacted]

SHOBHIT UNIVERSITY GANGOH
School of Engineering and Technology

Date: 12/06/2020

To
Dr. Anil Lamba
Professor and Head
School of Computer Science and Application
Geeta University

Subject: Invitation to Attend the Board of Studies Meeting

Dear Sir

Greetings from School of Engineering and Technology

We are pleased to invite you to participate as an external subject expert in the upcoming meeting of the Board of Studies for the School of Engineering and Technology, scheduled as follows:

Date: 26/06/2020
Time: 10.00 AM
Mode: Online Mode (meet.google.com/ohw-pcvo-ind)

The meeting will deliberate on important academic matters including syllabus revision, new course proposals, and academic planning for the upcoming session. Your expert insights and contributions would be invaluable to the academic enrichment of our programs.

We request you to kindly confirm your availability and mode of attendance at your earliest convenience. For online participation, a meeting link will be shared upon confirmation. If attending in person, necessary hospitality arrangements will be made.

We look forward to your positive response and support.

Thank you.

Warm regards,

Prof. (Dr.) Tarun Kumar Sharma
Chairperson, Board of Studies

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 78308 10052
E-mail: regis[illegible]
U: www.su.ac.in

SHOBHIT UNIVERSITY GANGOH
School of Engineering and Technology

Date: 12/06/2020

To
Dr. Amit Goyal
Professor and Head
School of Computer Science and Engineering
Chandigarh University

Subject: Invitation to Attend the Board of Studies Meeting

Dear Sir

Greetings from School of Engineering and Technology

We are pleased to invite you to participate as an external subject expert in the upcoming meeting of the Board of Studies for the School of Engineering and Technology, scheduled as follows:

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We look forward to your positive response and support.

Thank you.

Warm regards,

Prof. (Dr.) Tarun Kumar Sharma
Chairperson, Board of Studies

Shobhit University
EDUCATION EMPOWERS

Babu Vijendra Marg, Adarsh Institutional
Area Gangoh, Distt. Saharanpur (U.P.)
247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

School of Engineering & Technology

Date: 26.06.2020

Minutes of the Meeting of Board of Studies

15th meeting of the Board of Studies of the School of Engineering and Technology, Shobhit University Gangoh was organized on 26th June 2020 at 10:00 am online through Google meet. The following members were present in the meeting:

1.	Prof.(Dr.) Tarun Kumar Sharma Head of the Department (Computer Science and Engineering) Shobhit University Gangoh	Chairperson
2.	Prof.(Dr.) Anil Lamba Professor and Head School of Computer Science and Application Geeta University	External expert
3.	Dr. Amit Goyal Professor and Head School of Computer Science and Engineering Chandigarh University	External Expert
4.	Dr. Jasvir Singh Rana Associate Professor School of Engineering and Technology Shobhit University Gangoh	Member
5.	Mr. Anil Kumar Assistant Professor School of Engineering and Technology Shobhit University Gangoh	Member

Welcome address by Chairman
The Chairman extended a warm welcome to all the members of Board of Studies and the following information was tabled before the members of the Board of Studies:

Input given by the Subject Experts on the Scheme and syllabi of the ongoing Batches.

The following discussed and approved on Choice Based Credit System:

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional
Area Gangoh, Distt. Saharanpur (U.P.)
247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

Item BOS 15.1: Approval of the Minutes of the 14th BOS Meeting held on 30 Dec. 2019 Was circulated among the members and the same were notified after the approval of the Board of Studies. {Annexure- 1}

Item BOS 15.2: New Interdisciplinary Courses to be added in B. Tech. semester w.e.f. the academic session 2020-21{Annexure-2}

- **BOS syllabus of CBSN-201 D , CCSN-209 D in B. Tech 3rd Sem.**

Item BOS 15.3: Approval of Examiners (Theory & Practical) and Paper Setters for the odd semester courses in BCA, MCA, and B. Tech for session **July to Dec. 2020** . The same is being sent to the Controller of Examinations, Shobhit University Gangoh, in a sealed cover. {Annexure-3}

Item BOS 15.4: Discussion on the Value Added courses offered for students and ratification of the same.

- BOS members approved the list of Value added courses offered to students

The meeting ended with a vote of thanks to the Chairman, Board of Studies.

The suggestions given by the panel of BOS have been discussed with the Vice Chancellor and Dean Academics. The action taken on the suggestions has been approved by competent authorities.

Signed by:

(Chairman, BOS)

(Vice Chancellor)

(Dean Academies)

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

15th Meeting of BOS (Item No. 15.1 Annexure -1)

School of Engineering and Technology

Minutes of the Meeting of Board of Studies **Date: 30.12.2019**

14th meeting of the Board of Studies of School of Engineering and Technology, Shobhit University Gangoh was organized on 30th Dec. 2019 at 11:00 am online through Google meet. The following members were present in the meeting:

1. Prof.(Dr.) Shri Kant Gupta
   Head of the Department
   (Computer Science and Engineering)
   Shobhit University Gangoh — Chairperson
2. Prof.(Dr.) Anil Lamba
   Professor and Head
   School of Computer Science and Application
   Geeta University — External expert
3. Dr. Amit Goyal
   Professor and Head
   School of Computer Science and Engineering
   Chandigarh University — External Expert
4. Prof. D K Kaushik
   Professor
   School of Engineering and Technology
   Shobhit University Gangoh — Member
5. Mr. Anil Kumar
   Assistant Professor
   School of Engineering and Technology
   Shobhit University Gangoh — Member

Welcome address by Chairman
The Chairman extended a warm welcome to all the members of Board of Studies and the following information was tabled before the members of the Board of Studies:
Input given by the Subject Experts on the Scheme and syllabi of the ongoing Batches.

The following discussed and approved on Choice Based Credit System:

Item BOS 14.1: Approval of the Minutes of the 13th BOS Meeting held on 25 June 2019 Was circulated among the members and the same were notified after the approval of the Board of Studies. {Annexure- 1}

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.su.ac.in

Item BOS 14.2: New Interdisciplinary Courses to be added in BCA, MCA, and B. Tech 2nd Sem. {Annexure-2}

- **Approval of the syllabus of AECC-104 D , GCAC-108 D, CCAC-158 D in BCA 2nd Sem.**
- **Approval of the Syllabus of CCA-506 D in MCA 4th Sem.**
- **Approval of the Syllabus of CMAN-102 D, CEEN-102 D , CPHN-152 D Probability and Statistics, and Classical Mechanics in B. Tech 2nd Sem.**

Item BOS 14.3:Analysis of Students' feedback & Action taken report:

- BOS Chairman has expressed that the student feedback and action taken report process is done at the end of semester. The BOS members noted the same.

Item BOS 14.4: Analysis of the feedback on curriculum from stakeholders:

- The BOS chairman presented the analysis report of stakeholders' feedback on curriculum. The BOS members noted the same and advised to incorporate the suggestions as per the feasibility. The Action Taken Report is enclosed herewith. {Annexure-3}

Item BOS 14.5: Approval of Examiners (Theory & Practical) and Paper Setters for the even semester courses in BCA, MCA, and B.Tech for session **Jan. to June 2020** . The same is being sent to the Controller of Examinations, Shobhit University Gangoh, in a sealed cover. {Annexure-4}

Item BOS 14.6: Discussion on the Value Added courses offered for students and ratification of the same.

- BOS members approved the list of Value added courses offered to students.

The meeting ended with a vote of thanks to the Chairman, Board of Studies.
The suggestions given by the panel of BOS have been discussed with the Vice Chancellor and Dean Academics. The action taken on the suggestions has been approved by competent authorities.

Signed by:

(Chairman, BOS)

(Vice Chancellor)

(Dean Academics)

SHOBHIT UNIVERSITY, GANGOH (SAHARANPUR)

TEACHING SCHEME
Effective from 2015
B. TECH. (COMPUTER SCIENCE & ENGINEERING)
(CBCS SYSTEM)
III semester

Code	Course Title	Cr.	L	T	P
CCSN-201	DATA STRUCTURE USING 'C'	4	3	1	0
CCSN-203	DBMS	4	3	1	0
CCSN-205	OPERATING SYSTEMS (UNIX PROGRAMMING)	4	3	1	0
CCSN-207	JAVA PROGRAMMING	4	3	1	0
CCSN-XXX	PROFESSIONAL ELECTIVE-I	4	3	1	0
CBSN-201	VALUE EDUCATION, HUMAN RIGHTS ANDLEGISLATIVE PROCEDURES	2	2	0	0
CBSN-201 A	PERSONALITY DEVELOPMENT- I				
CBSN-201 B	BEHAVIOUR SKILL- I				
CBSN-201 C	LANGUAGE PROFICIENCY AND ENGLISH I				
CBSN-201 D	PUBLIC SPEAKING AND PRESENTATION I				
CCSN-251	DATA STRUCTURE USING 'C' LAB	1	0	0	2
CCSN-253	DBMS LAB	1	0	0	2
CCSN-255	JAVA PROGRAMMING LAB	1	0	0	2
	Total	25	17	5	6

PROFESSIONAL ELECTIVE-I

1. CCSN 209 DISCRETE MATHEMATICS
   - i. CCSN 209 A ENGINEERING MATHEMATICS-I
   - ii. CCSN 209 B BASIC MATHEMATICS
   - iii. CCSN 209 C STATISTICAL TECHNIQUES IN COMPUTER SCIENCE
   - iv. CCSN 209 D ELEMENTARY MATHEMATICS
2. CCSN 211 PERL PROGRAMMING
3. CCSN 213 INTRODUCTION TO SOFT COMPUTING (Neural Networks, Fuzzy Logic and Genetic Algorithm)
4. CCSN 215 MATLAB PROGRAMMING FOR ENGINEERS

PUBLIC SPEAKING AND PRESENTATION I

CBSN-201 D

L	T	P	Cr
3	1	0	4

Course Objectives

1. To develop confidence in public speaking.
2. To teach effective speech organization and structure.
3. To enhance verbal and non-verbal communication skills.
4. To train in the use of visual aids and presentation tools.
5. To improve audience engagement and handling Q&A sessions.

Course Outcomes

1. Deliver clear and confident speeches in various settings.
2. Structure presentations with a strong introduction, body, and conclusion.
3. Use gestures, eye contact, and voice modulation effectively.
4. Incorporate multimedia tools to support key points.
5. Respond to audience questions and feedback professionally.

Unit 1: Introduction to Public Speaking

This unit covers the fundamentals of public speaking, including its importance in personal and professional contexts. Students will explore different types of speeches, such as informative, persuasive, and special occasion speeches. The unit will also introduce key elements of effective communication, including audience analysis, purpose identification, and the role of ethics in public speaking.

Unit 2: Speech Preparation

In this unit, students will learn the process of preparing a speech. This includes selecting a topic, conducting research, organizing content logically, and crafting an outline. Emphasis will be placed on the importance of developing a strong thesis statement and using evidence effectively to support arguments. Additionally, students will practice writing introductions and conclusions that engage the audience.

Unit 3: Delivery Techniques

This unit focuses on the various delivery methods for speeches, including extemporaneous, memorized, and manuscript delivery. Students will learn about body language, vocal variety, and the use of pauses. Practical exercises will help students develop their delivery skills, emphasizing the importance of confidence, eye contact, and audience engagement.

Unit 4: Use of Visual Aids

Students will explore the role of visual aids in enhancing presentations. This unit will cover different types of visual aids, such as slides, charts, graphs, and props, and best practices for their effective use. Emphasis will be placed on how to create visually appealing slides that complement the spoken message rather than distract from it.

Unit 5: Handling Questions and Feedback

This unit addresses the importance of managing audience questions and feedback during and after a presentation. Students will learn strategies for anticipating questions, handling difficult audience members, and responding to feedback constructively. Role-playing exercises will allow students to practice these skills in a supportive environment.

ELEMENTARY MATHEMATICS

CCSN 209 D

L	T	P	Cr
3	1	0	4

Course Objectives

1. To build a strong foundation in basic math concepts.
2. To develop problem-solving and logical thinking skills.
3. To introduce arithmetic operations and number sense.
4. To familiarize students with basic geometry and measurements.
5. To enhance understanding of patterns, data, and simple graphs.

Course Outcomes

1. Perform basic operations with whole numbers, fractions, and decimals.
2. Apply math skills to solve everyday problems.
3. Understand and use basic geometric shapes and terms.
4. Measure length, weight, and capacity using standard units.
5. Interpret simple data from charts, tables, and graphs.

Unit 1: Numbers and Operations
This unit covers basic number concepts including counting, comparing, and ordering numbers. Students will learn place value up to hundreds and practice the four fundamental operations: addition, subtraction, multiplication, and division. The unit also introduces the concept of even and odd numbers.

Unit 2: Fractions and Decimals
Students are introduced to basic fractions such as halves and quarters, learning to identify, compare, and perform simple operations with them. The unit also includes an introduction to decimals and understanding the relationship between fractions and decimals in everyday contexts.

Unit 3: Measurement
This unit focuses on measuring length, weight, and capacity using standard units like centimeters, meters, kilograms, and liters. Students will also learn to read clocks and understand time in hours, minutes, and days, as well as perform basic money calculations involving coins and notes.

Unit 4: Geometry
Students will explore basic two-dimensional and three-dimensional shapes, understanding their properties such as sides, corners, and faces. The unit introduces symmetry, simple patterns, and an early understanding of perimeter and area.

Unit 5: Data Handling and Patterns
In this unit, students learn to collect and interpret simple data using pictographs and bar graphs. They will also work with basic number patterns and sequences, and solve simple word problems that involve data interpretation and logical reasoning.

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

15th Meeting of BOS (Item No. 15.3 Annexure -3)

SHOBHIT UNIVERSITY GANGOH
SCHOOL OF ENGINEERING AND TECHNOLOGY
List of Examiners (2020-2021)

Sr. No.	Course code with Title	Name, Designation, Institution and Correspondence address of the Paper Setter/Examiner	Contact number with E. Mail ID
1.	CCAC-101 :C Programming Fundamentals	External Examiner	
		1. Dr. Arun Giri	arungiri123@yahoo.com, 9818809053
		2. Dr. Nidhi Tyagi 3. Dr. Maheep Singh	nidhi.tyagi9785@gmail.com, 9927007273 kingmaheep@gmail.com, 9411293327
		Internal Examiner 1. Dr. Tarun Kumar Sharma	Tarun.sharma@shobhituniversity.ac.in, 9456086759
		2. Dr. Varun Bansal	Varun.bansal@shobhituniversity.ac.in, 9411295559
2	CCAC-103:Computer System Architecture	External Examiner 1. Dr. Abahay Bhatia	dr.abhay@ritrookee.ac.in, 9837386973
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com, 97604492192
		3. Dr. Mamta	mamta.bansal345@gmail.com, 9997025606
		Internal Examiner 1. Mr. Kuldeep Chauhan	Kuldeep.chauhan@shobhituniversity.ac.in, 9756997090

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

		2. Mr. Vinod Kumar	Vinod.kumar@shobhituniversity.ac.in, 9758749227
3	AECC-101:Professional Communication M	External Examiner 1. Dr. Abahay Bhatia	dr.abhay@ritrookee.ac.in, 9837386973
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com, 97604492192
		3. Dr. Mamta	mamta.bansal345@gmail.com,9997025606
		Internal Examiner 1.Dr. Varun Bansal	Varun.bansal@shobhituniversity.ac.in, 9411295559
		2.Mr. Nitin Kumar	nitin.kumar@shobhituniversity.ac.in, 9758170029
4	GCAC-101Mathematics	External Examiner 1. Dr. Abahay Bhatia	dr.abhay@ritrookee.ac.in, 9837386973
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com, 97604492192
		3. Dr. Mamta	mamta.bansal345@gmail.com,9997025606
		Internal Examiner 1. Dr. Varun Bansal	Varun.bansal@shobhituniversity.ac.in, 9411295559
		2. Mr. Kuldeep Chauhan	Kuldeep.chauhan@shobhituniversity.ac.in, 9756997090
5	GCAC-103: Computer Fundamentals	External Examiner 1. Dr. Abahay Bhatia	dr.abhay@ritrookee.ac.in, 9837386973
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com, 97604492192
		3. Dr. Mamta	mamta.bansal345@gmail.com,9997025606
		Internal Examiner	

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

		1.Dr. Varun Bansal	Varun.bansal@shobhituniversity.ac.in, 9411295559
		2.Sumika Jain	Sumika.jai@shobhituniversity.ac.in, 9456666326
6	CCAC-153: Computer System Architecture Lab	External Examiner 1. Dr. Abahay Bhatia	dr.abhay@ritrookee.ac.in, 9837386973
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com, 97604492192
		3. Dr. Mamta	mamta.bansal345@gmail.com,9997025606
		Internal Examiner 1. Dr. Tarun Kumar Sharma	Tarun.sharma@shobhituniversity.ac.in, 9456086759
		2. Mr. Vinod Kumar	Vinod.kumar@shobhituniversity.ac.in, 9758749227
7	AECC-151: Professional Communication LAB	External Examiner 1. Dr. Abahay Bhatia	dr.abhay@ritrookee.ac.in, 9837386973
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com, 97604492192
		3. Dr. Mamta	mamta.bansal345@gmail.com,9997025606
		Internal Examiner 1. Dr. Tarun Kumar Sharma	Tarun.sharma@shobhituniversity.ac.in, 9456086759
		2. Mr. Vinod Kumar	Vinod.kumar@shobhituniversity.ac.in, 9758749227
8	CCAC-201: Database Management Systems	External Examiner 1 Dr. Abahay Bhatia	dr.abhay@ritrookee.ac.in, 9837386973
		3. Dr. Ankit Sharma	gurukul.ankit@gmail.com, 97604492192

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

		4. Dr. Mamta	mamta.bansal345@gmail.com,9997025606
		Internal Examiner 1. Dr. Tarun Kumar Sharma	Tarun.sharma@shobhituniversity.ac.in, 9456086759
		2. Mr. Vinod Kumar	Vinod.kumar@shobhituniversity.ac.in, 9758749227
9	CCAC-203: Operating Systems	External Examiner 1.Dr Mamta	mamta.bansal345@gmail.com,9997025606
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com, 97604492192
		3. Dr. Abahay Bhatia	dr.abhay@ritrookee.ac.in, 9837386973
		Internal Examiner 1. Ms. Sumika Jain	Sumika.jai@shobhituniversity.ac.in, 9456666326
		2. Mr. Vinod Kumar	Vinod.kumar@shobhituniversity.ac.in, 9758749227
10	CCAC-205: Computer Networks	External Examiner 1. Dr. Abahay Bhatia	dr.abhay@ritrookee.ac.in, 9837386973
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com, 97604492192
		3. Dr. Mamta	mamta.bansal345@gmail.com,9997025606
		Internal Examiner 1. Dr. Varun Bansal	Varun.bansal@shobhituniversity.ac.in, 9411295559
		2. Mr. Kuldeep Chauhan	Kuldeep.chauhan@shobhituniversity.ac.in, 9756997090
11	SCAC-201: HTML	External Examiner	

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

	Programming	1. Dr. Mamta	mamta.bansal345@gmail.com,9997025606
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com, 97604492192
		3. Dr. Abahay Bhatia	dr.abhay@ritrookee.ac.in, 9837386973
		Internal Examiner 1. Mr. Nitin Kumar	nitin.kumar@shobhituniversity.ac.in, 9758170029
		2. Mr. Vinod Kumar	Vinod.kumar@shobhituniversity.ac.in, 9758749227
12	CCAC-301: Internet Technologies	External Examiner 1. Dr. Ankit Sharma	gurukul.ankit@gmail.com, 97604492192
		2. Dr. Mamta	mamta.bansal345@gmail.com,9997025606
		3. Dr. Abahay Bhatia	dr.abhay@ritrookee.ac.in, 9837386973
		Internal Examiner 1. Mr. Kuldeep Chauhan	Kuldeep.chauhan@shobhituniversity.ac.in, 9756997090
		2. Mr. Nitin Kumar	nitin.kumar@shobhituniversity.ac.in, 9758170029
13	CCAC-303:Software Project Management	External Examiner 1. Dr. Abahay Bhatia	dr.abhay@ritrookee.ac.in, 9837386973
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com, 97604492192
		3. Dr. Mamta	mamta.bansal345@gmail.com,9997025606
		Internal Examiner 1. Mr. Vinod Kumar	Vinod.kumar@shobhituniversity.ac.in, 9758749227
		2. Ms. Sumika Jain	Sumika.jai@shobhituniversity.ac.in,

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

			9456666326
14	DCAC-301: Knowledge Management	External Examiner 1. Dr. Abahay Bhatia	dr.abhay@ritrookee.ac.in, 9837386973
		2. Dr. Mamta	mamta.bansal345@gmail.com,9997025606
		3. Dr. Ankit Sharma	gurukul.ankit@gmail.com, 97604492192
		Internal Examiner 1. Mr. Kuldeep Chauhan	Kuldeep.chauhan@shobhituniversity.ac.in, 9756997090
		2. Mr. Nitin Kumar	nitin.kumar@shobhituniversity.ac.in, 9758170029
15	DCAC-303: Data Mining	External Examiner 1. Dr. Mamta	mamta.bansal345@gmail.com,9997025606
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com, 97604492192
		3. Dr. Abahay Bhatia	dr.abhay@ritrookee.ac.in, 9837386973
		Internal Examiner 1. Ms. Sumika Jain	Sumika.jai@shobhituniversity.ac.in, 9456666326
		2. Mr. Vinod Kumar	Vinod.kumar@shobhituniversity.ac.in, 9758749227
16	DCAC-307 Digital Image Processing	External Examiner 1. Dr. Abahay Bhatia	dr.abhay@ritrookee.ac.in, 9837386973
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com, 97604492192
		3. Dr. Mamta	mamta.bansal345@gmail.com,9997025606
		Internal Examiner 3. Mr. Kuldeep	Kuldeep.chauhan@shobhituniversity.ac.in,

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

		Chauhan	9756997090
		4. Mr. Nitin Kumar	nitin.kumar@shobhituniversity.ac.in, 9758170029

MCA (List of Examiners)

Sr. No.	Course code with Title	Name, Designation, Institution and Correspondence address of the Paper Setter/Examiner	Contact number with E. Mail ID
1.	Java Programming (CCA 501)	External Examiner 4. Dr. Abhay Bhatia	Dr.abhay@ritroorkee.ac.in 9837386973 Dr.abhay@ritroorkee.ac.in 9837386973
		5. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		6. Dr. Mamta Singh	Mamta.bansal345@gmail.com 9997025606
		Internal Examiner 3. Mr. Jitendra K. Saini	Jitendra.saini@shobhituniversity.ac.in 7669110295
		4. Mr. Shahnawaaj	Mohd.shahnawaz@shobhituniversity.ac.in 9536940100
2	C# Programming (CCA 503)	External Examiner 4. Dr. Ankit Sharma	Gurukul.ankit@gmail.com 9760492192
		5. Dr. Arun Giri	Arungiri123@yahoo.com 981880953
		6. Dr. Nidhi Tyagi	Nidhi.tyagi9785@gmail.com 9927007273
		Internal Examiner 3. Dr. Varun Bansal	Varun.bansal@shobhituniversity.ac.in 9675478559

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

		4. Mr. Shubham Kumar	Shubham.k@shobhituniversity.ac.in 7895408519
3	Data Communication and Networking (CCA 505)	External Examiner 1. Dr. Mamta Bansal	Mamta.bansal345@gmail.com 9997025606
		2. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		3. Dr. Abhay Bhatia	Dr.abhay@ritroorkee.ac.in 9837386973
		Internal Examiner 1. Ms. Sumika Jain	Sumika.jain@shobhituniversity.ac.in 9456666326
		2. Mr. Kuldeep Chauhan	Kuldeep.chauhan@shobhituniversity.ac.in 9756997090
4	Advanced Operating System (CCA 507)	External Examiner 1. Dr. Abhay Bhati	Dr.abhay@ritroorkee.ac.in 9837386973
		2. Dr. Ankit Sharma	Gurukul.ankit@gmail.com 9760492192
		3. Dr. Mamta Bansal	Mamta.bansal345@gmail.com 9997025606
		Internal Examiner 1. Ms. Sumika Jain	Sumika.jain@shobhituniversity.ac.in 9456666326
		2. Mr. Kuldeep Chauhan	Kuldeep.chauhan@shobhituniversity.ac.in 9756997090
5	Theory of Computation (CCA 509)	External Examiner 1. Dr. Abhay Bhati	Dr.abhay@ritroorkee.ac.in 9837386973
		2. Dr. Ankit Sharma	Gurukul.ankit@gmail.com 9760492192
		3. Dr. Mamta Bansal	Mamta.bansal345@gmail.com 9997025606
		Internal Examiner 1. Ms. Sumika Jain	Sumika.jain@shobhituniversity.ac.in 9456666326
		2. Mr. Kuldeep Chauhan	Kuldeep.chauhan@shobhituniversity.ac.in

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

			9756997090
6	Computer Based Numerical & Statistical Techniques (CCA 511)	External Examiner 1. Dr. Ankit Sharma	Gurukul.ankit@gmail.com 9760492192
		2. Dr. Arun Giri	Arungiri123@yahoo.com 981880953
		3. Dr. Nidhi Tyagi	Nidhi.tyagi9785@gmail.com 9927007273
		Internal Examiner 1. Dr. Varun Bansal	Varun.bansal@shobhituniversity.ac.in 9675478559
		2. Mr. Shubham Kumar	Shubham.k@shobhituniversity.ac.in 7895408519
7	Advanced DBMS (CCA 601)	External Examiner 1. Dr. Abhay Bhatia	Dr.abhay@ritroorkee.ac.in 9837386973
		2. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		3. Dr. Mamta Bansal	Mamta.bansal345@gmail.com 9997025606
		Internal Examiner 1. Mr. Jitendra K. Saini	Jitendra.saini@shobhituniversity.ac.in 7669110295
		2. Mr. Shahnawaaj	Mohd.shahnawaz@shobhituniversity.ac.in 9536940100
8	Advanced DAA (CCA 603)	External Examiner 1. Dr. Nidhi Tyagi	Nidhi.tyagi9785@gmail.com 9927007273
		2. Dr. Mamta Bansal	Mamta.bansal345@gmail.com 9997025606
		3. Dr. Abhay Bhatia	Dr.abhay@ritroorkee.ac.in 9837386973
		Internal Examiner 1. Mr. Jitendra K. Saini	Jitendra.saini@shobhituniversity.ac.in 7669110295
		2. Dr. Tarun Kumar Sharma	Tarun.sharma@shobhituniversity.ac.in 9456086759
9.	Expert Intelligence	External Examiner	Gurukul.ankit@gmail.com 9760492192

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

	System (CCA 605)	1. Dr. Ankit Sharma	
		2. Dr. Arun Giri	Arungiri123@yahoo.com 981880953
		3. Dr. Nidhi Tyagi	Nidhi.tyagi9785@gmail.com 9927007273
		Internal Examiner 1. Dr. Varun Bansal	Varun.bansal@shobhituniversity.ac.in 9675478559
		2. Ms. Sumika Jain	Sumika.jain@shobhituniversity.ac.in 9456666326
10.	Distributed OS (CCA 607)	External Examiner 1. Dr. Mamta Bansal	Mamta.bansal345@gmail.com 9997025606
		2. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		3. Dr. Abhay Bhatia	Dr.abhay@ritroorkee.ac.in 9837386973
		Internal Examiner 1. Dr. Varun Bansal	Varun.bansal@shobhituniversity.ac.in 9675478559
		2. Ms. Sumika Jain	Sumika.jain@shobhituniversity.ac.in 9456666326
11.	Neural Network (UCA 601)	External Examiner 1. Dr. Ankit Sharma	Gurukul.ankit@gmail.com 9760492192
		2. Dr. Arun Giri	Arungiri123@yahoo.com 981880953
		3. Dr. Nidhi Tyagi	Nidhi.tyagi9785@gmail.com 9927007273
		Internal Examiner 1. Mr. Nitin Kumar	Nitin.kumar@shobhituniversity.ac.in 9758170029
		2. Ms. Sumika Jain	Sumika.jain@shobhituniversity.ac.in 9456666326

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional
Area Gangoh, Distt. Saharanpur (U.P.)
247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

M.Tech(List of Examiners)

Sr. No.	Course code with Title	Name, Designation, Institution and Correspondence address of the Paper Setter/Examiner	Contact number with E. Mail ID
1.	Software Engineering Methodologies CE- 501	External Examiner 7. Dr. Arun Giri	arungiri123@yahoo.com 9818809053
		8. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		9. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		Internal Examiner 1. Mr. Kuldeep Chauhan	kuldeep.chauhan@shobhituniversity.ac.in 9756997090
		2. Mr. Vinod Kumar	vinod.kumar@shobhituniversity.ac.in 9758749227
2.	Analysis and Design of Algorithms CE-503	External Examiner 7. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		8. Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192
		9. Dr. Mamta Bansal	mamta.bansal345@gmail.com 9997025606
		Internal Examiner 5. Ms. Sumika Jain	sumika.jain@shobhituniversity.ac.in 9456666326
		2. Mr. Raveendra Kr.	raveendra.bharati@shobhituniversity.ac.in

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

		Bharati	9953328744
3.	Advanced Database Management Systems CE- 505	External Examiner 1. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		2. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		3. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		Internal Examiner 1. Mr. Raveendra Kr. Bharati	raveendra.bharati@shobhituniversity.ac.in 9953328744
		2. Mr. Nitin Kumar	nitin.kumar@shobhituniversity.ac.in 9758170029
4.	Computer Communication and Networks CE- 507	External Examiner 1. Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192
		2. Dr. Mamta Bansal	mamta.bansal345@gmail.com 9997025606
		3. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		Internal Examiner 1. Mr. Raveendra Kr. Bharati	anil.nishad@shobhituniversity.ac.in 8171418088
		2. Mr. Kuldeep Chauhan	kuldeep.chauhan@shobhituniversity.ac.in 9756997090
5.	Fundamental of Computer Programming	External Examiner 1. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional
Area Gangoh, Distt. Saharanpur (U.P.)
247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

	(Audit) CE- 509	2. Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192
		3. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		Internal Examiner 1. Mr. Vinod Kumar	vinod.kumar@shobhituniversity.ac.in 9758749227
		2. Ms. Sumika Jain	sumika.jain@shobhituniversity.ac.in 9456666326
6.	Fundamental of Mathematics (Audit) CE- 511	External Examiner 1. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192
		3. Dr. Mamta Bansal	mamta.bansal345@gmail.com 9997025606
		Internal Examiner 1. Mr. Madhav P. Namdev	Madhav.namdev@shobhituniversity.ac.in 94572731592
		2. Mr. Raveendra Kr. Bharati	raveendra.bharati@shobhituniversity.ac.in 9953328744
7.	Algorithms Lab CE-551	External Examiner 1. Dr. Arun Giri	arungiri123@yahoo.com 9818809053
		2. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		3. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.suz.ac.in

		Internal Examiner 1. Mr. Vinod Kumar	vinod.kumar@shobhituniversity.ac.in 9758749227
		2. Mr. Raveendra Kr. Bharati	raveendra.bharati@shobhituniversity.ac.in 9953328744
8.	Seminar-I CE- 581	External Examiner 1. Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192
		2. Dr. Mamta Bansal	mamta.bansal345@gmail.com 9997025606
		3. Dr. Arun Giri	arungiri123@yahoo.com 9818809053
		Internal Examiner 1. Mr. Varun Bansal	varun.bansal@shobhituniversity.ac.in 9675478559
		2. Ms. Sumika Jain	sumika.jain@shobhituniversity.ac.in 9456666326
9	Data Mining and Warehousing CE-601	External Examiner	
		1. Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192
		2. Dr. Mamta Bansal	mamta.bansal345@gmail.com 9997025606
		3. Dr. Arun Giri	arungiri123@yahoo.com 9818809053
		Internal Examiner 1. Mr. Vinod Kumar	vinod.kumar@shobhituniversity.ac.in 9758749227

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

		2. Mr. Raveendra Kr. Bharati	raveendra.bharati@shobhituniversity.ac.in 9953328744
10	Internet and Web Technology CE- 603	External Examiner	
		1. Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192
		2. Dr. Mamta Bansal	mamta.bansal345@gmail.com 9997025606
		3. Dr. Arun Giri	arungiri123@yahoo.com 9818809053
		Internal Examiner 1. Mr. Varun Bansal	varun.bansal@shobhituniversity.ac.in 9675478559
		2. Ms. Sumika Jain	sumika.jain@shobhituniversity.ac.in 9456666326
11	Medical Image Processing CE- 605	External Examiner	
		1. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192
		3. Dr. Mamta Bansal	mamta.bansal345@gmail.com 9997025606
		Internal Examiner 1. Mr. Madhav P. Namdev	Madhav.namdev@shobhituniversity.ac.in 94572731592
		2. Mr. Raveendra Kr. Bharati	raveendra.bharati@shobhituniversity.ac.in 9953328744

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

12	Software Verification, Validation and Testing CE- 607	External Examiner	
		1. Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192
		2. Dr. Mamta Bansal	mamta.bansal345@gmail.com 9997025606
		3. Dr. Arun Giri	arungiri123@yahoo.com 9818809053
		Internal Examiner 1. Ms. Sumika Jain	sumika.jain@shobhituniversity.ac.in 9456666326
		2. Mr. Raveendra Kr. Bharati	raveendra.bharati@shobhituniversity.ac.in 9953328744
13	Network Security CE-625	External Examiner	
		1. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192
		3. Dr. Mamta Bansal	mamta.bansal345@gmail.com 9997025606
		Internal Examiner 1. Mr. Vinod Kumar	vinod.kumar@shobhituniversity.ac.in 9758749227
		2. Mr. Raveendra Kr. Bharati	raveendra.bharati@shobhituniversity.ac.in 9953328744
14	Minor Project CE-671	External Examiner	
		1. Dr. Ankit Sharma	gurukul.ankit@gmail.com

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

			9760492192
		2. Dr. Mamta Bansal	mamta.bansal345@gmail.com 9997025606
		3. Dr. Arun Giri	arungiri123@yahoo.com 9818809053
		Internal Examiner 1. Mr. Kuldeep Chauhan	kuldeep.chauhan@shobhituniversity.ac.in 9756997090
		2. Mr. Vinod Kumar	vinod.kumar@shobhituniversity.ac.in 9758749227

B.tech CSE (Examiner)

Sr. No.	Course code with Title	Name, Designation, Institution and Correspondence address of the Paper Setter/Examiner	Contact number with E. Mail ID
1.	MATHEMATICS-I (CMAN 101)	External Examiner 10. Dr. Arun Giri	arungiri123@yahoo.com 9818809053
		11. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		12. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		Internal Examiner 5. Mr. Raveendra Kr. Bharati	raveendra.bharati@shobhituniversity.ac.in 9953328744
		6. Mr. Abdulla Khan	abdulla.khan@shobhituniversity.ac.in

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.su.ac.in

			7454976780
2.	ENGINEERING MECHANICS (CMEN 101)	External Examiner 10. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		11. Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192
		12. Dr. Mamta Bansal	mamta.bansal345@gmail.com 9997025606
		Internal Examiner 1. Mr. Shoyab Hussain	shoyab.hussain@shobhituniversity.ac.in 9837446390
		2. Mr. Anil Kumar Joshi	anil.joshi@shobhituniversity.ac.in 9690758787
3.	FUNDAMENTALS OF ELECTRONICS (CECN 101)	External Examiner 4. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		5. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		6. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		Internal Examiner 1. Dr. Jasvir Singh Rana	jasvirsingh.rana@shobhituniversity.ac.in 9759233859
		2. Mr. Hamid Ali	hamid.ali@shobhituniversity.ac.in 9759302770
4.	ENGINEERING	External Examiner	arungiri123@yahoo.com

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

	CHEMISTRY AND ENVIRONMENTAL (CESN 101)	1. Dr. Arun Giri	9818809053
		2. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		3. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		Internal Examiner 1. Mr. Y.P Malik	yp.malik@shobhituniversity.ac.in 8650145236
		2. Ms. Abhilasha R. Goel	abhilasha.goel@shobhituniversity.ac.in 6396705043
5.	PRESENTATION AND COMMUNICATION SKILLS (CPCN 101)	External Examiner 1. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192
		3. Dr. Mamta Bansal	mamta.bansal345@gmail.com 9997025606
		Internal Examiner 1. Ms. Abhilasha R. Goel	abhilasha.goel@shobhituniversity.ac.in 6396705043
		2. Ms. Sumika Jain	sumika.jain@shobhituniversity.ac.in 9456666326
6.	ENGINEERING WORKSHOP PRACTICE	External Examiner 7. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		8. Dr. Maheep Singh	kingmaheep@gmail.com

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional
Area Gangoh, Distt. Saharanpur (U.P.)
247341, India
Tel: +91 7830810052
E-mail: registrar.gangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

	(CMEN 151)		9411293327
		9. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		Internal Examiner 1. Mr. Shoyab Hussain	shoyab.hussain@shobhituniversity.ac.in 9837446390
		2. Mr. Anil Kumar Joshi	anil.joshi@shobhituniversity.ac.in 9690758787
7.	ENGINEERING GRAPHICS LAB (CMEN 153)	External Examiner 1. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192
		3. Dr. Mamta Bansal	mamta.bansal345@gmail.com 9997025606
		Internal Examiner 1. Dr. Jasvir Singh Rana	jasvirsingh.rana@shobhituniversity.ac.in 9759233859
		2. Mr. Hamid Ali	hamid.ali@shobhituniversity.ac.in 9759302770
8.	COMMUNICATION LAB (CPCN 151)	External Examiner 1. Dr. Arun Giri	arungiri123@yahoo.com 9818809053
		2. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

		3. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		Internal Examiner 1. Dr. Shri Kant Gupta	shrikant.gupta@shobhituniversity.ac.in 8279909590
		2. Mr. Varun Bansal	varun.bansal@shobhituniversity.ac.in 9675478559
9.	DATA STRUCTURE USING 'C' (CCSN 201)	External Examiner 1. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		2. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		3. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		Internal Examiner 1. Mr. Varun Bansal	varun.bansal@shobhituniversity.ac.in 9675478559
		2. Ms. Sumika Jain	sumika.jain@shobhituniversity.ac.in 9456666326
10.	DBMS (CCSN 203)	External Examiner 1. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192
		3. Dr. Mamta Bansal	mamta.bansal345@gmail.com

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

			9997025606
		Internal Examiner 1. Dr. Tarun Kumar Sharma	tarun.sharma@shobhituniversity.ac.in 9456086759
		2. Mr. Nitin Kumar	nitin.kumar@shobhituniversity.ac.in 9758170029
11.	OPERATING SYSTEMS (UNIX PROGRAMMING) (CCSN 205)	External Examiner 1. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		2. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		3. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		Internal Examiner 1. Ms. Sumika Jain	sumika.jain@shobhituniversity.ac.in 9456666326
		2. Mr. Nitin Kumar	nitin.kumar@shobhituniversity.ac.in 9758170029
12.	JAVA PROGRAMMING (CCSN 207)	External Examiner 1. Dr. Arun Giri	arungiri123@yahoo.com 9818809053
		2. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		3. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		Internal Examiner	vinod.kumar@shobhituniversity.ac.in

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U: www.su.ac.in

		1. Mr. Vinod Kumar	9758749227
		2. Mr. Varun Bansal	varun.bansal@shobhituniversity.ac.in 9675478559
13.	DISCRETE MATHEMATICS (CCSN 209)	External Examiner 1. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192
		3. Dr. Mamta Bansal	mamta.bansal345@gmail.com 9997025606
		Internal Examiner 1. Dr. Vishvas Chand	vishvas.chand@shobhituniversity.ac.in 9286093196
		2. Ms. Abhilasha R. Goel	abhilasha.goel@shobhituniversity.ac.in 6396705043
14.	VALUE EDUCATION, HUMAN RIGHTS ANDLEGISLATIVE PROCEDURES (CBSN 201)	External Examiner 1. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		2. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		3. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		Internal Examiner 1. Dr. Shri Kant Gupta	shrikant.gupta@shobhituniversity.ac.in 8279909590
		2. Ms. Taruna Pahuja	

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

15.	DATA STRUCTURE USING 'C' LAB (CCSN 251)	External Examiner 1. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		2. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		3. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		Internal Examiner 1. Mr. Varun Bansal	varun.bansal@shobhituniversity.ac.in 9675478559
		2. Ms. Sumika Jain	sumika.jain@shobhituniversity.ac.in 9456666326
16.	DBMS LAB (CCSN 253)	External Examiner 1. Dr. Arun Giri	arungiri123@yahoo.com 9818809053
		2. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		3. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		Internal Examiner 1. Dr. Tarun Kumar Sharma	tarun.sharma@shobhituniversity.ac.in 9456086759
		2. Mr. Nitin Kumar	nitin.kumar@shobhituniversity.ac.in 9758170029
17.	JAVA PROGRAMMING	External Examiner 1. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

	LAB (CCSN 255)	2. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		3. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		Internal Examiner 1. Mr. Vinod Kumar	vinod.kumar@shobhituniversity.ac.in 9758749227
		2. Mr. Varun Bansal	varun.bansal@shobhituniversity.ac.in 9675478559
18.	SOFTWARE ENGINEERING (CCSN 301)	External Examiner 1. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		2. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		3. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		Internal Examiner 1. Dr. Tarun Kumar Sharma	tarun.sharma@shobhituniversity.ac.in 9456086759
		2. Mr. Varun Bansal	varun.bansal@shobhituniversity.ac.in 9675478559
19.	COMPILER DESIGN (CCSN 303)	External Examiner 4. Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192
		5. Dr. Mamta Bansal	mamta.bansal345@gmail.com 9997025606

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

		6. Dr. Arun Giri	arungiri123@yahoo.com 9818809053
		Internal Examiner 1. Mr. Varun Bansal	varun.bansal@shobhituniversity.ac.in 9675478559
		2. Mr. Nitin Kumar	nitin.kumar@shobhituniversity.ac.in 9758170029
20.	OBJECT ORIENTED ANALYSIS AND DESIGN (CCSN 305)	External Examiner 1. Dr. Arun Giri	arungiri123@yahoo.com 9818809053
		2. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		3. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		Internal Examiner 1. Mr. Vinod Kumar	vinod.kumar@shobhituniversity.ac.in 9758749227
		2. Ms. Sumika Jain	sumika.jain@shobhituniversity.ac.in 9456666326
21.	CRYPTOGRAPHY & INFORMATION SECURITY (CCSN 307)	External Examiner 1. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		2. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		3. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

		Internal Examiner 1. Ms. Sumika Jain	sumika.jain@shobhituniversity.ac.in 9456666326
		2. Mr. Kuldeep Chauhan	kuldeep.chauhan@shobhituniversity.ac.in 9756997090
22.	CLOUD COMPUTING (CUCS 345)	External Examiner 1. Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192
		2. Dr. Mamta Bansal	mamta.bansal345@gmail.com 9997025606
		3. Dr. Arun Giri	arungiri123@yahoo.com 9818809053
		Internal Examiner 1. Dr. Tarun Kumar Sharma	tarun.sharma@shobhituniversity.ac.in 9456086759
		2. Mr. Varun Bansal	varun.bansal@shobhituniversity.ac.in 9675478559
23.	ENERGY STUDIES (CBSN 301)	External Examiner 1.Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		2.Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192
		3. Dr. Mamta Bansal	mamta.bansal345@gmail.com 9997025606
		Internal Examiner 1. Dr. Mahipal Singh	registrargangh@shobhituniversity.ac.in 9759174581

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

		2. Dr. Shri Kant Gupta	shrikant.gupta@shobhituniversity.ac.in 8279909590
24.	SOFTWARE ENGINEERING LAB (CCSN 351	External Examiner 1. Dr. Arun Giri	arungiri123@yahoo.com 9818809053
		2. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		3. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		Internal Examiner 1. Dr. Tarun Kumar Sharma	tarun.sharma@shobhituniversity.ac.in 9456086759
		2. Mr. Varun Bansal	varun.bansal@shobhituniversity.ac.in 9675478559
25.	COMPILER DESIGN LAB (CCSN 353)	External Examiner 1. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		2. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		3. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		Internal Examiner 1. Mr. Varun Bansal	varun.bansal@shobhituniversity.ac.in 9675478559
		2. Mr. Nitin Kumar	nitin.kumar@shobhituniversity.ac.in 9758170029

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

26.	OBJECT ORIENTED ANALYSIS AND DESIGN LAB (CCSN 355)	External Examiner 1. Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192
		2. Dr. Mamta Bansal	mamta.bansal345@gmail.com 9997025606
		3. Dr. Arun Giri	arungiri123@yahoo.com 9818809053
		Internal Examiner 1. Mr. Vinod Kumar	vinod.kumar@shobhituniversity.ac.in 9758749227
		2. Ms. Sumika Jain	sumika.jain@shobhituniversity.ac.in 9456666326
27.	ARTIFICIAL INTELLIGENCE (CCSN 401)	External Examiner 1. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192
		3. Dr. Mamta Bansal	mamta.bansal345@gmail.com 9997025606
		Internal Examiner 1. Ms. Sumika Jain	sumika.jain@shobhituniversity.ac.in 9456666326
		2. Mr. Anil Kumar	anil.joshi@shobhituniversity.ac.in 9690758787
28.	DISTRIBUTED COMPUTING	External Examiner 1. Dr. Arun Giri	arungiri123@yahoo.com 9818809053

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.suz.ac.in

	SYSTEMS (CCSN 403)	2. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		3. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		Internal Examiner 1. Mr. Nitin Kumar	nitin.kumar@shobhituniversity.ac.in 9758170029
		2. Mr. Kuldeep Chauhan	kuldeep.chauhan@shobhituniversity.ac.in 9756997090
29.	ADVANCED COMPUTER SYSTEM ARCHITECTURE (CCSN 405)	External Examiner 1. Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192
		2. Dr. Mamta Bansal	mamta.bansal345@gmail.com 9997025606
		3. Dr. Arun Giri	arungiri123@yahoo.com 9818809053
		Internal Examiner 1. Mohd Ahamad	mohd.ahamad@shobhituniversity.ac.in 9548159750
		2. Mr. Hamid Ali	hamid.ali@shobhituniversity.ac.in 9759302770
30.	PYTHON (CCSN 415)	External Examiner 1. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		2. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

		3. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		Internal Examiner 1. Mr. Vinod Kumar	vinod.kumar@shobhituniversity.ac.in 9758749227
		2. Mr. Kuldeep Chauhan	kuldeep.chauhan@shobhituniversity.ac.in 9756997090
31.	COMPUTER BASED NUMERICAL & STATISTICAL TECHNIQUES (CUCS 447)	External Examiner 1. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192
		3. Dr. Mamta Bansal	mamta.bansal345@gmail.com 9997025606
		Internal Examiner 1. Mr. Abdulla Khan	abdulla.khan@shobhituniversity.ac.in 7454976780
		2. Mr. Raveendra Kr. Bharati	raveendra.bharati@shobhituniversity.ac.in 9953328744
32.	LAW FOR ENGINEERS (CBSN 401)	External Examiner 1. Dr. Arun Giri	arungiri123@yahoo.com 9818809053
		2. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		3. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

		Internal Examiner 1. Mr. Kuldeep Chauhan	kuldeep.chauhan@shobhituniversity.ac.in 9756997090
		2. Mr. Mahendra Kumar	mahendra.kumar@shobhituniversity.ac.in 9458432303
33.	ARTIFICIAL INTELLIGENCE LAB (CCSN 451)	External Examiner 1. Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192
		2. Dr. Mamta Bansal	mamta.bansal345@gmail.com 9997025606
		3. Dr. Arun Giri	arungiri123@yahoo.com 9818809053
		Internal Examiner 1. Ms. Sumika Jain	sumika.jain@shobhituniversity.ac.in 9456666326
		2. Mr. Anil Kumar	anil.joshi@shobhituniversity.ac.in 9690758787
34.	DISTRIBUTED COMPUTING SYSTEMS LAB (CCSN 453)	External Examiner 1. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192
		3. Dr. Mamta Bansal	mamta.bansal345@gmail.com 9997025606
		Internal Examiner 1. Mr. Nitin Kumar	nitin.kumar@shobhituniversity.ac.in 9758170029

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Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

		2. Mr. Kuldeep Chauhan	kuldeep.chauhan@shobhituniversity.ac.in 9756997090
35.	SEMINAR & GROUP DISCUSSION (CCSN 481)	External Examiner 1. Dr. Arun Giri	arungiri123@yahoo.com 9818809053
		2. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		3. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		Internal Examiner 1. Dr. Tarun Kumar Sharma	tarun.sharma@shobhituniversity.ac.in 9456086759
		2. Dr. Mahipal Singh	registrargangh@shobhituniversity.ac.in 9759174581

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: engineering.gangoh@shobhituniversity.ac.in
U.: www.su.ac.in

SHOBHIT UNIVERSITY GANGOH
School of Engineering and Technology

Date: 16/12/2020

NOTICE

Subject: Meeting of the Board of Studies

All members of the Board of Studies are hereby informed that a meeting will be held as per the following details:

Date: 29/12/2020
Time: 11.30 AM
Venue: "meet.google.com/ayq-hhuo-zao"

Agenda:

1. Confirmation of minutes of the previous meeting
2. New Interdisciplinary courses to be added in BCA, MCA and B.Tech 4th Sem.
3. Analysis of the Students' feedback & Action taken report and Analysis of the feedback on curriculum from stakeholders
4. Approval of Examiners (Theory & Practical) and Paper Setters for the even semester courses in BCA, MCA, M.Tech, B.Tech for session **Jan. to June. 2021.**
5. Discussion on the value Added courses offered for students and ratification of the same.
6. Any other matter with the permission of the Chair

All members are requested to make it convenient to attend the meeting and come prepared with relevant documents and suggestions.

Prof. (Dr.) Tarun Kumar Sharma
Chairperson, Board of Studies
Head of the Department
16/12/2020

Shobhit University
EDUCATION EMPOWERS

Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrar
U:

SHOBHIT UNIVERSITY GANGOH
School of Engineering and Technology

Date: 16/12/2020

To
Dr. Anil Lamba
Professor and Head
School of Computer Science and Application
Geeta University

Subject: Invitation to Attend the Board of Studies Meeting

Dear Sir

Greetings from School of Engineering and Technology

We are pleased to invite you to participate as an external subject expert in the upcoming meeting of the Board of Studies for the School of Engineering and Technology, scheduled as follows:

Date: 29/12/2020
Time: 11.30 AM
Mode: Online Mode (meet.google.com/ayq-hhuo-zao)

The meeting will deliberate on important academic matters including syllabus revision, new course proposals, and academic planning for the upcoming session. Your expert insights and contributions would be invaluable to the academic enrichment of our programs.

We request you to kindly confirm your availability and mode of attendance at your earliest convenience. For online participation, a meeting link will be shared upon confirmation. If attending in person, necessary hospitality arrangements will be made.

We look forward to your positive response and support.

Thank you.

Warm regards,

Prof.(Dr.) Arun Kumar Sharma
Chairperson, Board of Studies

School of Engineering and Technology ★ Shobhit University Gangoh ★

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institution
Area Gangoh, Distt. Saharanpur (U.P.)
247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U: www.sug.ac.in

SHOBHIT UNIVERSITY GANGOH

School of Engineering and Technology

Date: 16/12/2020

To
Dr. Amit Goyal
Professor and Head
School of Computer Science and Engineering
Chandigarh University

Subject: Invitation to Attend the Board of Studies Meeting

Dear Sir

Greetings from School of Engineering and Technology

We are pleased to invite you to participate as an external subject expert in the upcoming meeting of the Board of Studies for the School of Engineering and Technology, scheduled as follows:

Date: 29/12/2020
Time: 11.30 AM
Mode: Online Mode (meet.google.com/ayq-hhuo-zao)

The meeting will deliberate on important academic matters including syllabus revision, new course proposals, and academic planning for the upcoming session. Your expert insights and contributions would be invaluable to the academic enrichment of our programs.

We request you to kindly confirm your availability and mode of attendance at your earliest convenience. For online participation, a meeting link will be shared upon confirmation. If attending in person, necessary hospitality arrangements will be made.

We look forward to your positive response and support.

Thank you.

Warm regards,

Prof.(Dr.) Parmi Kumar Sharma
Chairperson, Board of Studies

Shobhit University
EDUCATION EMPOWERS

Babu Vijendra Marg, Adarsh Institutional
Area Gangoh, Distt. Saharanpur (U.P.)
247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

School of Engineering & Technology

Date: 29.12.2020

Minutes of the Meeting of Board of Studies

16th meeting of the Board of Studies of the School of Engineering and Technology, Shobhit University Gangoh was organized on 29th Dec. 2020 at 11:30 am online through Google meet. The following members were present in the meeting:

1.	Prof.(Dr.) Tarun Kumar Sharma Head of the Department (Computer Science and Engineering) Shobhit University Gangoh	Chairperson
2.	Prof.(Dr.) Anil Lamba Professor and Head School of Computer Science and Application Geeta University	External expert
3.	Dr. Amit Goyal Professor and Head School of Computer Science and Engineering Chandigarh University	External Expert
4.	Dr. Jasvir Singh Rana Associate Professor School of Engineering and Technology Shobhit University Gangoh	Member
5.	Mr. Anil Kumar Assistant Professor School of Engineering and Technology Shobhit University Gangoh	Member

Welcome address by Chairman
The Chairman extended a warm welcome to all the members of Board of Studies and the following information was tabled before the members of the Board of Studies:

Input given by the Subject Experts on the Scheme and syllabi of the ongoing Batches.

The following discussed and approved on Choice Based Credit System:

Item BOS 16.1: Approval of the Minutes of the 15th BOS Meeting held on 26 June 2020

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
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E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

Was circulated among the members and the same were notified after the approval of the Board of Studies. {Annexure- 1}

Item BOS 16.2: New Interdisciplinary Courses to be added in BCA, and B. Tech 4th Sem. {Annexure-2}

- **BOS approved syllabus of GCAC-201 D & GCAC-201 E in BCA 4th Sem.**
- **BOS approved syllabus of CBSN-202 D in B. Tech 4th Sem.**

Item BOS 16.3: Analysis of Students' feedback & Action taken report:

- BOS Chairman has expressed that the student feedback and action taken report process is done at the end of semester. The BOS members noted the same.

Item BOS 16.4: Analysis of the feedback on curriculum from stakeholders:

- The BOS chairman presented the analysis report of stakeholders' feedback on curriculum. The BOS members noted the same and advised to incorporate the suggestions as per the feasibility. The Action Taken Report is enclosed herewith. {Annexure-3}

Item BOS 16.5: Approval of Examiners (Theory & Practical) and Paper Setters for the even semester courses in BCA, MCA, M.Tech and B. Tech for session **Jan. to June. 2021.** The same is being sent to the Controller of Examinations, Shobhit University Gangoh, in a sealed cover. {Annexure-4}

Item BOS 16.6: Discussion on the Value Added courses offered for students and ratification of the same.

- BOS members approved the list of Value added courses offered to students.

The meeting ended with a vote of thanks to the Chairman, Board of Studies.
The suggestions given by the panel of BOS have been discussed with the Vice Chancellor and Dean Academics. The action taken on the suggestions has been approved by competent authorities.

Signed by:

(Chairman, BOS)

(Vice Chancellor)

(Dean Academics)

Shobhit University
EDUCATION EMPOWERS
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U.: www.shu.ac.in

16th Meeting of BOS (Item No. 16.1 Annexure -1)
School of Engineering & Technology

Date: 26.06.2020

Minutes of the Meeting of Board of Studies

15th meeting of the Board of Studies of the School of Engineering and Technology, Shobhit University Gangoh was organized on 26th June 2020 at 10:00 am online through Google meet. The following members were present in the meeting:

1.	Prof.(Dr.) Tarun Kumar Sharma Head of the Department (Computer Science and Engineering) Shobhit University Gangoh	Chairperson
2.	Prof.(Dr.) Anil Lamba Professor and Head School of Computer Science and Application Geeta University	External expert
3.	Dr. Amit Goyal Professor and Head School of Computer Science and Engineering Chandigarh University	External Expert
4.	Dr. Jasvir Singh Rana Associate Professor School of Engineering and Technology Shobhit University Gangoh	Member
5.	Mr. Anil Kumar Assistant Professor School of Engineering and Technology Shobhit University Gangoh	Member

Welcome address by Chairman

The Chairman extended a warm welcome to all the members of Board of Studies and the following information was tabled before the members of the Board of Studies:

Input given by the Subject Experts on the Scheme and syllabi of the ongoing Batches.

The following discussed and approved on Choice Based Credit System:

Shobhit University
EDUCATION EMPOWERS
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U.: www.sug.ac.in

Item BOS 15.1: Approval of the Minutes of the 14th BOS Meeting held on 30 Dec. 2019 Was circulated among the members and the same were notified after the approval of the Board of Studies. {Annexure- 1}

Item BOS 15.2: New Interdisciplinary Courses to be added in B. Tech. semester w.e.f. the academic session 2020-21{Annexure-2}

- **BOS syllabus of CBSN-201 D , CCSN-209 D in B. Tech 3rd Sem.**

Item BOS 15.3: Approval of Examiners (Theory & Practical) and Paper Setters for the odd semester courses in BCA, MCA, and B. Tech for session **July to Dec. 2020** . The same is being sent to the Controller of Examinations, Shobhit University Gangoh, in a sealed cover. {Annexure-3}

Item BOS 15.4: Discussion on the Value Added courses offered for students and ratification of the same.

- BOS members approved the list of Value added courses offered to students

The meeting ended with a vote of thanks to the Chairman, Board of Studies.

The suggestions given by the panel of BOS have been discussed with the Vice Chancellor and Dean Academics. The action taken on the suggestions has been approved by competent authorities.

Signed by:

(Chairman, BOS)
SHOBHIT UNIVERSITY GANGOH 247341

(Vice Chancellor)
SHOBHIT UNIVERSITY GANGOH 247341

(Dean Academics)
SHOBHIT UNIVERSITY GANGOH 247341

16th Meeting of BOS (Item No. 16.1 Annexure -2)

Shobhit University

EDUCATION EMPOWERS

Shobhit University, Gangoh

(Established by UP Shobhit University Act No. 3, 2012)

School of School of Engineering and Technology

Ordinances, Regulations & Syllabus

For

Bachelor of Computer Application (BCA) Three Year Programme

Semester System

(w.e.f. session 2013-14)

Approved and adopted in the year 2016 (7th Meeting, Board of Studies)

IV Semester

Course Types	Subject Code and Title	L	P	Total	Cr.
Core Course	CCAC202: Software Engineering	4			4
	CCAC 204: Design and Analysis of Algorithms	4			4
	CCAC 206: OOPS Using C++	4			4
Skill Enhancement Courses	SCAC-202: UNIX/LINUX Programming	4			4
	SCAC-204:: Programming in Visual Basic				
Generic Elective	GCAC-201: Discrete Structure GCAC- 201 A- Engineering Mathematics II GCAC- 201 B – Discrete Mathematics II GCAC- 201 C- Basic Mathematics II GCAC- 201 D- Mathematical Foundation of Computer Science II GCAC- 201 E- Elementary Mathematics II	4			4
	GCAC-204 :Information Security and Cyber Laws				
Practical	CCAC-252: Software Engineering Lab		2		1
	CCAC-254:Design and Analysis of Algorithms Lab		2		1
	CCAC-256: OOPS Using C++ Lab		2		1
	SCAC-202:UNIX/LINUX Programming Lab		2		1
	SCAC-204:: Programming in Visual Basic				
	Total Credits (5 Theory +4 Lab)	20	8		24

Mathematical Foundation of Computer Science II

GCAC- 201 D

Course Objectives

1. To introduce advanced mathematical concepts used in computer science.
2. To develop logical reasoning and proof techniques.
3. To explore graph theory and its applications.
4. To study combinatorics and recurrence relations.
5. To understand finite automata and formal languages.

Course Outcomes

1. Apply logic and proof strategies in computer science problems.
2. Analyze and solve problems using combinatorics and recurrence relations.
3. Model and solve problems using graph theory.
4. Understand and design finite automata and regular expressions.
5. Demonstrate understanding of formal language concepts in computing.

Unit 1: Logic and Proof Techniques
This unit focuses on propositional and predicate logic, logical connectives, truth tables, and methods of proof such as direct, indirect, contradiction, and mathematical induction. It builds the foundation for reasoning in computer science applications.

Unit 2: Combinatorics and Recurrence Relations
Students learn the basic principles of counting, including permutations, combinations, and the pigeonhole principle. The unit also covers solving linear recurrence relations and applying them in algorithm analysis and problem-solving.

Unit 3: Graph Theory
This unit introduces the fundamentals of graph theory including types of graphs, graph representations, traversals, connectivity, and basic algorithms such as DFS, BFS, and shortest path. Applications in computer networks and data structures are also discussed.

Unit 4: Trees and Boolean Algebra
Students explore properties of trees, binary trees, spanning trees, and tree traversals. The unit also covers Boolean algebra, logic gates, and simplification techniques useful in digital logic design.

Unit 5: Formal Languages and Automata Theory
This unit introduces formal languages, regular expressions, and finite automata. Students will learn about deterministic and non-deterministic finite automata, regular languages, and their role in compiler design and text processing.

Elementary Mathematics II

GCAC- 201 E

Course Objectives

1. To strengthen understanding of number operations and place value.
2. To develop skills in working with fractions and decimals.
3. To enhance measurement and time-related problem-solving.
4. To build knowledge of geometry and spatial reasoning.
5. To introduce data interpretation and basic probability.

Course Outcomes

1. Solve multi-digit problems using all four operations.
2. Compare, add, and subtract fractions and decimals accurately.
3. Measure and calculate perimeter, area, and time intervals.
4. Identify geometric shapes and their properties.
5. Interpret data from graphs and understand basic probability.

Unit 1: Advanced Number Concepts
This unit expands on number sense by exploring larger numbers, place value, estimation, and rounding. Students will deepen their understanding of operations with whole numbers and begin working with multi-digit calculations and problem-solving strategies.

Unit 2: Fractions and Decimals
Students learn to compare, order, add, and subtract fractions and decimals. The unit also covers converting between fractions and decimals and applying these concepts in real-life contexts such as money, measurement, and data interpretation.

Unit 3: Measurement and Time
This unit focuses on more detailed measurement skills, including perimeter, area, and volume. Students practice using both metric and customary units, and they develop skills in reading and calculating time intervals using clocks and calendars.

Unit 4: Geometry and Spatial Understanding
Students explore properties of two-dimensional and three-dimensional shapes, including angles, lines, and symmetry. The unit encourages visualization and manipulation of shapes to develop spatial reasoning and introduces basic coordinate geometry.

Unit 5: Data Handling and Introduction to Probability
This unit introduces data collection, organization, and interpretation using tables, bar graphs, and pictographs. Students also explore basic concepts of probability, learning to predict outcomes and describe events as likely, unlikely, or certain.

SHOBHIT UNIVERSITY, GANGOH (SAHARANPUR)

TEACHING SCHEME

Effective from 2015

B. TECH. (COMPUTER SCIENCE & ENGINEERING)

(CBCS SYSTEM)

IV semester

Code	Course Title	Cr.	L	T	P
CCSN-202	OBJECT ORIENTED PROGRAMMING USING C++	4	3	1	0
CCSN-204	DESIGN AND ANALYSIS OF ALGORITHMS	4	3	1	0
CCSN-206	INTERNET AND WEB TECHNOLOGY	4	3	1	0
CCSN-208	COMPUTER NETWORKS	4	3	1	0
CCSN-XXX	PROFESSIONAL ELECTIVE-II	4	3	1	0
CBSN-202 CBSN-202 A CBSN-202 B CBSN-202 C CBSN-202 D	TECHNICAL ENGLISH TECHNICAL COMMUNICATION TECHNICAL PRESENTATION SKILLS USER MANUALS AND GUIDES BUSINESS COMMUNICATION	2	2	0	0
CCSN-252	OBJECT ORIENTED PROGRAMMING USING C++ LAB	1	0	0	2
CCSN-254	DESIGN AND ANALYSIS OF ALGORITHMS LAB	1	0	0	2
CCSN-256	INTERNET AND WEB TECHNOLOGY LAB	1	0	0	2
	Total	25	17	5	6

PROFESSIONAL ELECTIVE-II

1. CCSN 210 FORMAL LANGUAGES & AUTOMATION THEORY
2. CCSN 212 NANO SCIENCES

BUSINESS COMMUNICATION

CBSN-202 D

L	T	P	Cr
3	1	0	4

Course Objectives

1. To develop effective oral and written communication skills for business settings.
2. To enhance professional presentation and public speaking abilities.
3. To improve interpersonal and cross-cultural communication.
4. To teach the structure and style of business correspondence.
5. To build skills in digital communication and business etiquette.

Course Outcomes

1. Communicate clearly and professionally in business contexts.
2. Prepare effective emails, reports, and business letters.
3. Deliver confident and structured business presentations.
4. Demonstrate appropriate communication in diverse teams.
5. Use digital tools and platforms for efficient business communication.

Unit 1: Introduction to Business Communication

In this unit, students will explore the significance of communication within the business environment. It will cover the various forms of communication, including verbal, non-verbal, written, and visual communication. The unit will address the barriers that can hinder effective communication and discuss strategies to overcome these obstacles. Additionally, the role of technology in facilitating business communication will be examined.

Unit 2: Written Communication

This unit focuses on the principles of written communication in a business context. Students will learn about the structure and format of essential business documents such as letters, emails, memos, and reports. The emphasis will be on techniques that promote clarity, conciseness, and coherence in writing. The importance of tone and style will also be highlighted, alongside guidelines for creating effective proposals and presentations.

Unit 3: Oral Communication

In this unit, students will gain insights into the fundamentals of effective speaking within a business setting. They will explore techniques for delivering engaging presentations and public speaking skills. The unit will address the significance of body language and voice modulation in communication, as well as strategies for conducting productive meetings and discussions.

Unit 4: Interpersonal Communication

This unit will delve into the nature of interpersonal communication and its critical role in business interactions. Students will develop skills in active listening and providing constructive feedback. The unit will also cover conflict resolution techniques and negotiation skills, emphasizing how to build and maintain professional relationships through effective communication.

Unit 5: Business Communication in a Global Context

Students will examine the challenges and strategies associated with cross-cultural communication in this unit. The importance of understanding diversity in communication styles and practices will be emphasized. The impact of globalization on business communication will also be discussed, along with ethical considerations and etiquette when communicating in an international business environment.

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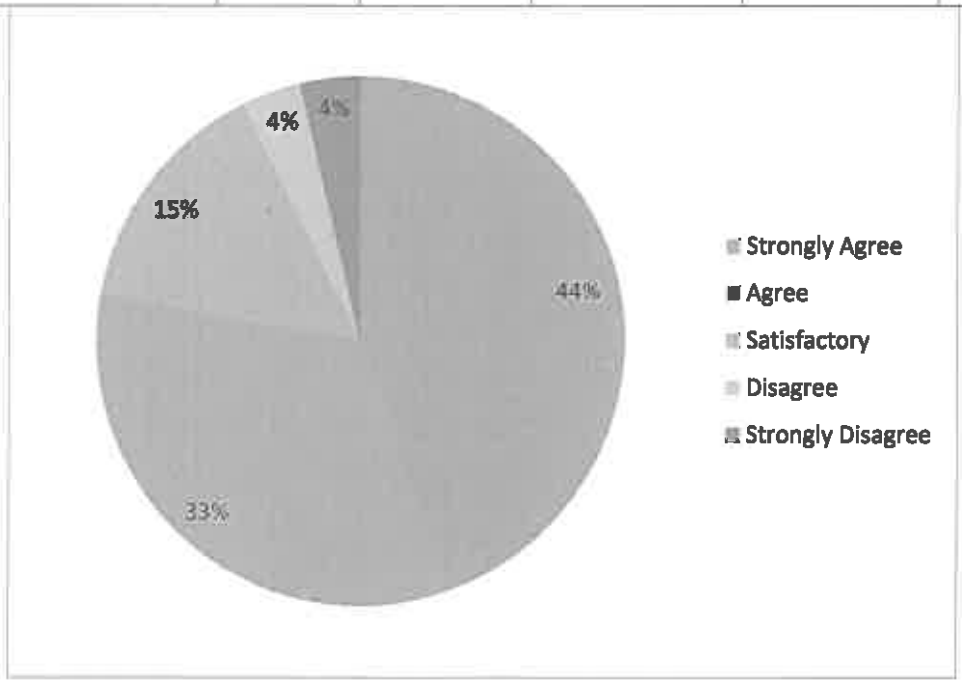
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Area Gangoh, Distt. Saharanpur (U.P.)
247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

16th Meeting of BOS (Item No. 16.3 Annexure -3)

Analysis of Alumni' Feedback of School of Engineering and Technology through Table and Pie Chart

1.The courses based on state of art trends and recent developments?

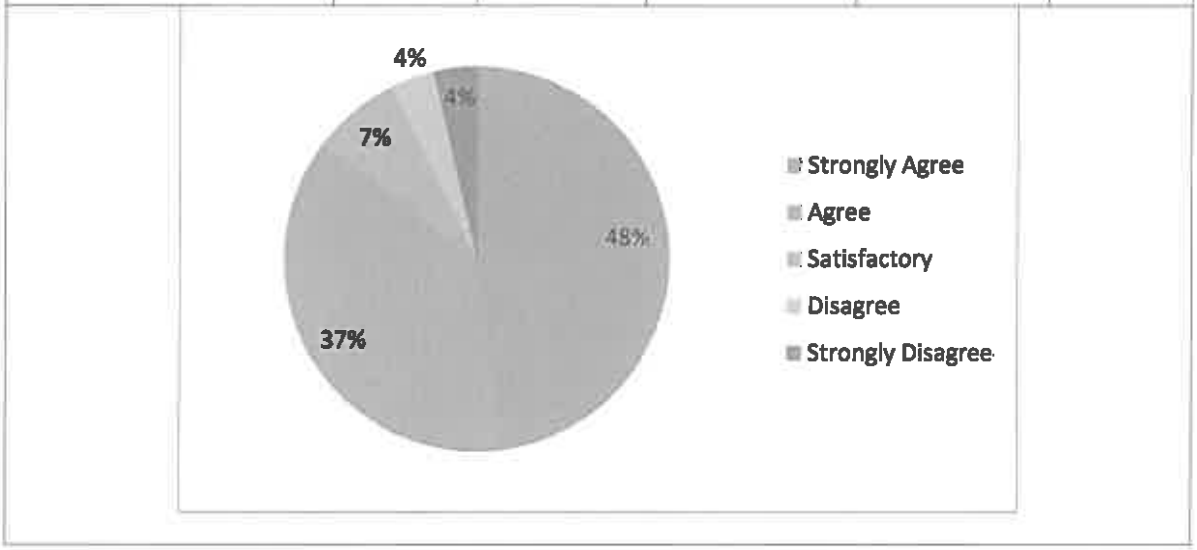
The courses based on state of art trends and recent developments	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	44.44	33.33	14.81	3.70	3.70



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Babu Vijendra Marg, Adarsh Institutional
Area Gangoh, Distt. Saharanpur (U.P.)
247341, India
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Q.2 The courses found to be helpful in developing skills and knowledge in respective domain?

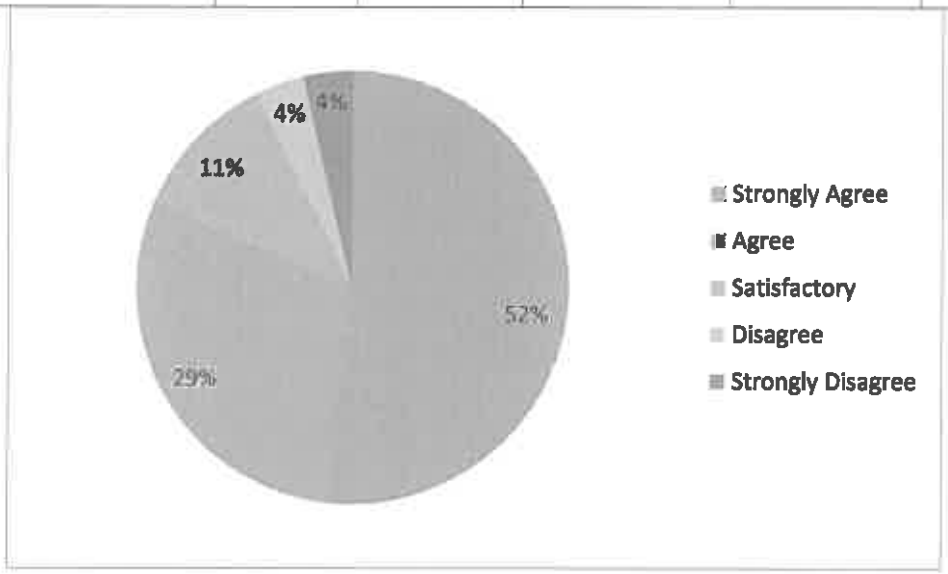
The courses found to be helpful in developing skills and knowledge in respective domain	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	48.15	37.04	7.41	3.70	3.70



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247341, India
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Q.3 The courses found to be productive in competing professionally at national/international level?

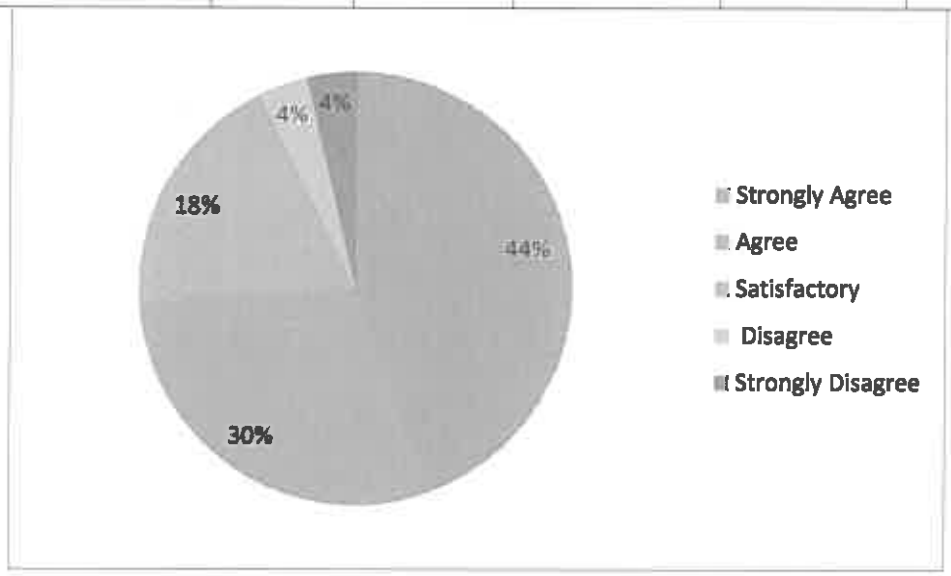
The courses found to be productive in competing professionally at national/international level	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	51.85	29.63	11.11	3.70	3.70



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Area Gangoh, Distt. Saharanpur (U.P.)
247341, India
Tel: +91 7830810052
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Q.4 The courses found to be appropriate in motivating students towards nation building by inculcating ethical and professional values?

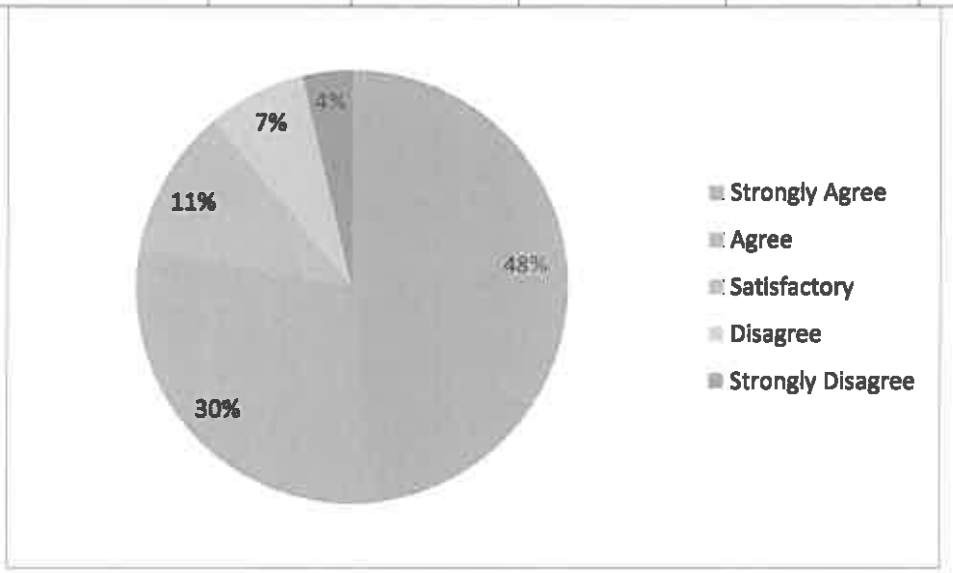
The courses found to be appropriate in motivating students towards nation building by inculcating ethical and professional values	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	44.44	29.63	18.52	3.70	3.70



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Area Gangoh, Distt. Saharanpur (U.P.)
247341, India
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Q.5 Theprogramme helped to understand the impact of domain knowledge in social and global context?

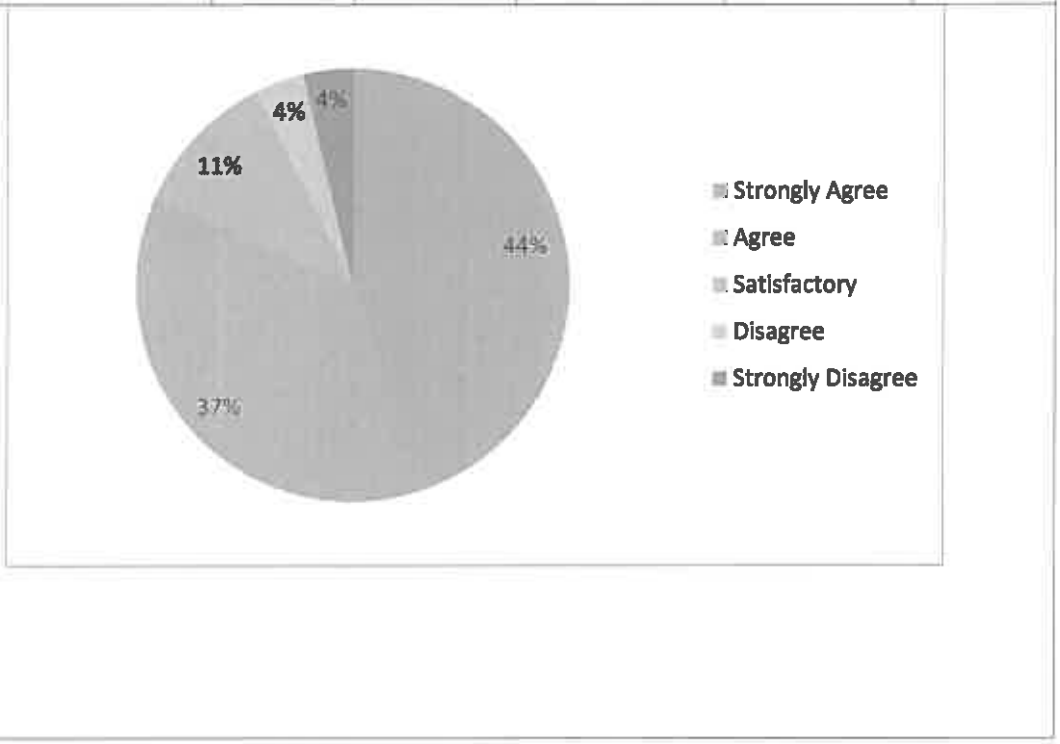
The programme helped to understand the impact of domain knowledge in social and global context	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	48.15	29.63	11.11	7.41	3.70



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E-mail: registrargangoh@shobhituniversity.ac.in
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Q.6 Theprogramme provided awareness on recent advancements and innovations?

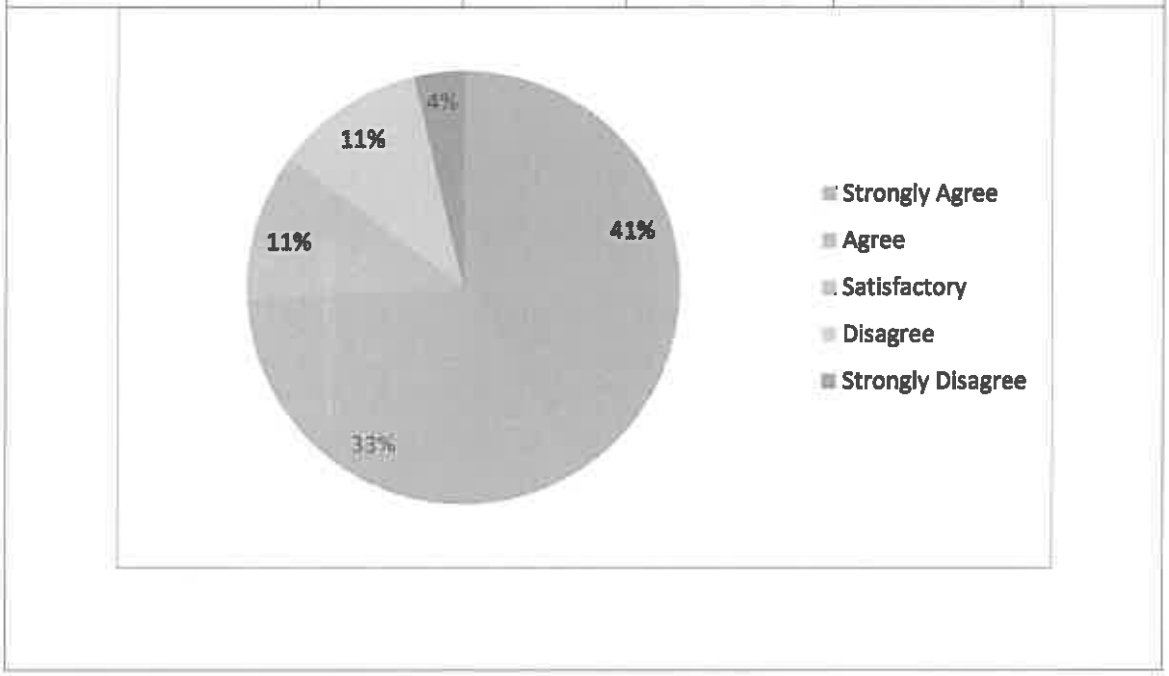
The programme provided awareness on recent advancements and innovations	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	44.44	37.04	11.11	3.70	3.70



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Q.7 Theprogramme improved critical thinking ability and problem-solving aptitude.

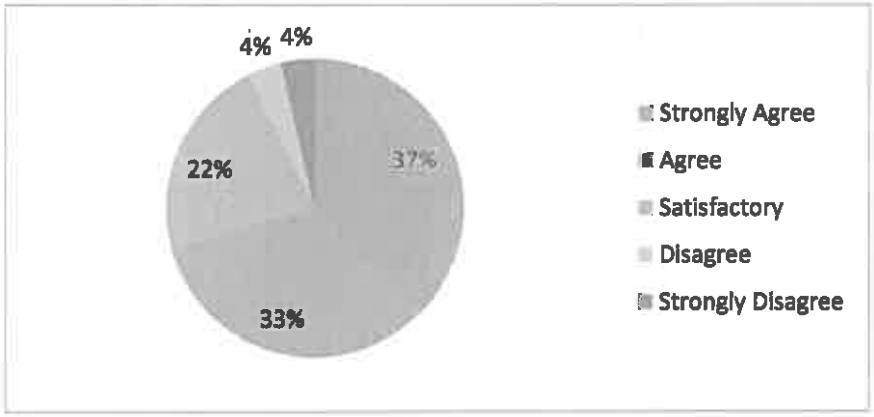
The programme improved critical thinking ability and problem-solving aptitude.	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	40.74	33.33	11.11	11.11	3.70



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Q.8 Theprogramme helped to take independent decisions and perform managerial &administerial functions diligently?

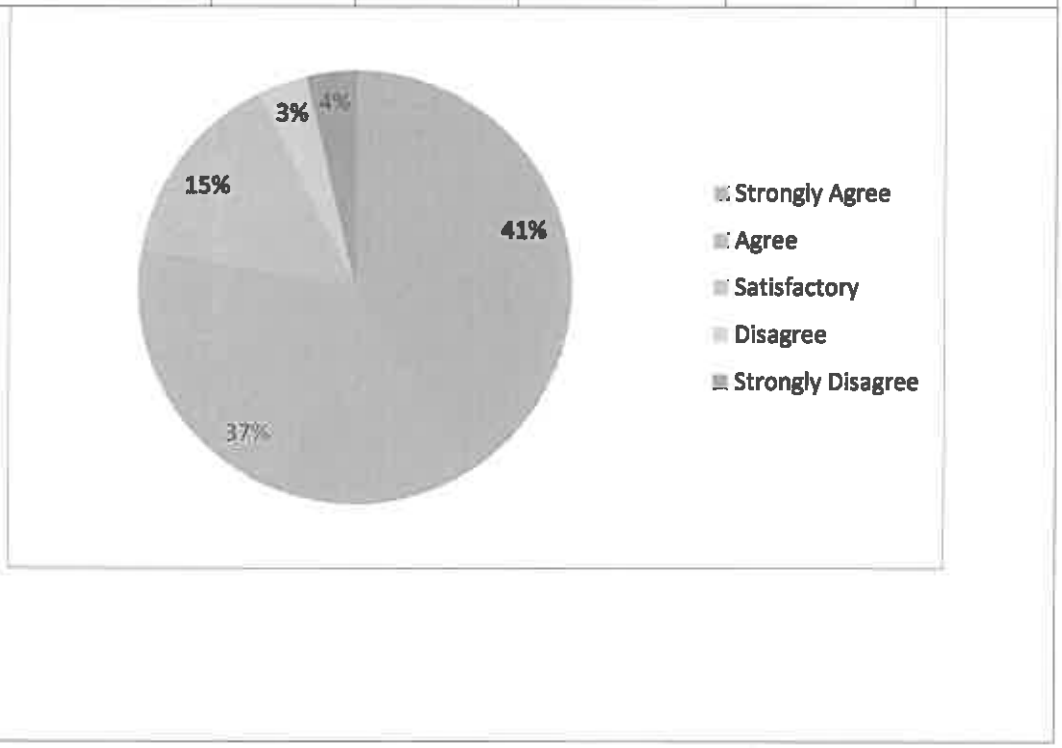
The programme helped to take independent decisions and perform managerial &administerial functions diligently	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	37.04	33.33	22.22	3.70	3.70



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Babu Vijendra Marg, Adarsh Institutional
Area Gangoh, Distt. Saharanpur (U.P.)
247341, India
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Q.9 The curriculum was helpful in acquiring advance level knowledge to pursue research and higher studies?

The curriculum was helpful in acquiring advance level knowledge to pursue research and higher studies	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	40.74	37.04	14.81	3.70	3.70



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School of Engineering and Technology (27)

Sr No	Questions	Details	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
1	The courses based on state of art trends and recent developments?	No of Alumni	12	9	4	1	1
		Percentage	44.44	33.33	14.81	3.70	3.70
2	The courses found to be helpful in developing skills and knowledge in respective domain?	No of Alumni	13	10	2	1	1
		Percentage	48.15	37.04	7.41	3.70	3.70
3	The courses found to be productive in competing professionally at national/international level?	No of Alumni	14	8	3	1	1
		Percentage	51.85	29.63	11.11	3.70	3.70
4	The courses found to be appropriate in motivating students towards nation building by inculcating ethical and professional values?	No of Alumni	12	8	5	1	1
		Percentage	44.44	29.63	18.52	3.70	3.70
5	The programme helped to understand the impact of domain knowledge in social and global context?	No of Alumni	13	8	3	2	1
		Percentage	48.15	29.63	11.11	7.41	3.70
6	The programme provided awareness on recent advancements and innovations?	No of Alumni	12	10	3	1	1
		Percentage	44.44	37.04	11.11	3.70	3.70
7	The programme improved critical thinking ability and problem-solving aptitude.	No of Alumni	11	9	3	3	1
		Percentage	40.74	33.33	11.11	11.11	3.70
8	The programme helped to take independent decisions and perform managerial &administerial functions diligently?	No of Alumni	10	9	6	1	1
		Percentage	37.04	33.33	22.22	3.70	3.70
9	The curriculum was helpful in acquiring advance level knowledge to pursue research and higher studies?	No of Alumni	11	10	4	1	1
		Percentage	40.74	37.04	14.81	3.70	3.70

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247341, India
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E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

Analys of the Feedback

The alumni feedback reveals a clear distinction between the perceived strengths and weaknesses of the curriculum. High ratings (92.59%) were consistently given for its ability to develop domain-specific skills, foster ethical and professional values, increase awareness of recent innovations, and enhance managerial competencies. These areas suggest that the curriculum is highly effective in preparing students for professional roles and instilling core values. However, the feedback also highlights critical shortcomings, with extremely low ratings in areas such as alignment with state-of-the-art trends (25.00%), global competitiveness (25.00%), understanding the impact of domain knowledge in a social and global context (25.00%), improving critical thinking and problem-solving skills (25.00%), and research readiness (24.00%). These results indicate that the curriculum may be outdated and insufficiently focused on modern trends, global challenges, and fostering higher-order cognitive skills. To enhance its relevance and impact, the curriculum needs significant updates to address emerging industry demands, promote deeper analytical thinking, and better prepare students for advanced research and global professional environments.

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Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

Action Taken Report

(School of Engineering and Technology)

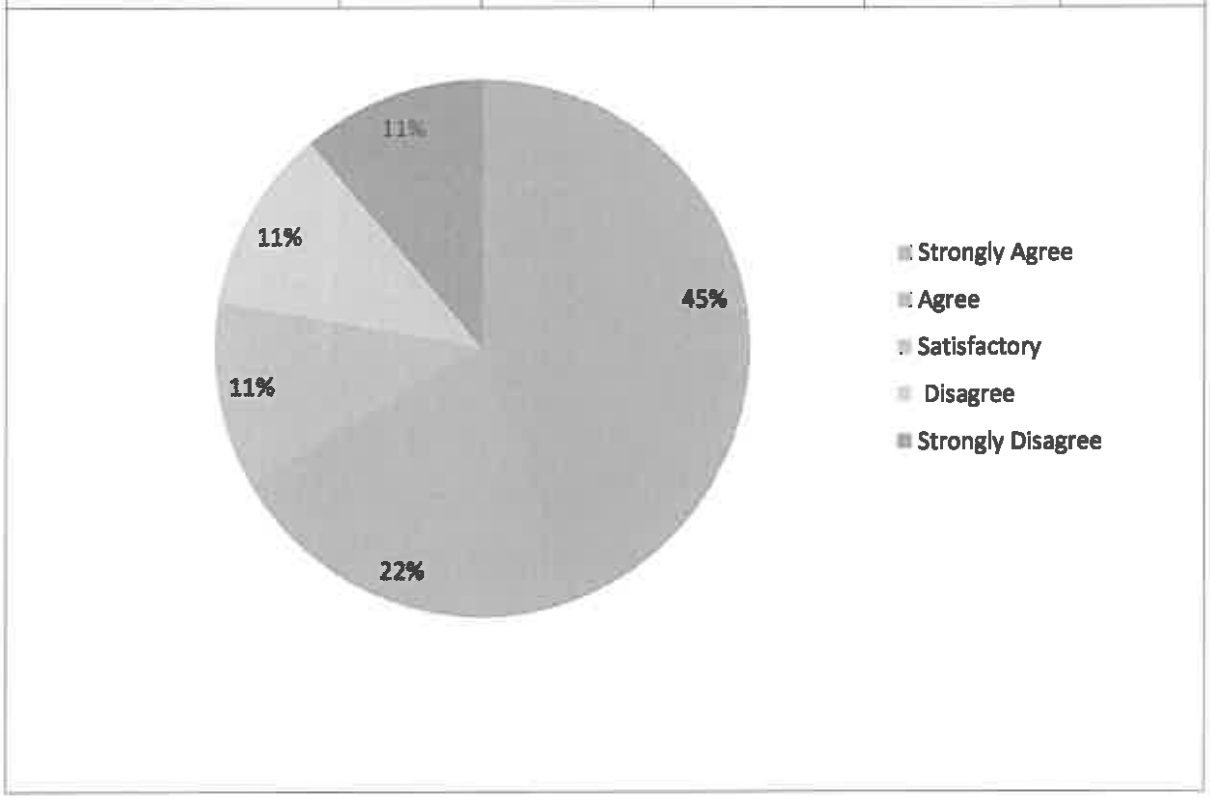
Sr. No.	Suggestions	Action Taken	Outcome
1	Align curriculum with state-of-the-art technological trends	Updated syllabi in collaboration with industry experts; introduced courses on AI, ML, IoT, cybersecurity, and sustainable engineering practices.	Students are now more familiar with current industry standards and technologies, improving job readiness and technical relevance.
2	Improve global competitiveness and exposure to international standards	Launched international collaborations, online certification programs (Coursera/NPTEL), and participation in global hackathons and conferences.	Increased student exposure to global platforms; improved performance in international competitions and placements.
3	Strengthen focus on critical thinking and problem-solving	Integrated design thinking workshops, real-world project challenges, and interdisciplinary team-based assignments into core courses.	Enhanced student engagement in creative problem-solving; demonstrated improvement in innovation-driven project outcomes.
4	Enhance research readiness and support for higher studies	Introduced research methodology modules, final-year thesis requirements, and faculty-guided mini-research projects at earlier semesters.	Rise in undergraduate research activity and postgraduate admissions; more students presenting at academic conferences.

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Babu Vijendra Marg, Adarsh Institutional
Area Gangoh, Distt. Saharanpur (U.P.)
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Analysis of Employer's Feedback of School of Engineering and Technology through Table and Pie Chart

Q.1 curriculum assists the students to acquire necessary entry level skills in industrial sector.

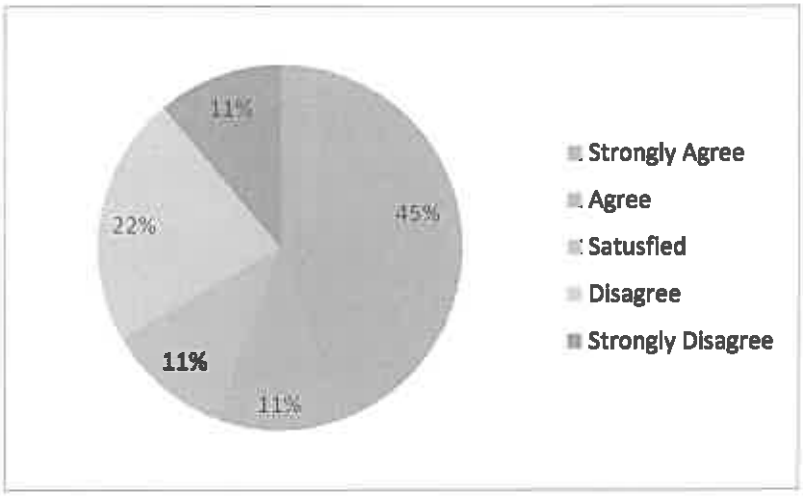
The curriculum assists the students to acquire necessary entry level skills in industrial sector.	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	44.44	22.22	11.11	11.11	11.11



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Babu Vijendra Marg, Adarsh Institutional
Area Gangoh, Distt. Saharanpur (U.P.)
247341, India
Tel: +91 7830810052
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Q.2 The curriculum offers adequate scope for life-long learning and higher-level aptitude for new technology/tools.

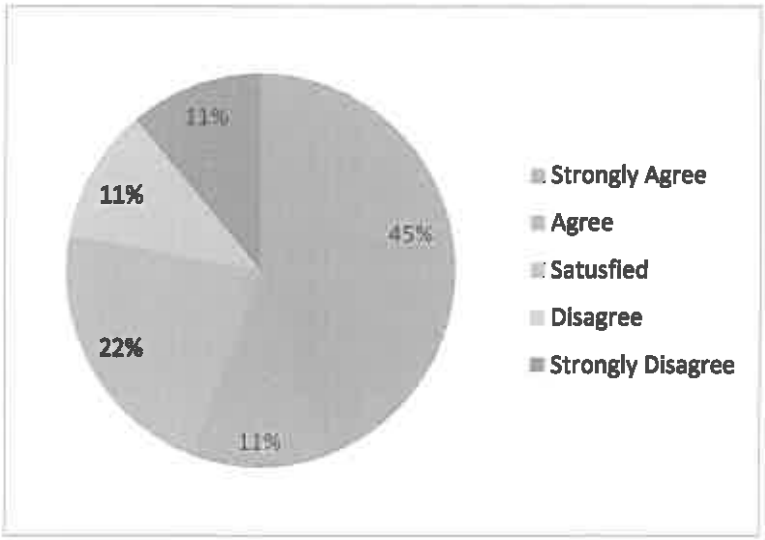
The curriculum offers adequate scope for life-long learning and higher-level aptitude for new technology/tools.	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	44.4	11.1	11.1	22.2	11.1



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Babu Vijendra Marg, Adarsh Institutional
Area Gangoh, Distt. Saharanpur (U.P.)
247341, India
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E-mail: registrargangoh@shobhituniversity.ac.in
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Q.3 The curriculum has adequate scope for multidisciplinary knowledge and sufficient number of elective courses.

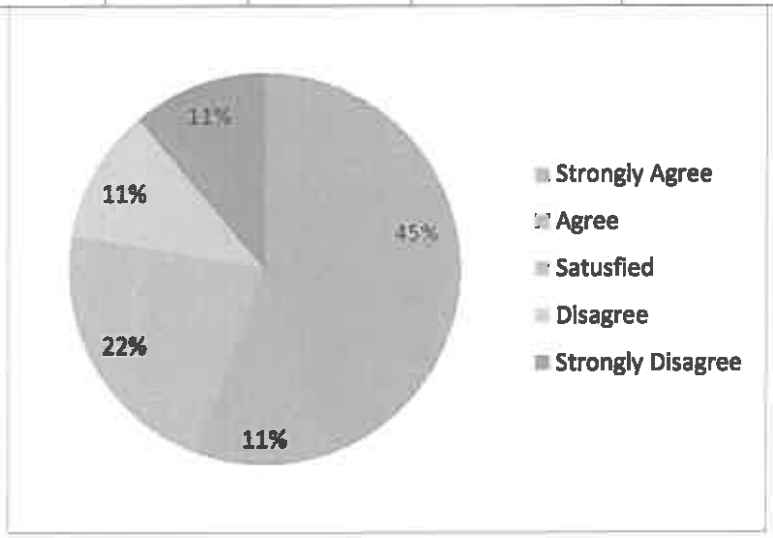
The curriculum has adequate scope for multidisciplinary knowledge and sufficient number of elective courses.	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	44.4	22.2	11.1	11.1	11.1



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Area Gangoh, Distt. Saharanpur (U.P.)
247341, India
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Q.4 The curriculum has relevant content to assist students to work independently as well in a team with high level of adaptability.

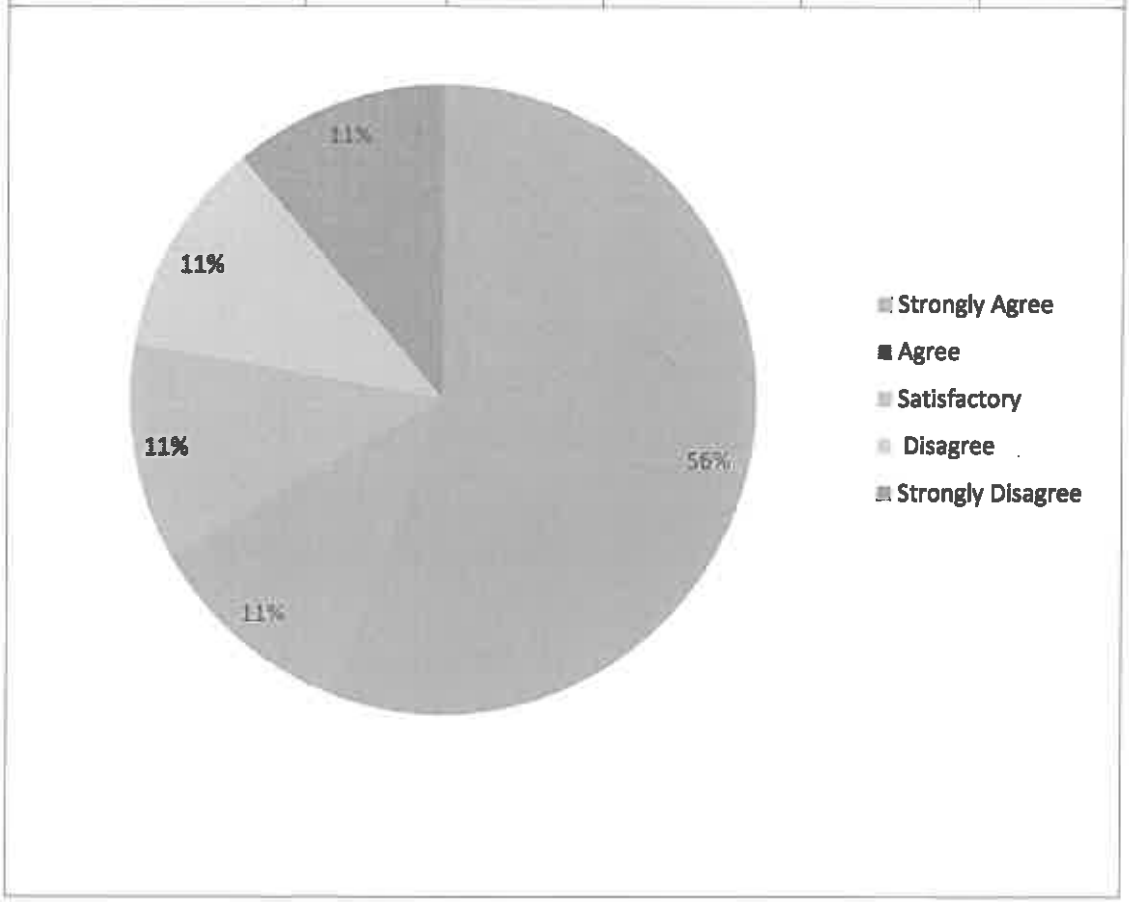
The curriculum has relevant content to assist students to work independently as well in a team with high level of adaptability	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	44.4	11.1	22.2	11.1	11.1



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247341, India
Tel: +91 7830810052
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Q.5 The curriculum provides enough scope for improving entrepreneurial skill as well as industry readiness.

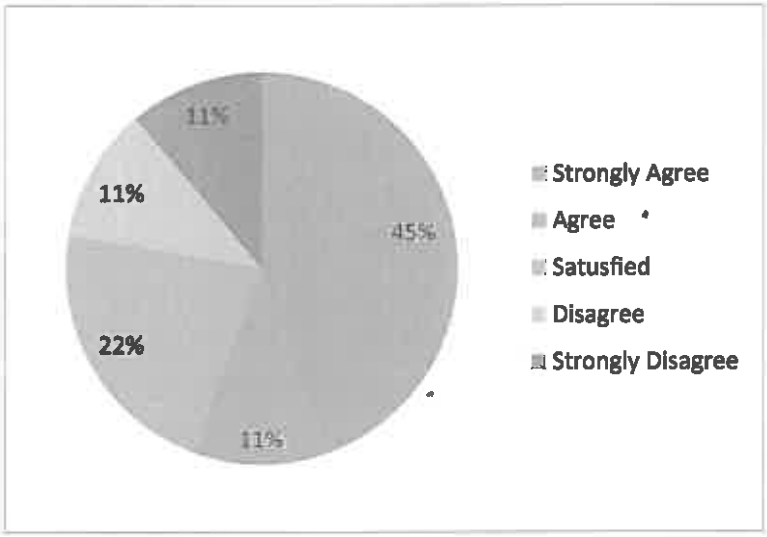
The curriculum provides enough scope for improving entrepreneurial skill as well as industry readiness.	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	55.56	11.11	11.11	11.11	11.11



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Area Gangoh, Distt. Saharanpur (U.P.)
247341, India
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Q.6 The curriculum provides ample knowledge for increased employability and to promote students for higher education.

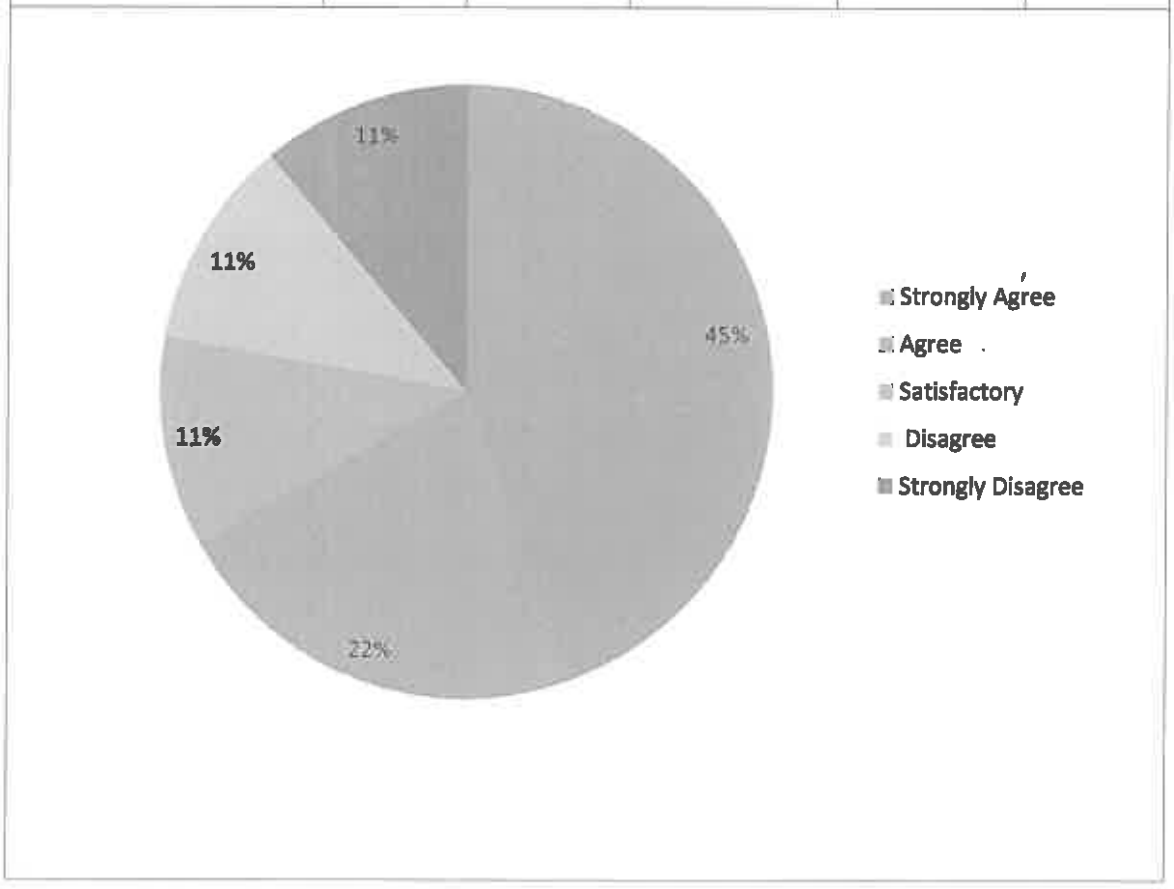
The curriculum provides ample knowledge for increased employability and to promote students for higher education.	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	33.3	22.2	11.1	11.1	22.2



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EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional
Area Gangoh, Distt. Saharanpur (U.P.)
247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
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Q.7 The curriculum has focus on personality development by presence of courses on human values and professional ethics.

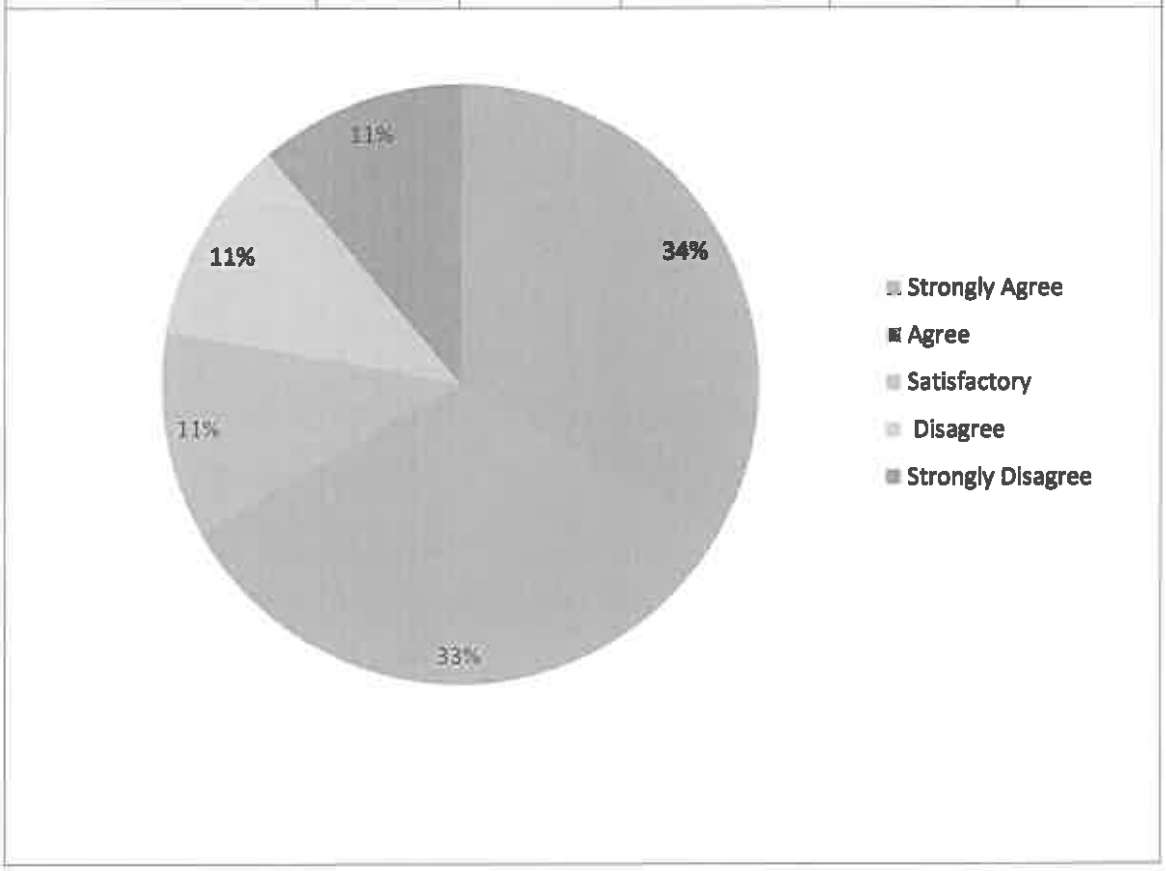
The curriculum has focus on personality development by presence of courses on human values and professional ethics	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	44.44	22.22	11.11	11.11	11.11



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Q.8 The curriculum is well organized and balanced for the programme with proper credit allocation.

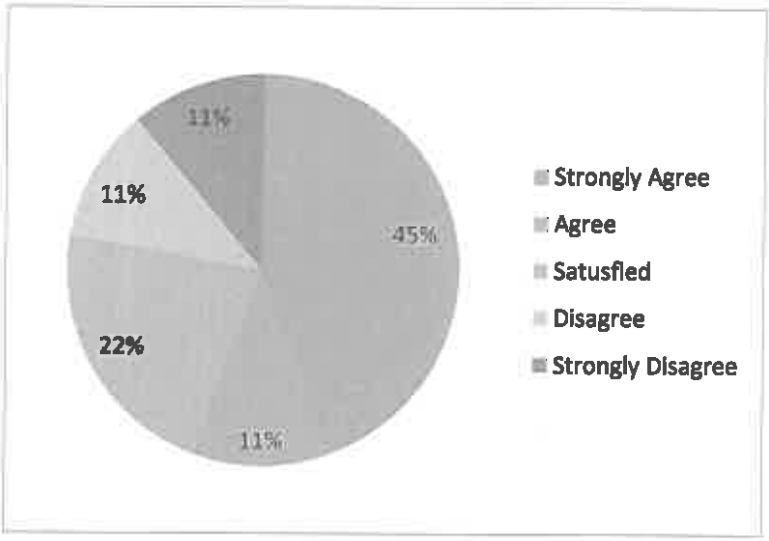
The curriculum is well organized and balanced for the programme with proper credit allocation.	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	33.33	33.33	11.11	11.11	11.11



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U.: www.sug.ac.in

Q.9 The courses have adequate balance between theory and application for a student's holistic development.

The courses have adequate balance between theory and application for student's holistic development	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	33.3	22.2	11.1	22.2	11.1



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School of Engineering & Technology (09)

Total no. of Employer: 09		Strongly Agree	Agree	Satisfied	Disagree	Strongly Disagree
The curriculum assists the students to acquire necessary entry level skills in industrial sector.	No. of Academicians	4	2	1	1	1
	Percentage	44.44	22.22	11.12	11.11	11.11
The curriculum offers adequate scope for life-long learning and higher-level aptitude for new technology/tools.	No. of Academicians	4	1	1	2	1
	Percentage	44.44	11.12	11.11	22.22	11.11
The curriculum has adequate scope for multidisciplinary knowledge and sufficient number of elective courses.	No. of Academicians	4	2	1	1	1
	Percentage	44.44	22.23	11.11	11.11	11.11
The curriculum has relevant content to assist students to work independently as well in a team with high level of adaptability	No. of Academicians	4	1	2	1	1
	Percentage	44.44	11.12	22.22	11.11	11.11
The curriculum provides enough scope for improving entrepreneurial skill as well as industry readiness.	No. of Academicians	5	1	1	1	1
	Percentage	55.56	11.11	11.11	11.11	11.11
The curriculum provides ample knowledge for	No. of Academicians	3	2	1	1	2

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increased employability and to promote students for higher education.	Percentage	33.33	22.22	11.11	11.12	22.22
The curriculum has focus on personality development by presence of courses on human values and professional ethics	No. of Academicians	4	2	1	1	1
	Percentage	44.44	22.22	11.11	11.11	11.11
The curriculum is well organized and balanced for the programme with proper credit allocation.	No. of Academicians	3	3	1	1	1
	Percentage	33.33	33.33	11.11	11.11	11.11
The courses have adequate balance between theory and application for student's holistic development.	No. of Academicians	3	2	1	2	1
	Percentage	33.33	22.22	11.11	22.22	11.11

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Area Gangoh, Distt. Saharanpur (U.P.)
247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

Analysis of Feedback:

The employers' feedback on the curriculum indicates areas for improvement, with several aspects receiving relatively moderate ratings. The curriculum helps students acquire necessary entry-level skills for the industrial sector, with 77.78% of employers agreeing on its effectiveness in this area. Similarly, the curriculum offers a good scope for multidisciplinary knowledge, with adequate elective courses and content that supports both independent and collaborative work, receiving the same rating of 77.78%. However, certain areas received lower ratings, such as the scope for life-long learning and the development of higher-level skills for new technology and tools (66.67%). Additionally, the curriculum's ability to enhance employability, promote higher education, and maintain a proper balance between theory and application (all at 66.66%) suggests there is room for improvement in these domains to better align with industry expectations. The curriculum's focus on entrepreneurial skills, industry readiness, personality development, and ethical courses received a slightly higher but still moderate rating of 77.78% and 77.77%, respectively. Overall, while the curriculum has several strengths, employers feel that it could be more comprehensive in preparing students for advanced skills, employability, and holistic development.

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Action Taken Report

(School of Engineering and Technology)

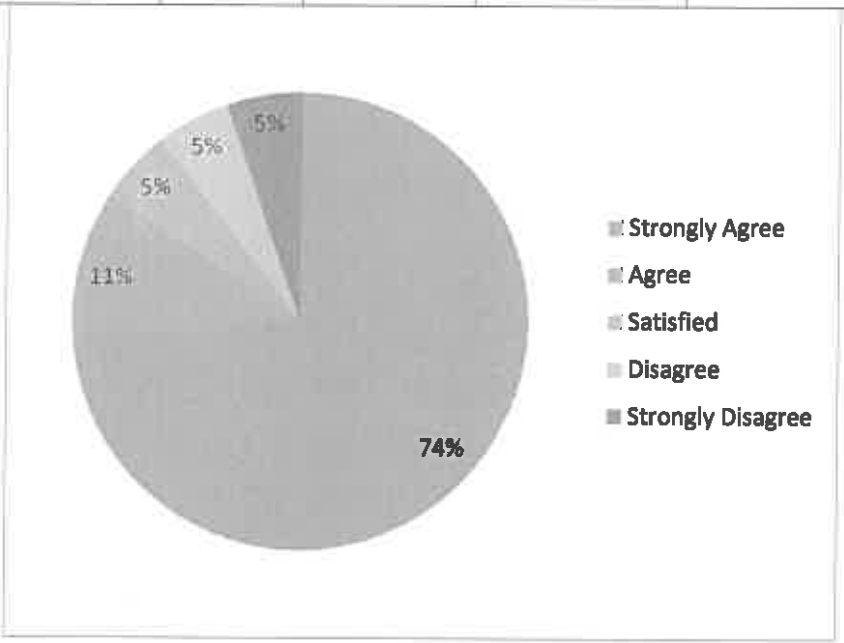
Sr. No.	Suggestions	Action Taken	Outcome
1	Improve alignment of curriculum with emerging technologies	Introduced new elective courses on AI, IoT, Data Analytics, and Industry 4.0 tools	Students gained exposure to in-demand technologies, improving job readiness
2	Enhance life-long learning and self-development components	Added modules on online learning platforms, certifications, and self-paced learning strategies	Increased student engagement in MOOCs and certifications beyond curriculum
3	Increase focus on employability and higher education preparation	Conducted training for competitive exams, soft skills workshops, and resume/interview preparation	Better placement outcomes and more students pursuing postgraduate studies
4	Strengthen balance between theory and practical application	Introduced more lab-based and project-oriented assessments, industry-linked mini-projects	Students demonstrated improved problem-solving skills and practical implementation

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Analysis of Peer Academician's Feedback of School of Engineering and Technology through Table and Pie Chart

Q.1 The syllabus of the courses are proper in relation to the competencies expected out of the programme.

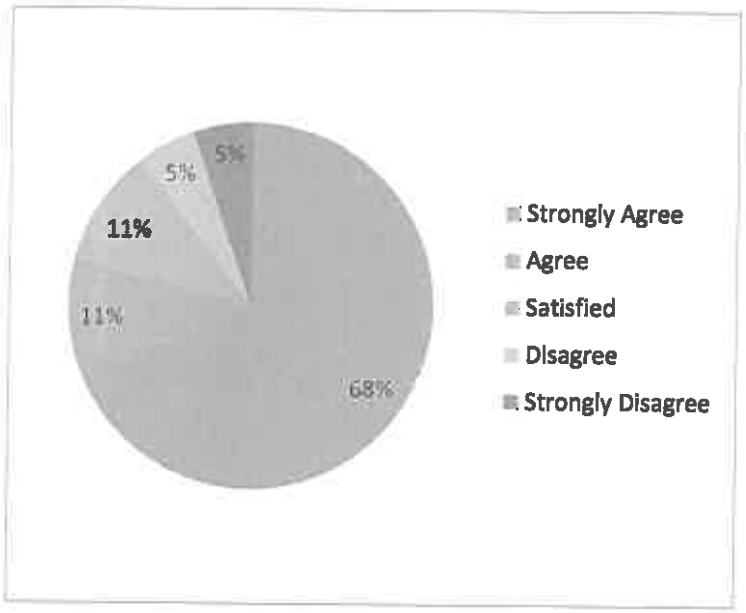
The syllabus of the courses are proper in relation to the competencies expected out of the programme.	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	73.68	10.52	5.26	5.26	5.26



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Q.2 The sequence and overall organization of the courses is proper in the curriculum.

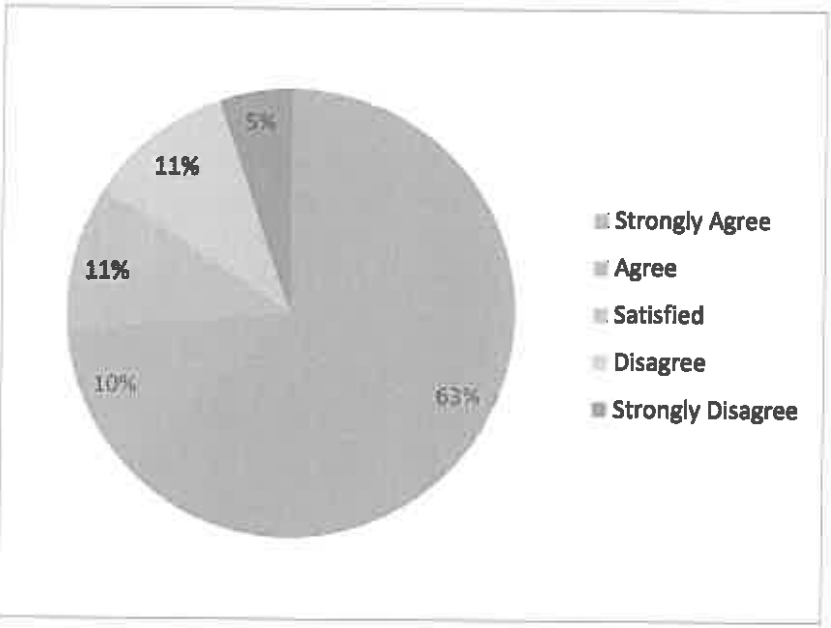
The sequence and overall organization of the courses is proper in the curriculum.	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	68.42	10.52	10.52	5.26	5.26



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Q.3 The curriculum has adequate scope for multidisciplinary knowledge and sufficient number of elective courses.

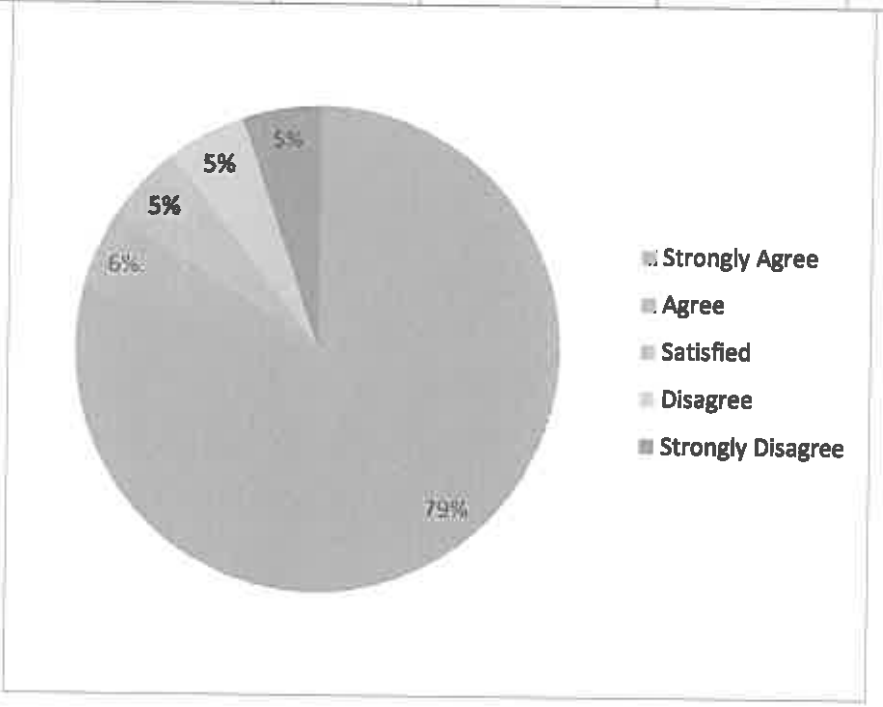
The curriculum has adequate scope for multidisciplinary knowledge and sufficient number of elective courses.	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	63.00	10.52	10.52	10.52	5.26



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Q.4 Extra care has been taken for extra learning or self-learning while designing the courses.

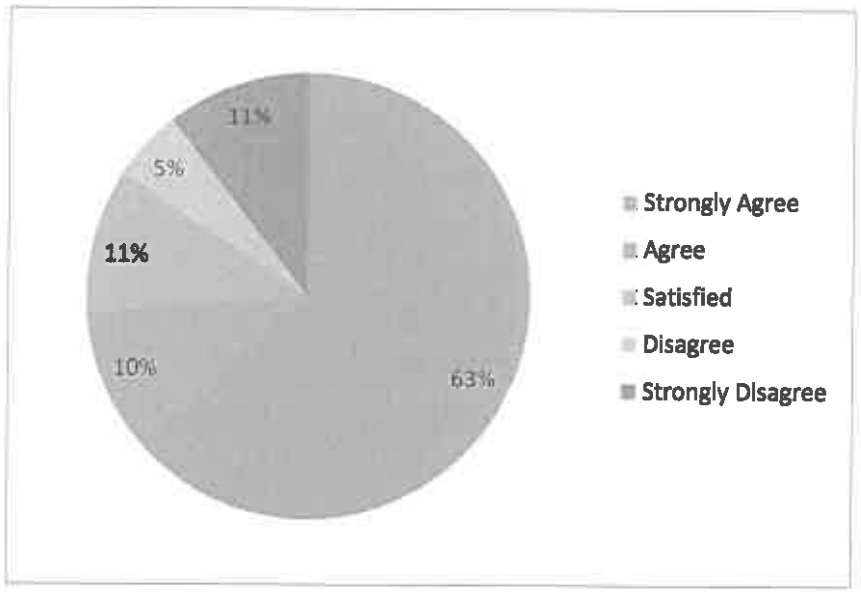
Extra care has been taken for extra learning or self-learning while designing the courses.	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	78.94	5.26	5.26	5.26	5.26



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Q.5 The curriculum provides enough scope for improving entrepreneurial skill as well as industry readiness.

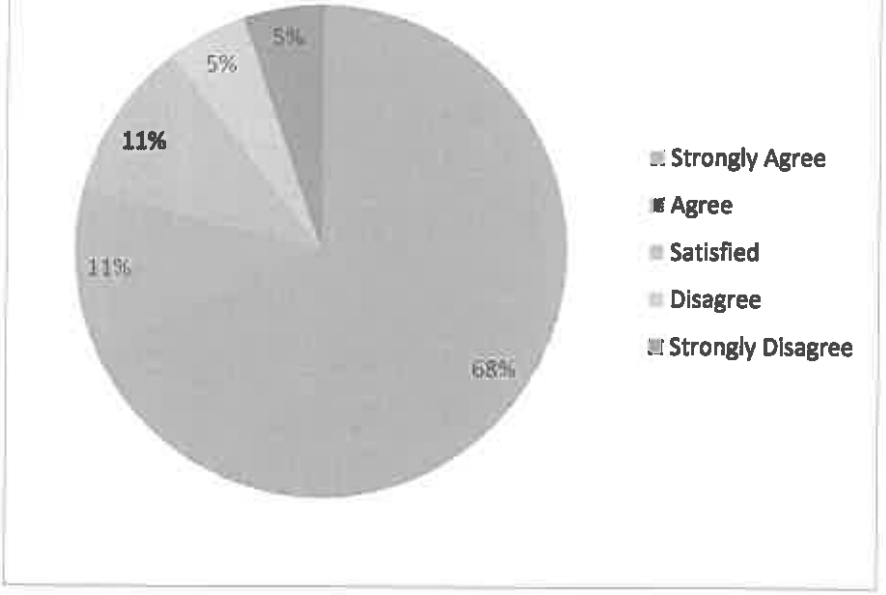
The curriculum provides enough scope for improving entrepreneurial skill as well as industry readiness.	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	63.00	10.52	10.52	5.26	10.52



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Q.6 The curriculum provides ample knowledge for increased employability and to promote students for higher education.

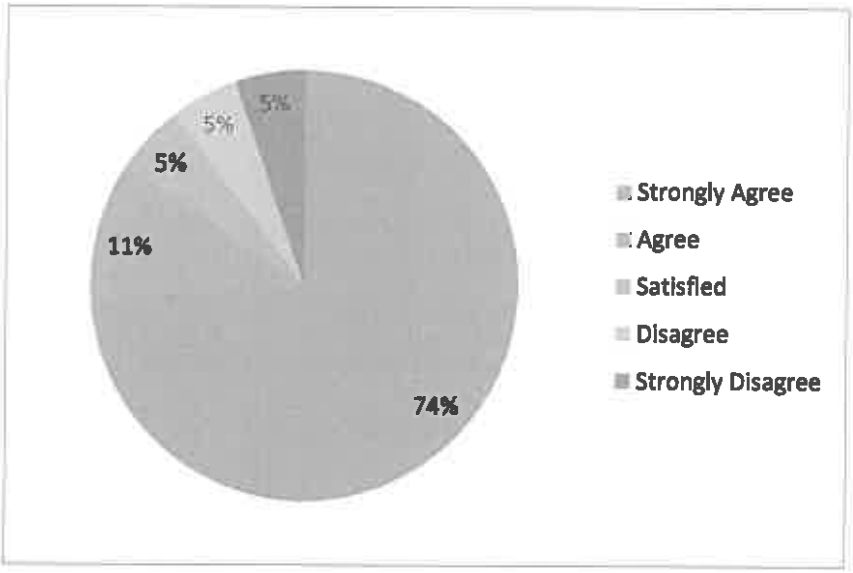
The curriculum provides ample knowledge for increased employability and to promote students for higher education.	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	68.42	10.52	10.52	5.26	5.26



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Q.7 The curriculum has focus on personality development by presence of courses on human values and professional ethics

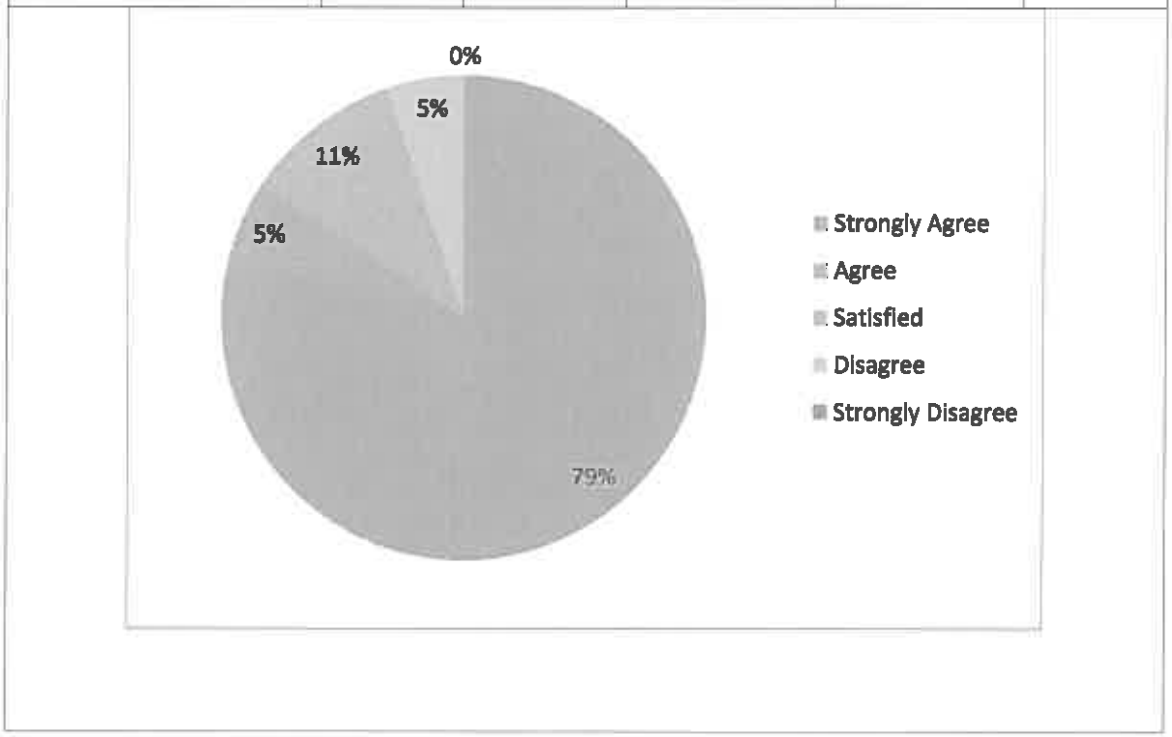
The curriculum has focus on personality development by presence of courses on human values and professional ethics	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	73.68	10.52	5.26	5.26	5.26



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Q.8 The curriculum is well organized and balanced for the programme with proper credit allocation.

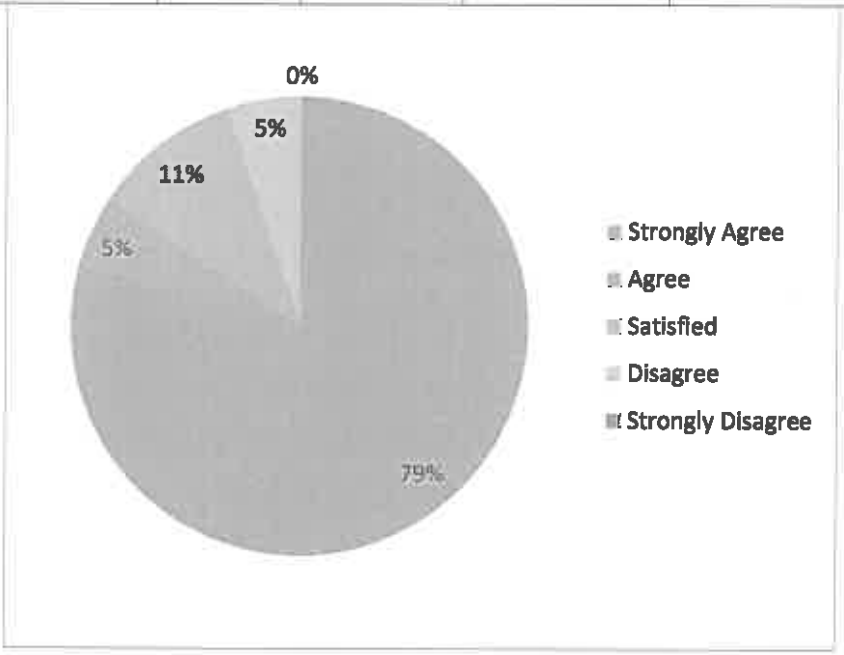
The curriculum is well organized and balanced for the programme with proper credit allocation.	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	78.94	5.26	10.52	5.26	0.00



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Q.9 The courses have adequate balance between theory and application for a student's holistic development.

The courses have adequate balance between theory and application for a student's holistic development.	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	78.94	5.26	10.52	5.26	0.00



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School of Engineering & Technology (19)						
Total no. of Peer Academicians: 19		Strongly Agree	Agree	Satisfied	Disagree	Strongly Disagree
The syllabus of the courses are proper in relation to the competencies expected out of the programme.	No. of Academicians	14.00	2.00	1.00	1.00	1.00
	Percentage	73.68	10.52	5.26	5.26	5.26
The sequence and overall organization of the courses is proper in the curriculum	No. of Academicians	13.00	2.00	2.00	1.00	1.00
	Percentage	68.42	10.52	10.52	5.26	5.26
The curriculum has adequate scope for multidisciplinary knowledge and sufficient number of elective courses	No. of Academicians	12.00	2.00	2.00	2.00	1.00
	Percentage	63.00	10.52	10.52	10.52	5.26
Extra care has been taken for extra learning or self-learning while designing the courses.	No. of Academicians	15.00	1.00	1.00	1.00	1.00
	Percentage	78.94	5.26	5.26	5.26	5.26
The curriculum provides enough scope for improving entrepreneurial skill as well as industry readiness.	No. of Academicians	12.00	2.00	2.00	1.00	2.00
	Percentage	63.00	10.52	10.52	5.26	10.52
The curriculum provides ample knowledge for increased employability and to promote students for higher education.	No. of Academicians	13.00	2.00	2.00	1.00	1.00
	Percentage	68.42	10.52	10.52	5.26	5.26

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The curriculum has focus on personality development by presence of courses on human values and professional ethics	No. of Academicians	14.00	2.00	1.00	1.00	1.00
	Percentage	73.68	10.52	5.26	5.26	5.26
The curriculum is well organized and balanced for the programme with proper credit allocation.	No. of Academicians	15.00	1.00	2.00	1.00	0.00
	Percentage	78.94	5.26	10.52	5.26	0.00
The courses have adequate balance between theory and application for a student's holistic development.	No. of Academicians	15.00	1.00	2.00	1.00	0.00
	Percentage	78.94	5.26	10.52	5.26	0.00

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U.: www.sug.ac.in

Analysis of Feedback:

The peer feedback on the curriculum reflects generally positive sentiments, with most areas receiving high ratings, particularly for the organization, credit allocation, and balance between theory and application, which both scored 94.72%. The syllabus is seen as well-aligned with the competencies expected from the program, and the sequence and organization of courses also received strong approval, both scoring 89.46%. However, there are two areas that stand out for improvement, namely the scope for multidisciplinary knowledge and entrepreneurial skill development, which scored lower at 84.04%. This suggests a potential gap in these areas that could be addressed to further enhance the curriculum. Despite these points, the curriculum is considered well-structured, with a clear focus on employability, self-learning, and personality development through courses on human values and ethics. Overall, the feedback indicates a robust curriculum with minor areas that could benefit from refinement.

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Babu Vijendra Marg, Adarsh Institutional
Area Gangoh, Distt. Saharanpur (U.P.)
247341, India
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E-mail: registrargangoh@shobhituniversity.ac.in
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Action Taken Report

(School of Engineering and Technology)

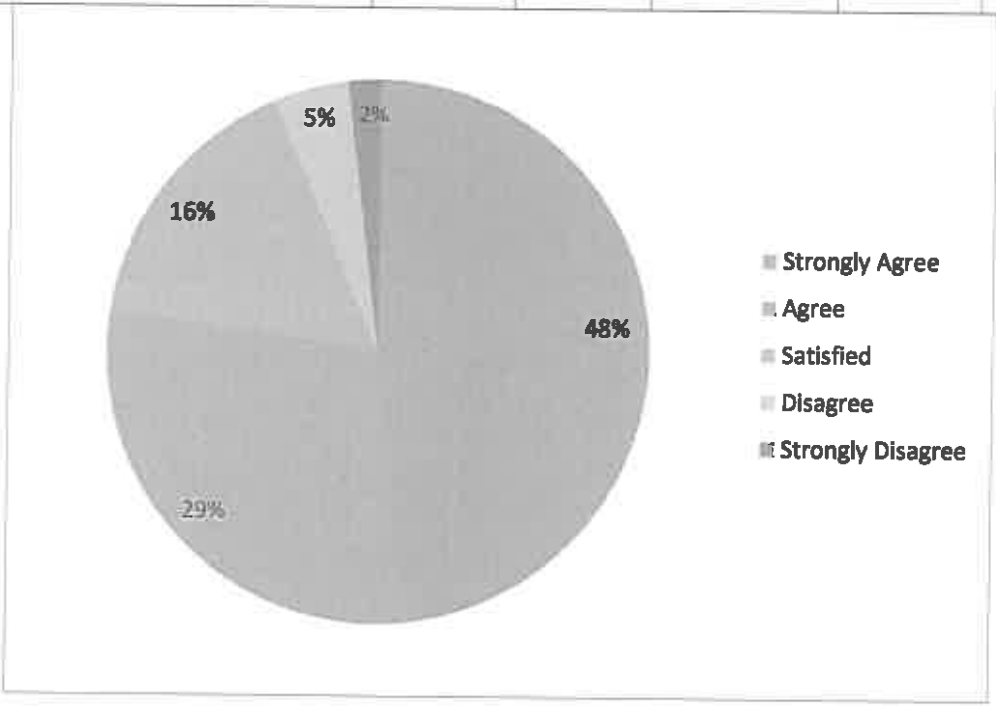
Sr. No.	Suggestions	Action taken	Outcome
1	Strengthen the scope for multidisciplinary knowledge	Introduced more interdisciplinary courses that combine engineering with fields like data science, environmental studies, and business	Increased student exposure to cross-disciplinary areas, enriching their problem-solving and innovation capabilities
2	Improve entrepreneurial skill development	Launched new courses and workshops focusing on tech entrepreneurship, including startup incubation programs and mentoring	Enhanced student understanding and skills in launching and managing engineering-related startups
3	Focus on enhancing self-learning and practical application	Expanded the use of project-based learning, hackathons, and industry collaborations to allow students to apply theoretical concepts in real-world settings	Greater hands-on experience for students and better integration of theory with practice
4	Further integrate human values and professional ethics into the curriculum	Added more modules on ethical technology development, societal impact of engineering, and sustainability	Improved student awareness of ethical issues in technology, fostering responsible innovation

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Analysis of Students' Feedback of School of Engineering and Technology through Table and Pie Chart

Q.1. Whether the curriculum has depth of the subjects and clears the concept?

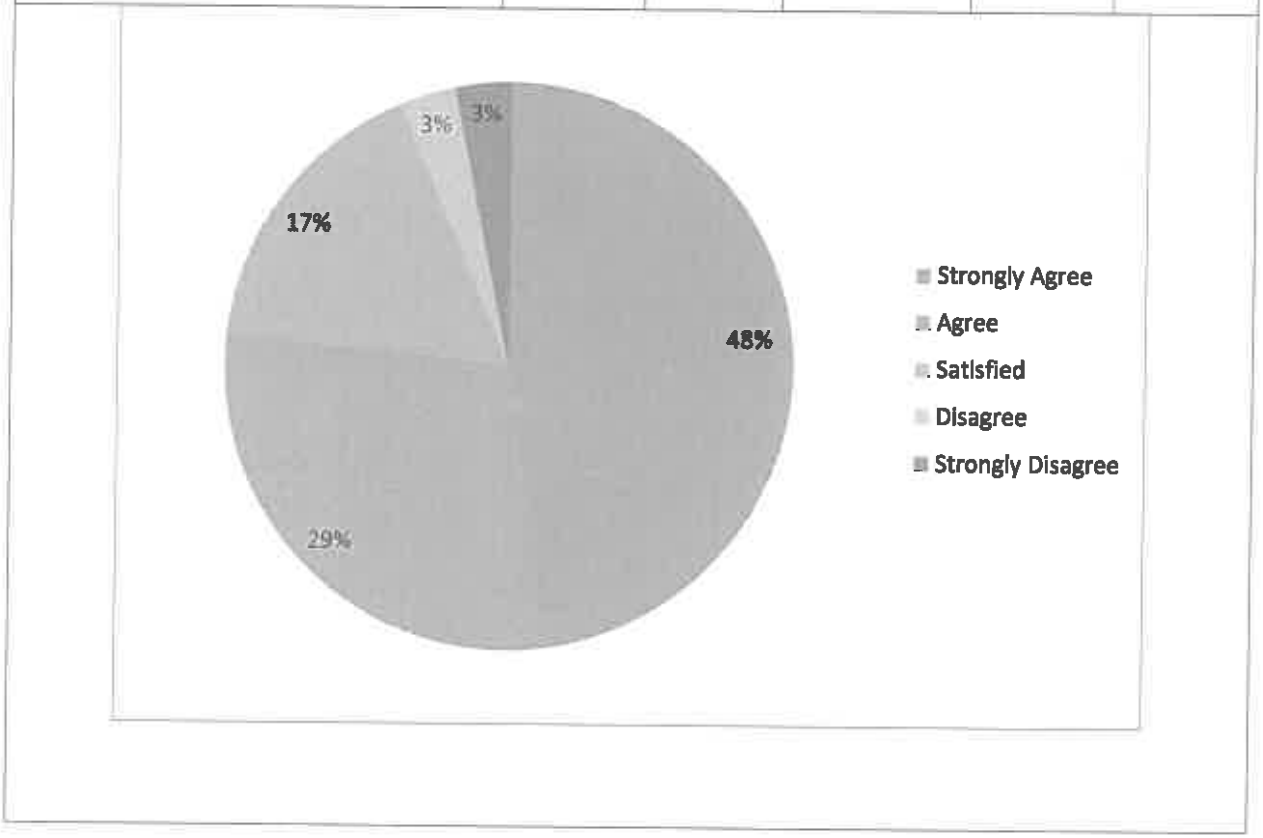
Curriculum has depth of the subjects and clears the concept	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	48.3871	29.03226	16.12903	4.516129	1.935484



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Q.2. How do you rate the course outcomes and relevance to the course content?

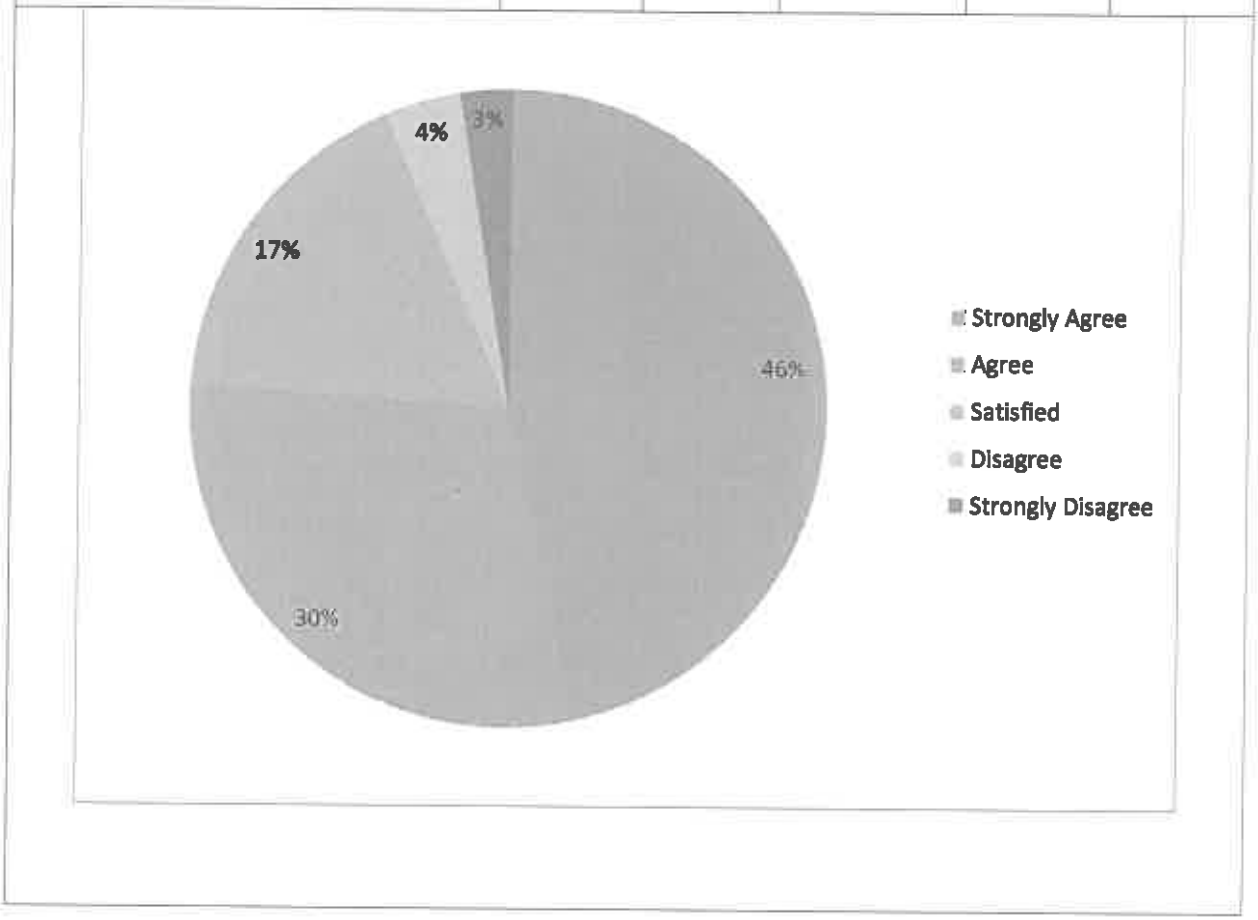
Rate the course outcomes and relevance to the course content	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	47.74194	29.03226	16.77419	3.225806	3.225806



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Q.3. How do you rate the sequence of units in the courses?

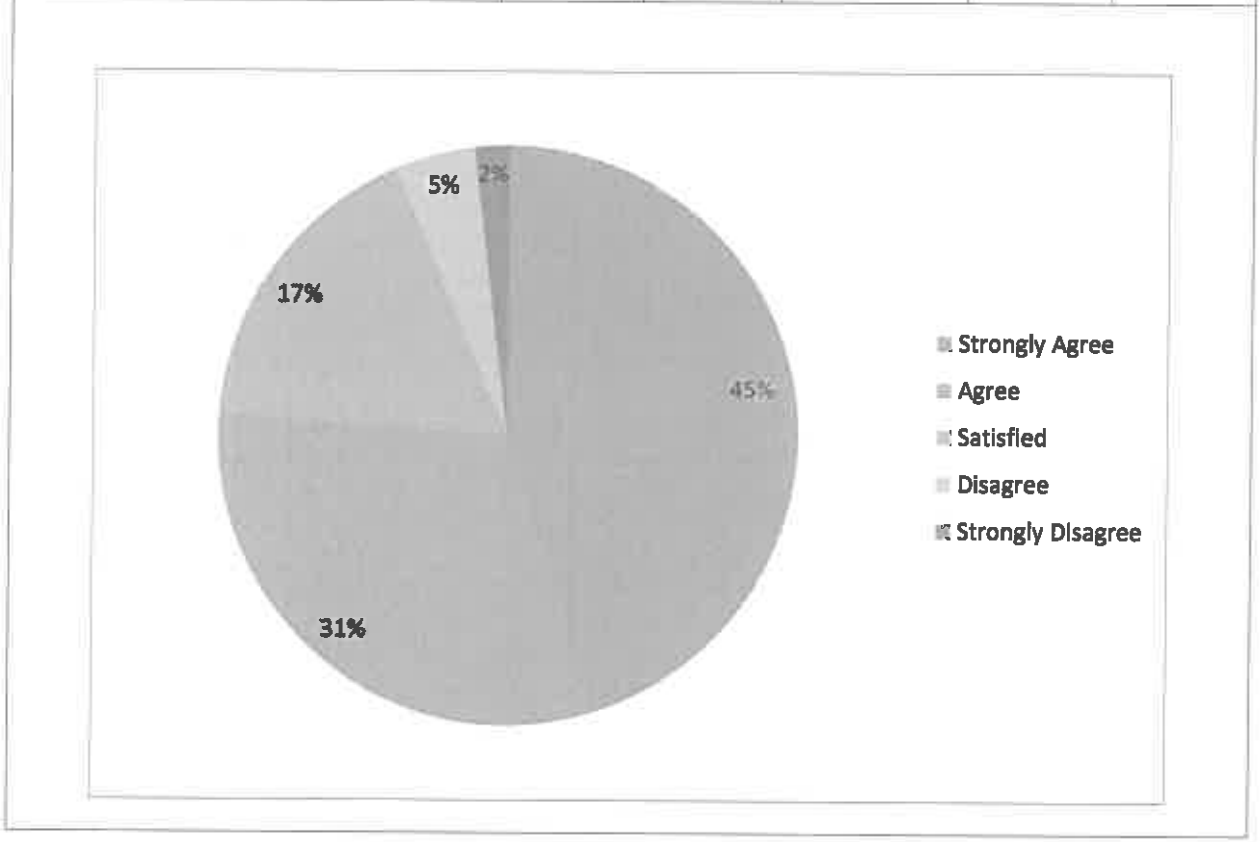
Rate the sequence of units in the courses	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	46.45161	29.67742	17.41935	3.870968	2.580645



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Q.4. How do you rate the credits allotted to individual courses?

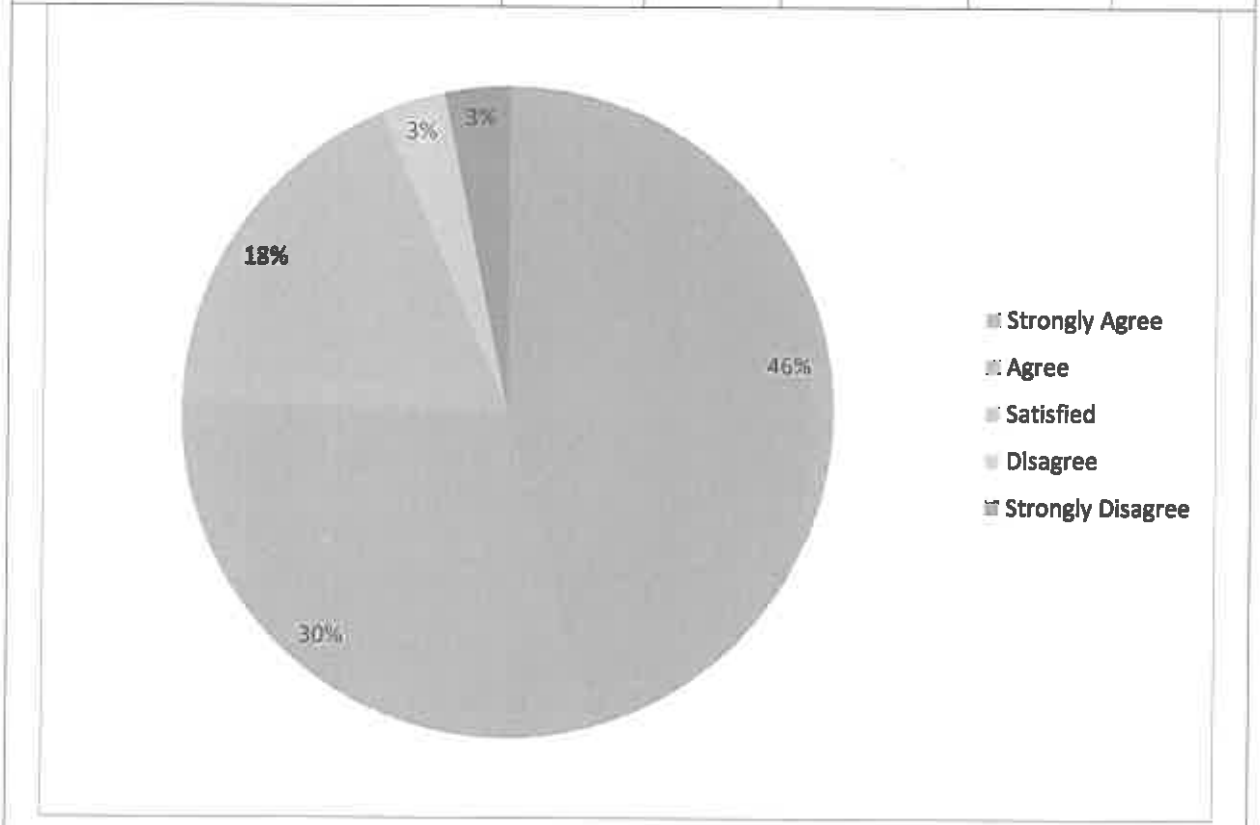
Rate the credits allotted to individual courses	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	45.16129	30.96774	17.41935	4.516129	1.935484



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Q.5. Does the curriculum focus on employability/career orientation?

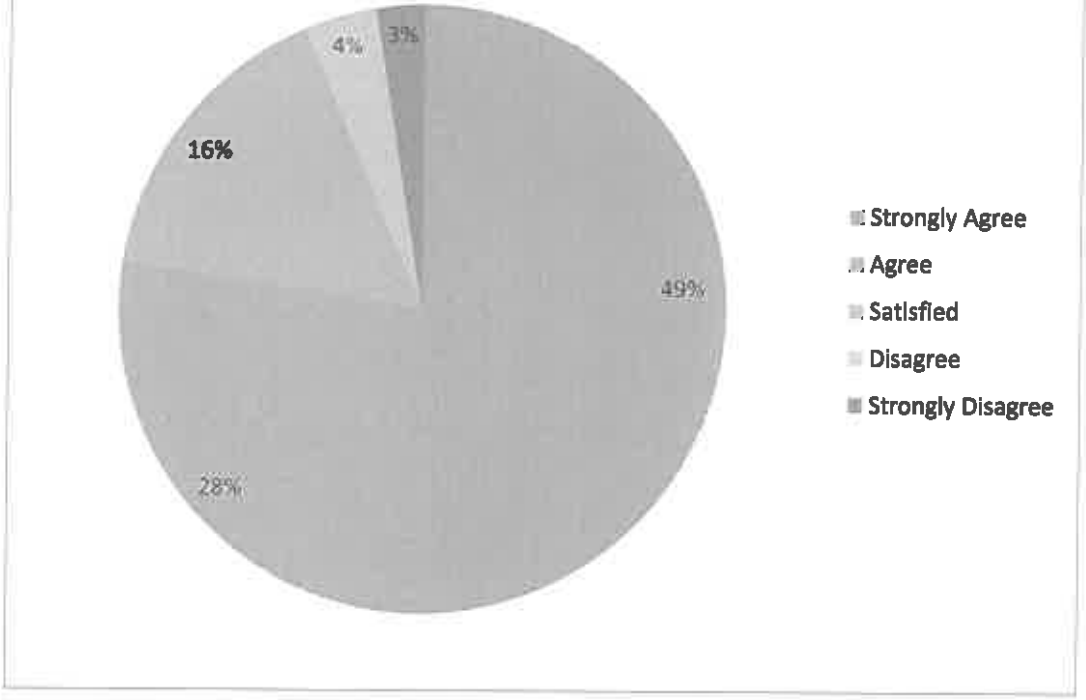
Curriculum focus on employability/career orientation	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	45.80645	29.67742	18.06452	3.225806	3.225806



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Q.6. Does the curriculum focus on skill development/entrepreneurship?

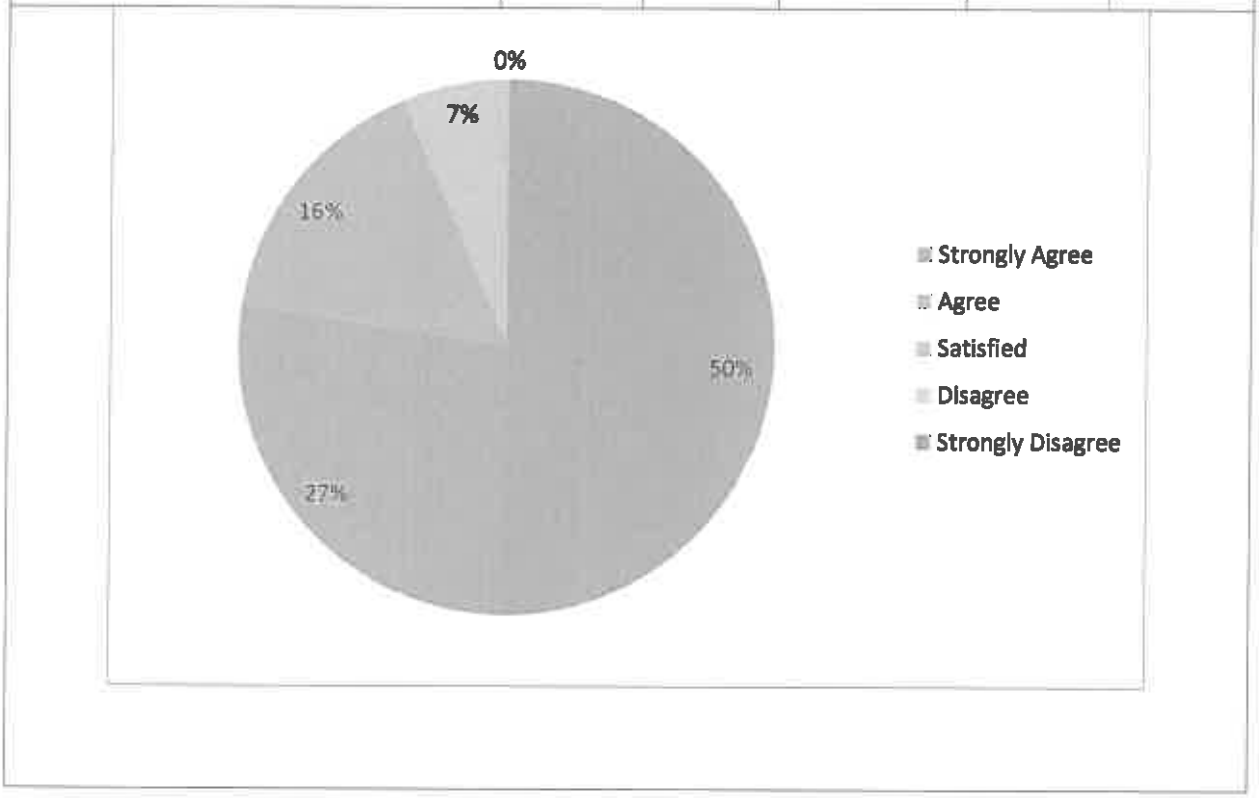
Curriculum focus on skill development/entrepreneurship	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	49.03226	28.3871	16.12903	3.870968	2.580645



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Q.7. Does the curriculum have satisfactory number of elective courses?

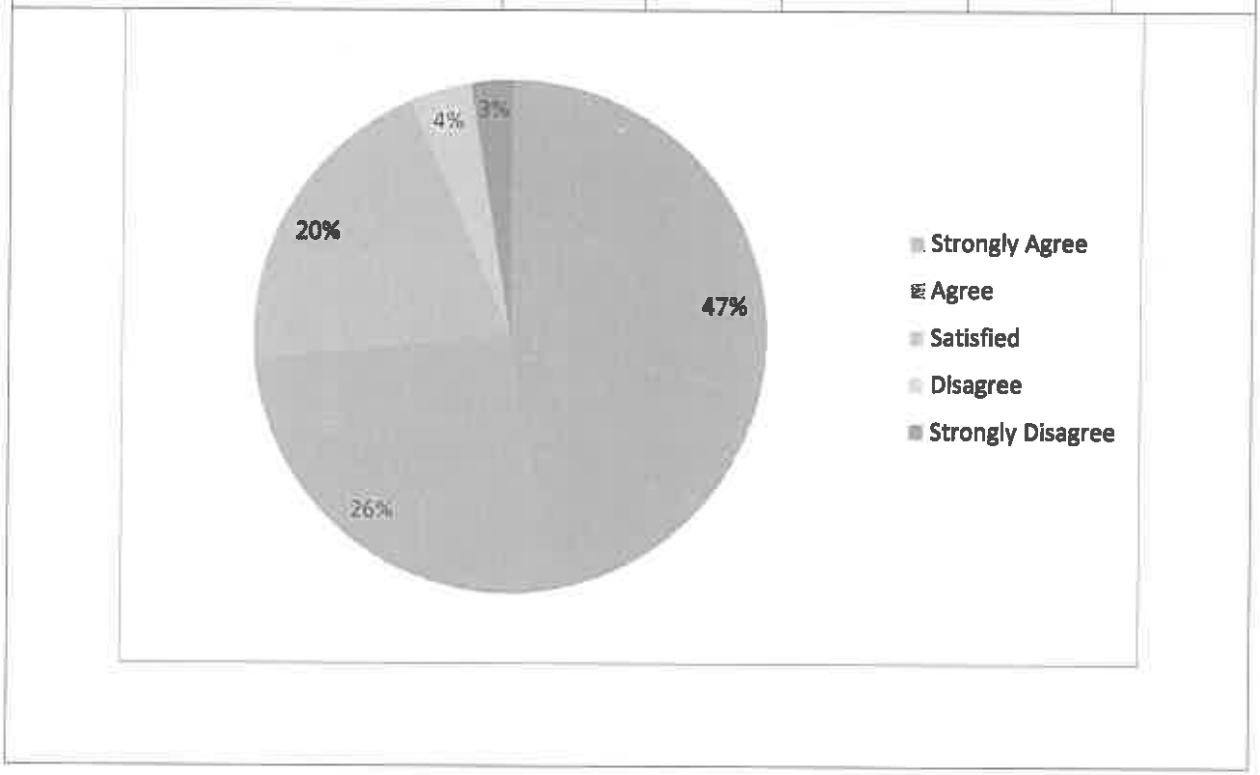
Curriculum have satisfactory number of elective courses	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	50.32258	27.09677	16.12903	6.451613	0



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Q.8. Does the curriculum focus on life skill or help in value addition?

Curriculum focus on life skill or help in value addition	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	47.09677	26.45161	20	3.870968	2.580645

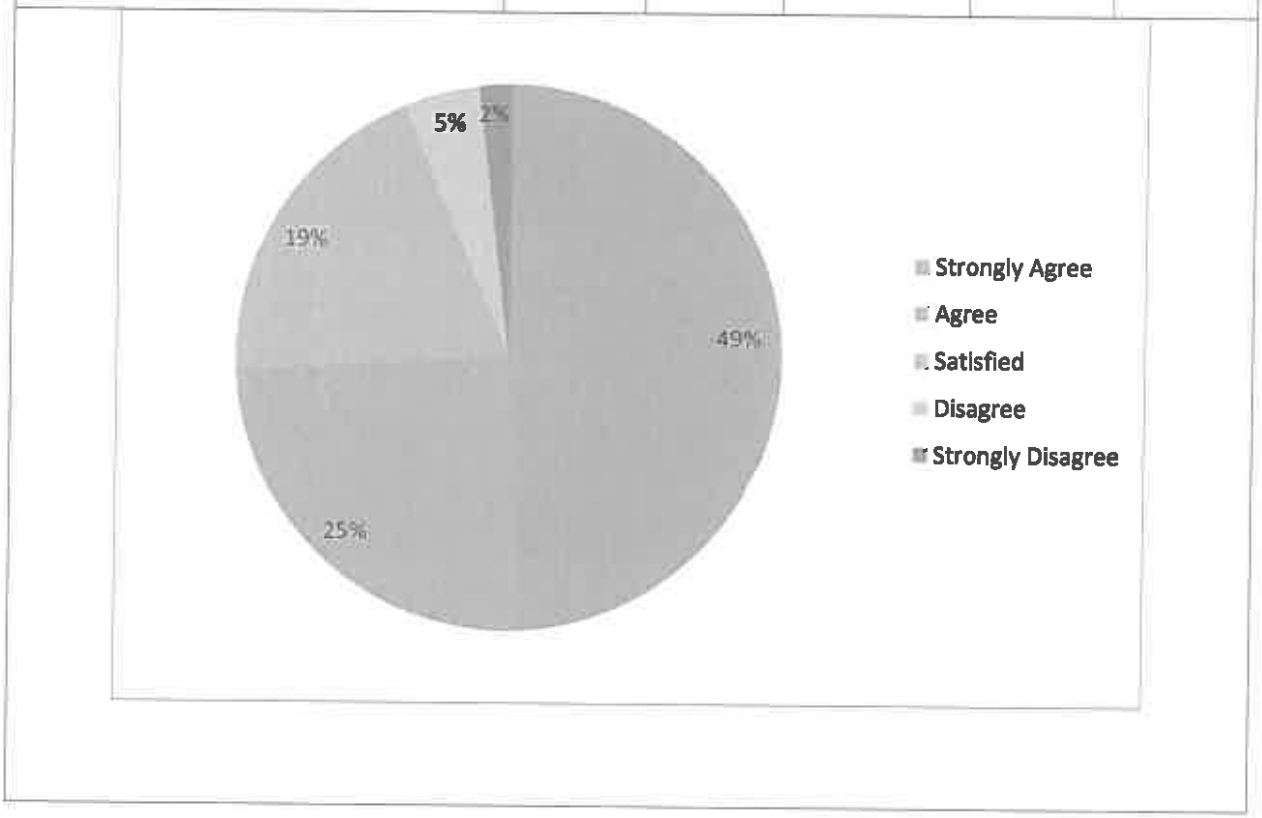


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Q.9. Do the theory subjects are properly linked to the laboratories/provide real-life exposure?

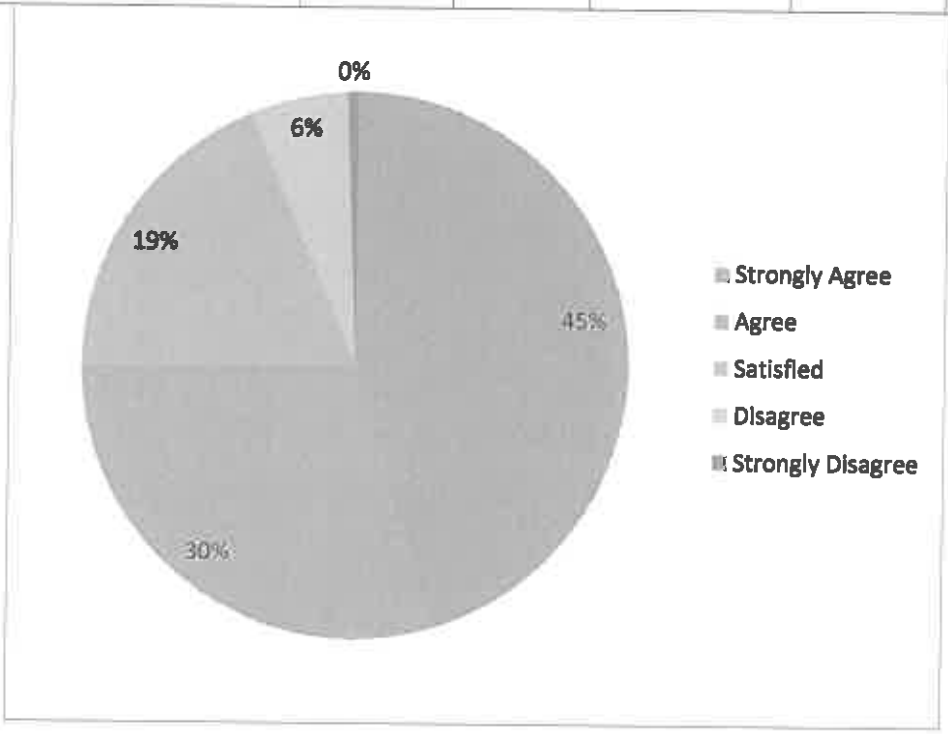
Theory subjects are properly linked to the laboratories/provide real-life exposure	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	49.03226	25.16129	19.35484	4.516129	1.935484



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E-mail: registrargangoh@shobhituniversity.ac.in
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Q.10. Does the curriculum provide multidisciplinary knowledge/information to a student?

Curriculum provide multidisciplinary knowledge/information to a student	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	45.16129	29.67742	18.70968	5.806452	0.645161



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247341, India
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U.: www.sug.ac.in

School of Engineering & Technology (155)						
Question	**Details**	**Strongly Agree**	**Agree**	**Satisfactory**	**Disagree**	**Strongly Disagree**
Whether the curriculum has depth of the subjects and clears the concept?	No of Students	75	45	25	7	3
	Percentage	48.38709677	29.03225806	16.12903226	4.516129032	1.935483871
How do you rate the course outcomes and relevance to the course content?	No of Students	74	45	26	5	5
	Percentage	47.74193548	29.03225806	16.77419355	3.225806452	3.225806452
How do you rate the sequence of units in the courses?	No of Students	72	46	27	6	4
	Percentage	46.4516129	29.67741935	17.41935484	3.870967742	2.580645161
How do you rate the credits allotted to individual courses?	No of Students	70	48	27	7	3
	Percentage	45.16129032	30.96774194	17.41935484	4.516129032	1.935483871
Does the curriculum focus on employability/career orientation?	No of Students	71	46	28	5	5
	Percentage	45.80645161	29.67741935	18.06451613	3.225806452	3.225806452
Does the curriculum focus on skill development/entrepreneurship?	No of Students	76	44	25	6	4
	Percentage	49.03225806	28.38709677	16.12903226	3.870967742	2.580645161
Does the curriculum have satisfactory number of elective courses?	No of Students	78	42	25	10	0
	Percentage	50.32258065	27.09677419	16.12903226	6.451612903	0
Does the curriculum focus on life skill or help in value addition?	No of Students	73	41	31	6	4
	Percentage	47.09677419	26.4516129	20	3.870967742	2.580645161
Do the theory subjects are properly linked to the laboratories/provide real-life exposure?	No of Students	76	39	30	7	3
	Percentage	49.03225806	25.16129032	19.35483871	4.516129032	1.935483871
Does the curriculum provide multidisciplinary knowledge/information to a student?	No of Students	70	46	29	9	1
	Percentage	45.16129032	29.67741935	18.70967742	5.806451613	0.64516129

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Analysis of Feedback:

Based on the feedback from 155 students of the School of Engineering & Technology, the curriculum is regarded positively across most areas, with room for targeted improvement. A significant portion of students (48.39%) strongly agree that the curriculum has depth and effectively clarifies concepts, and 47.74% strongly agree that course outcomes are relevant to the content. The sequence of units and credit allocation received favorable responses, with 46.45% and 45.16% of students strongly agreeing, respectively. Regarding career orientation, 45.81% strongly agree that the curriculum supports employability. Skill development and entrepreneurship are seen as well-supported, with 49.03% strongly agreeing on this aspect. The availability of elective courses is appreciated, with 50.32% strongly agreeing that there are sufficient options. Life skills and value addition are also positively viewed, with 47.10% strongly agreeing. The linkage between theoretical content and practical application is acknowledged by 49.03%, while 45.16% believe that the curriculum provides multidisciplinary knowledge. Overall, students perceive the curriculum as comprehensive and practical, with strong foundations in both academic and professional readiness.

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Action Taken Report

(School of Engineering and Technology)

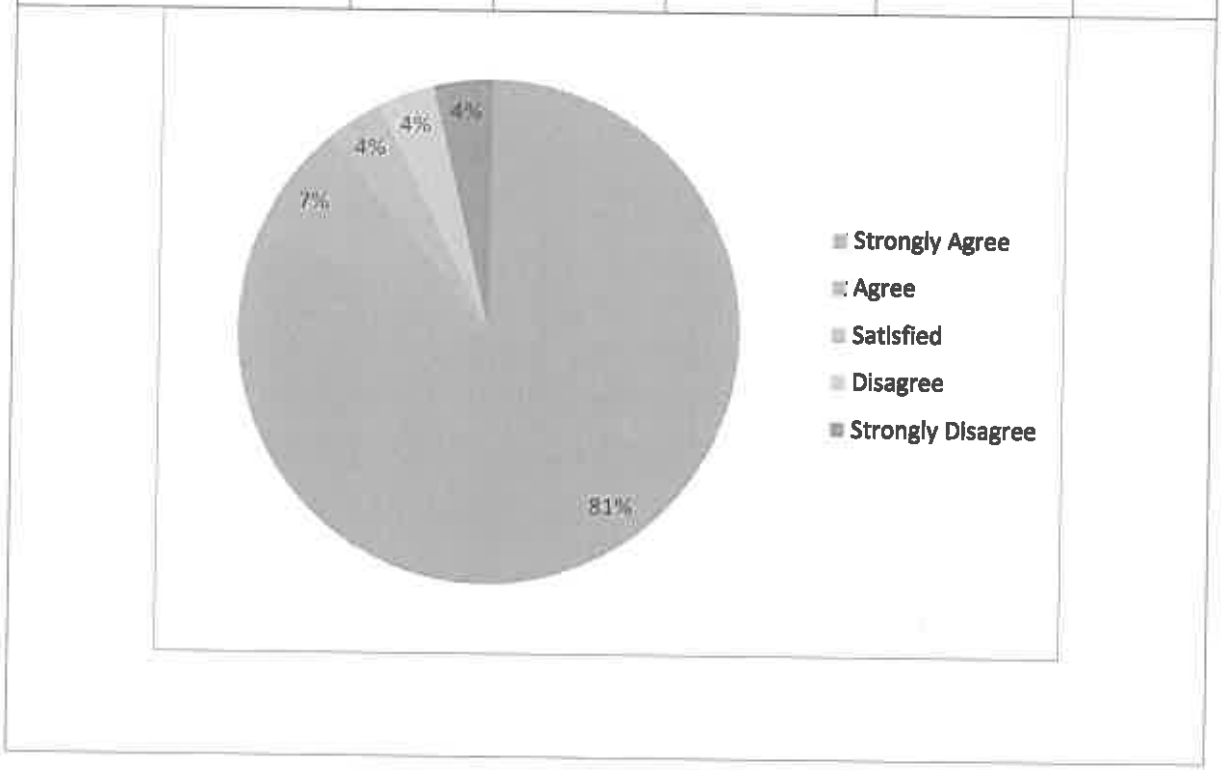
Sr. No.	Suggestions	Action Taken	Outcome
1	Enhance multidisciplinary exposure within core engineering subjects.	Introduced interdisciplinary electives and collaborative projects with other departments.	Broader knowledge base and improved ability to solve complex, real-world problems.
2	Strengthen linkage between theory and practical applications.	Increased lab hours, implemented hands-on workshops, and integrated industry case studies.	Improved understanding of concepts through experiential learning.
3	Further promote skill development and entrepreneurship.	Organized technical bootcamps, coding challenges, and entrepreneurship development programs.	Better innovation mindset and industry readiness among students.
4	Diversify elective course offerings to align with emerging technologies.	Added new electives in areas like AI, IoT, Data Science, and Green Technology.	Higher engagement and better preparation for future job markets.

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247341, India
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E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sng.ac.in

Analysis of Teacher's Feedback of School of Engineering and Technology through Table and Pie Chart

Q.1 The curriculum is well organized and balanced for the programme with proper credit allocation.

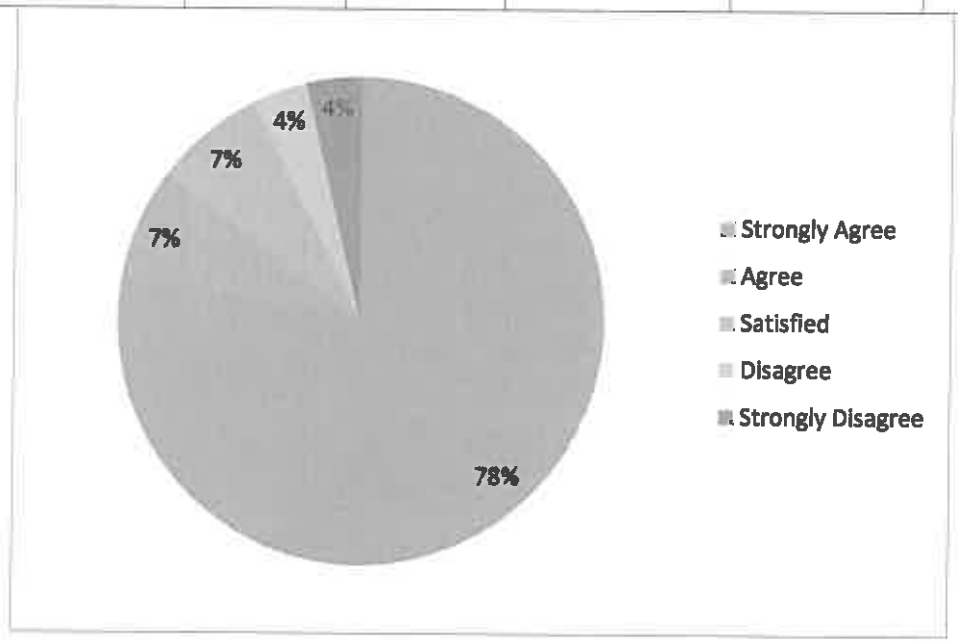
The curriculum is well organized and balanced for the programme with proper credit allocation	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	81.48	7.41	3.70	3.70	3.70



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U.: www.sug.ac.in

Q.2 The courses have adequate balance between theory and application for student's holistic development.

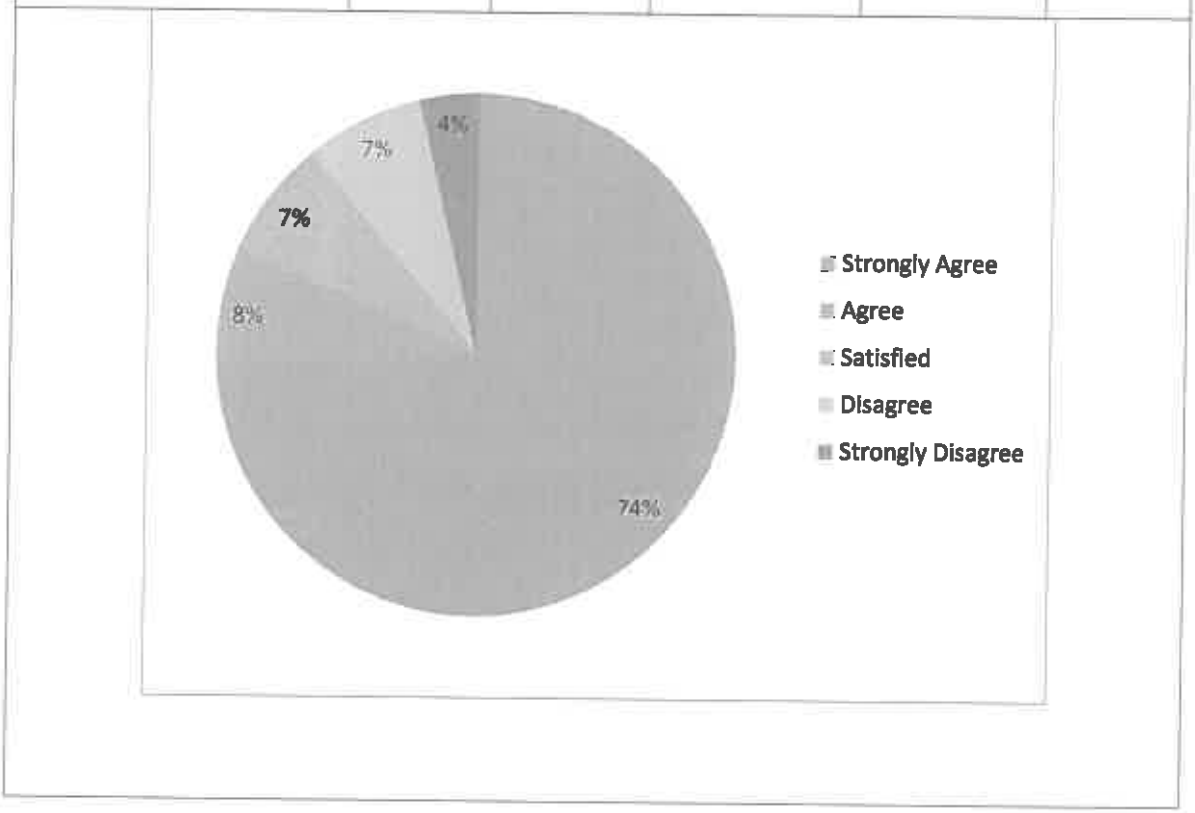
The courses have adequate balance between theory and application for student's holistic development.	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	77.78	7.41	7.41	3.70	3.70



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Q.3 The curriculum has adequate scope for multidisciplinary knowledge and sufficient number of elective courses.

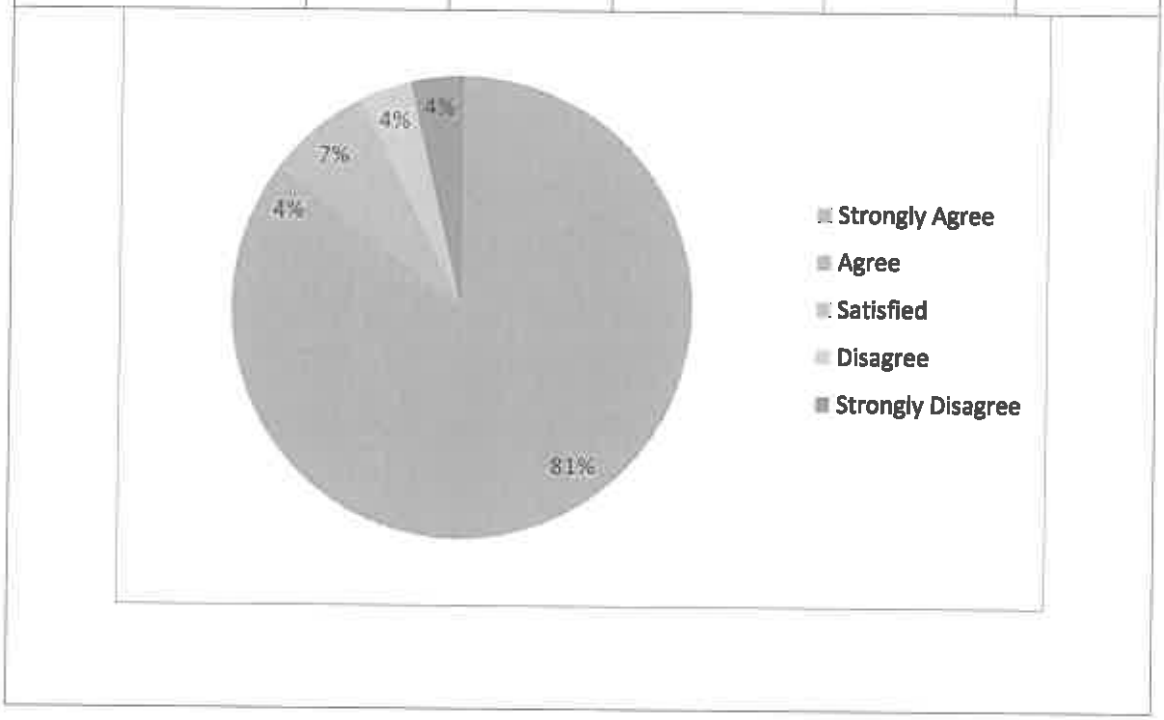
The curriculum has adequate scope for multidisciplinary knowledge and sufficient number of elective courses.	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	74.07	7.41	7.41	7.41	3.70



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Q.4 The curriculum has focus on personality development by presence of courses on human values and professional ethics

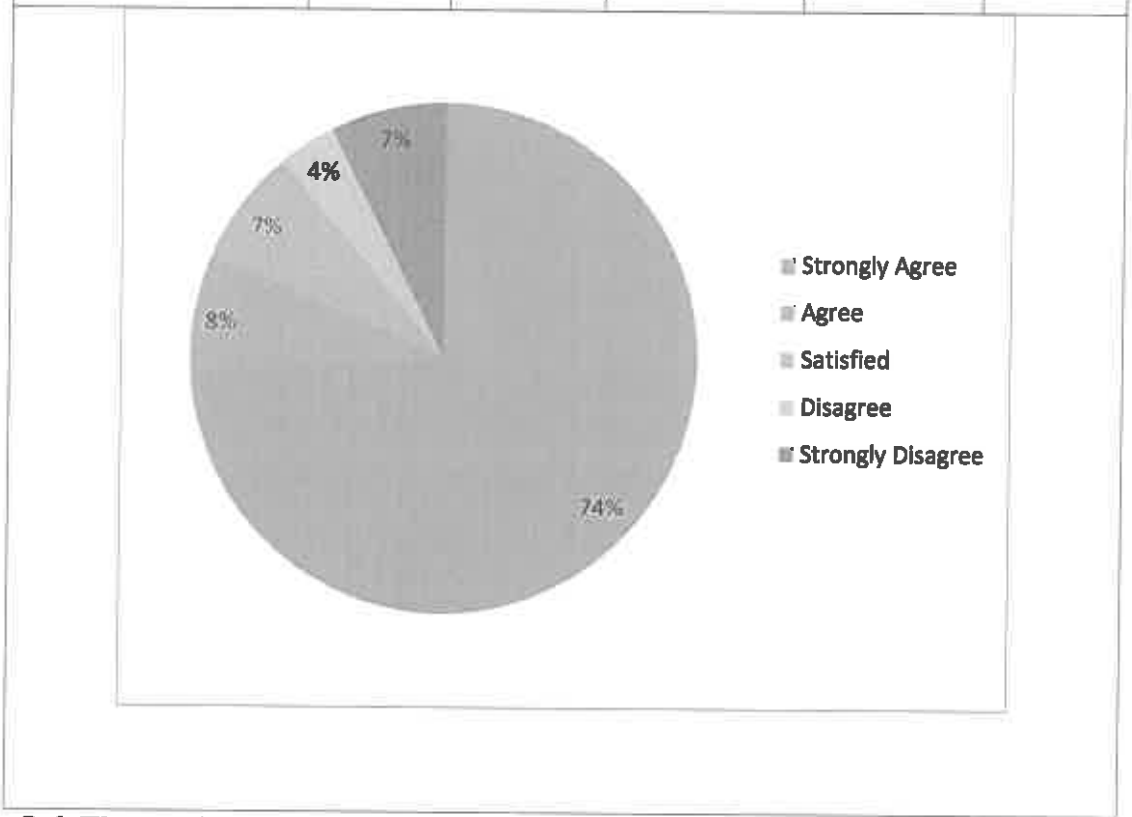
The curriculum has focus on personality development by presence of courses on human values and professional ethics.	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	81.48	3.70	7.41	3.70	3.70



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Babu Vijendra Marg, Adarsh Institutional
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247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

Q.5 The curriculum provides enough scope for improving entrepreneurial skill as well as industry readiness.

The curriculum provides enough scope for improving entrepreneurial skill as well as industry readiness.	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	74.07	7.41	7.41	3.70	7.41

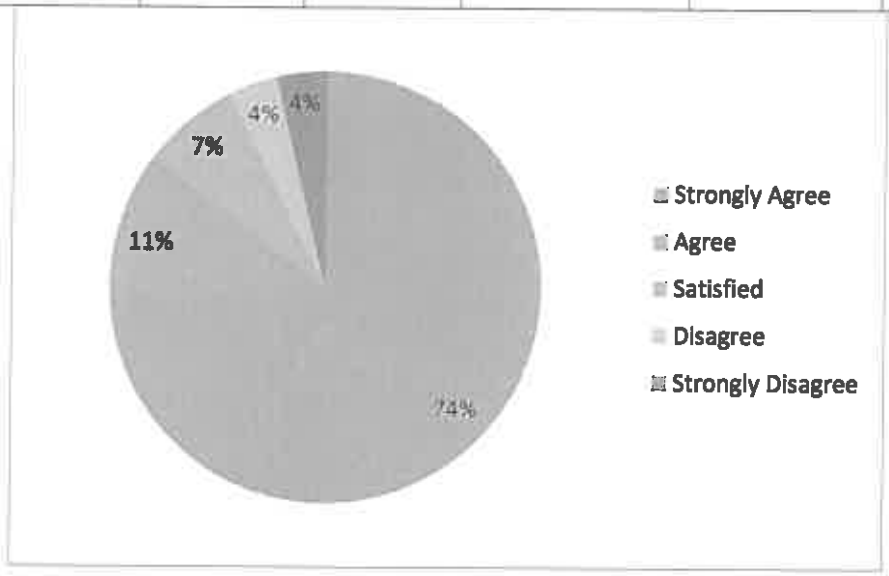


Q.6 The curriculum provides ample knowledge for increased employability and to promote students for higher education.

The curriculum provides ample	Strongly	Agree	Satisfactory	Disagree	Strongly

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Babu Vijendra Marg, Adarsh Institutional
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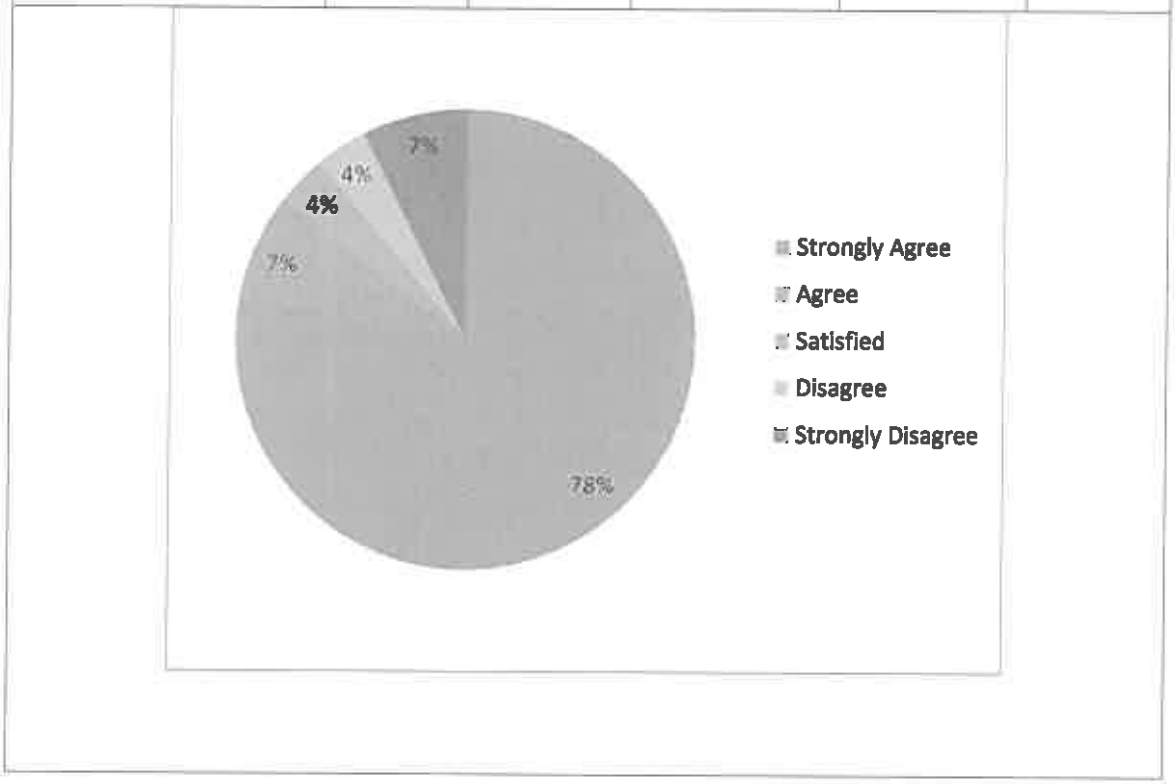
knowledge for increased employability and to promote students for higher education.	**Agree**				**Disagree**
Response (%)	74.07	11.11	7.41	3.70	3.70



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Babu Vijendra Marg, Adarsh Institutional
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247341, India
Tel: +91 7830810052
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Q.7 The curriculum helps in enhancing problem solving capability related to local/global societal issues.

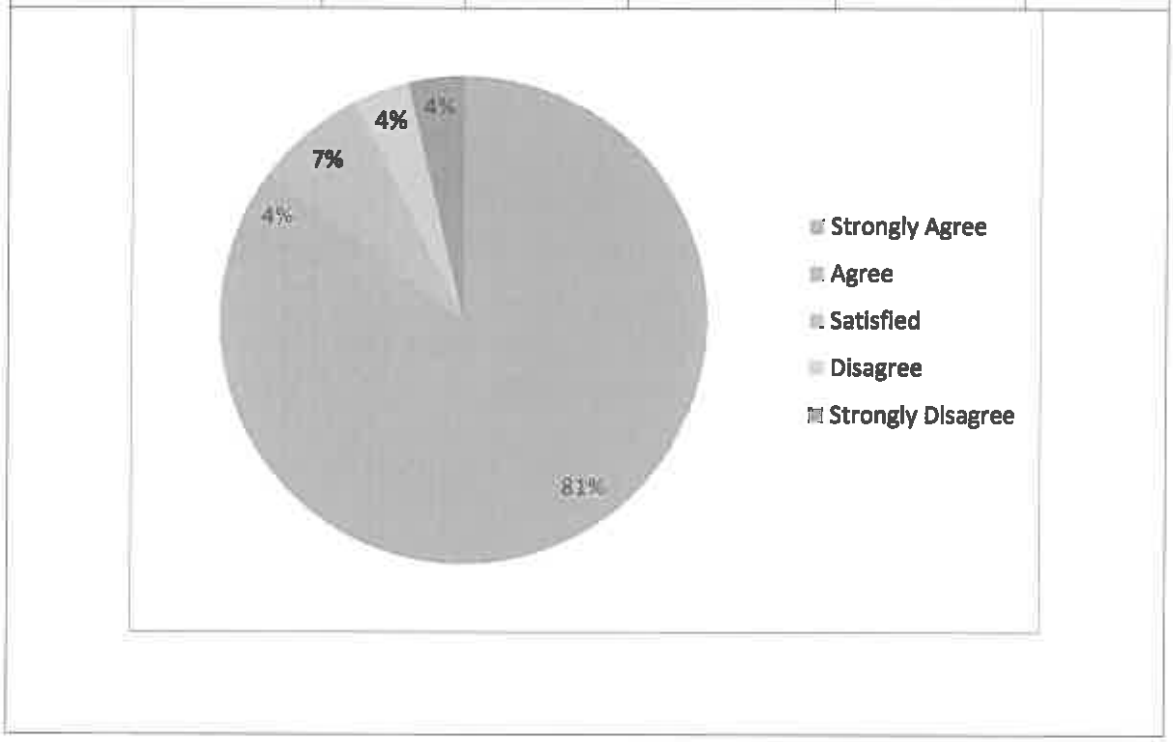
The curriculum helps in enhancing problem solving capability related to local/global societal issues.	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	77.78	7.41	3.70	3.70	7.41



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247341, India
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Q.8 Adequate freedom is given to offer opinion on design & development of curriculum.

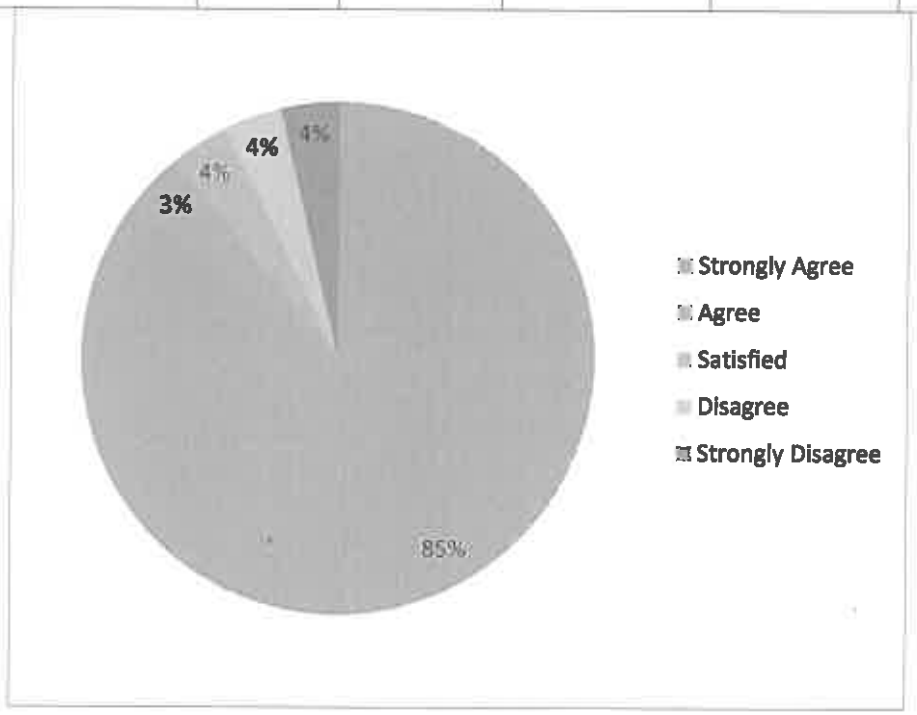
Adequate freedom is given to offer opinion on design & development of curriculum.	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	81.48	3.70	7.41	3.70	3.70



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Babu Vijendra Marg, Adarsh Institutional
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247341, India
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Q.9 The existing system for curriculum revision is found to be effective.

The existing system for curriculum revision is found to be effective.	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	85.19	3.85	3.85	3.85	3.85



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School of Engineering and Technology(27)

Total no. of Teachers : 27		Strongly Agree	Agree	Satisfied	Disagree	Strongly Disagree
The curriculum is well organized and balanced for the programme with proper credit allocation.	No. of Teachers	22.00	2.00	1.00	1.00	1.00
	Percentage	81.48	7.41	3.70	3.70	3.70
The courses have adequate balance between theory and application for student's holistic development.	No. of Teachers	21.00	2.00	2.00	1.00	1.00
	Percentage	77.78	7.41	7.41	3.70	3.70
The curriculum has adequate scope for multidisciplinary knowledge and sufficient number of elective courses.	No. of Teachers	20.00	2.00	2.00	2.00	1.00
	Percentage	74.07	7.41	7.41	7.41	3.70
The curriculum has focus on personality development by presence of courses on human values and professional ethics	No. of Teachers	22.00	1.00	2.00	1.00	1.00
	Percentage	81.48	3.70	7.41	3.70	3.70
The curriculum provides enough scope for improving entrepreneurial skill as well as industry	No. of Teachers	20.00	2.00	2.00	1.00	2.00
	Percentage	74.07	7.41	7.41	3.70	7.41

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Babu Vijendra Marg, Adarsh Institutional
Area Gangoh, Distt. Saharanpur (U.P.)
247341, India
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readiness.						
The curriculum provides ample knowledge for increased employability and to promote students for higher education.	No. of Teachers	20.00	3.00	2.00	1.00	1.00
	Percentage	74.07	11.11	7.41	3.70	3.70
The curriculum helps in enhancing problem solving capability related to local/global societal issues	No. of Teachers	21.00	2.00	1.00	1.00	2.00
	Percentage	77.78	7.41	3.70	3.70	7.41
Adequate freedom is given to offer opinion on design & development of curriculum.	No. of Teachers	22.00	1.00	2.00	1.00	1.00
	Percentage	81.48	3.70	7.41	3.70	3.70
The existing system for curriculum revision is found to be effective.	No. of Teachers	23.00	1.00	1.00	1.00	1.00
	Percentage	85.19	3.85	3.85	3.85	3.85

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Babu Vijendra Marg, Adarsh Institutional
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E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

Analysis of Feedback:

The overall feedback on the curriculum is overwhelmingly positive, with scores ranging from 88.89% to 92.88%, reflecting a well-structured and balanced programme. Teachers expressed satisfaction with the organization of the curriculum and its proper credit allocation (92.59%), ensuring that students receive a comprehensive and rigorous academic experience. Similarly, the courses strike a strong balance between theory and practical application (92.59%), promoting holistic student development.

The curriculum also covers a broad range of multidisciplinary subjects and offers an adequate number of elective courses (88.89%), contributing to the flexibility and depth of the programme. Furthermore, the inclusion of human values and professional ethics (92.59%) has been recognized as a key factor in fostering personality development, preparing students to engage in professional environments with ethical considerations.

The curriculum is seen as offering substantial opportunities for fostering entrepreneurial skills and industry readiness (88.89%), while also enhancing employability and preparing students for further academic pursuits (92.59%). A high score in problem-solving related to societal issues (88.89%) indicates that the curriculum effectively promotes critical thinking in real-world contexts.

Teachers also reported having ample freedom to provide input on the design and development of the curriculum (92.59%), ensuring that it remains relevant and responsive to emerging needs. The existing system for curriculum revision is considered effective (92.88%), reflecting confidence in the institution's ability to adapt and improve the curriculum

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Area Gangoh, Distt. Saharanpur (U.P.)
247341, India
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U.: www.sug.ac.in

Action Taken Report

(School of Engineering and Technology)

Sr. No.	Suggestions	Action taken	Outcome
1	Strengthen the balance between theory and practical application.	Increased the number of laboratory sessions, workshops, and hands-on projects across core engineering courses. Collaborated with industry experts to bring real-world scenarios into class activities.	Students gained more practical experience, improving their ability to apply theoretical knowledge in real-world settings. Faculty noted a higher level of student engagement and skill development.
2	Continue promoting multidisciplinary subjects and electives.	Introduced additional interdisciplinary electives in areas like data science, robotics, and sustainable engineering. Increased collaboration with other departments to offer students more choices in their coursework.	Students appreciated the added flexibility and broader academic exposure. The electives provided opportunities for students to diversify their skill sets and pursue personal academic interests.
3	Enhance entrepreneurial skills and industry readiness.	Launched an entrepreneurship development program, including workshops, mentorship, and access to startup incubators. Increased partnerships with industry leaders for internships and live project opportunities.	Improved student engagement with entrepreneurial activities, resulting in several student-led startups. Higher placement rates and positive industry feedback regarding student readiness for professional roles.
4	Further enhance the curriculum revision process to ensure responsiveness to emerging trends.	Established a more frequent review cycle for curriculum updates, incorporating real-time industry feedback and new technological trends. Increased faculty and student involvement in the revision process through surveys and focus groups.	The curriculum has become more agile and adaptable to the rapidly evolving engineering and technology landscape. Faculty and students reported feeling more involved and valued in the curriculum development process.

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EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
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16th Meeting of BOS (Item No. 16.4 Annexure -4)

SHOBHIT UNIVERSITY GANGOH
SCHOOL OF ENGINEERING AND TECHNOLOGY

List of Examiners (2020-2021)

Sr. No.	Course code with Title	Name, Designation, Institution and Correspondence address of the Paper Setter/Examiner	Contact number with E. Mail ID
1	CCAC-102:Java Programming	External Examiner 1. Dr. Abahay Bhatia	dr.abhav@ritrookee.ac.in 9837386973
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com, 97604492192
		3. Dr. Mamta	mamta.bansal345@gmail.com,9997025606
		Internal Examiner 1. Dr. Tarun Kumar Sharma	Tarun.sharma@shobhituniversity.ac.in, 9456086759
		2. Mr. Vinod Kumar	Vinod.kumar@shobhituniversity.ac.in 9758749227
2	AECC-104 Environmental Science	External Examiner 1. Dr. Abahay Bhatia	dr.abhav@ritrookee.ac.in 9837386973
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com, 97604492192
		3. Dr. Mamta	mamta.bansal345@gmail.com,9997025606
		Internal Examiner 1. Mr. Kuldeep Chauhan	Kuldeep.chauhan@shobhituniversity.ac.in, 9756997090
		2. Mr. Nitin Kumar	nitin.kumar@shobhituniversity.ac.in 9758170029
3	GCAC 106: Digital	External Examiner	

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Babu Vijendra Marg, Adarsh Institutional
Area Gangoh, Distt. Saharanpur (U.P.)
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E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

	Electronics	1. Dr. Abahay Bhatia	dr.abhay@ritrookee.ac.in, 9837386973
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com, 97604492192
		3. Dr. Mamta	mamta.bansal345@gmail.com,9997025606
		Internal Examiner 1. Mr. Nitin Kumar	nitin.kumar@shobhituniversity.ac.in 9758170029
		2. Ms. Sumika Jain	Sumika.jai@shobhituniversity.ac.in 9456666326
4	CCAC202: Software Engineering	External Examiner 1. Dr. Abahay Bhatia	dr.abhay@ritrookee.ac.in 9837386973
		2. Dr. Mamta	mamta.bansal345@gmail.com,9997025606
		3. Dr. Ankit Sharma	gurukul.ankit@gmail.com, 97604492192
		Internal Examiner 1. Mr. Vinod Kumar	
		2. Mr. Kuldeep Chauhan	Kuldeep.chauhan@shobhituniversity.ac.in 9756997090
5	CCAC 204: Design and Analysis of Algorithms	External Examiner 1. Dr. Abahay Bhatia	dr.abhay@ritrookee.ac.in 9837386973
		2. Dr. Mamta	mamta.bansal345@gmail.com,9997025606
		3. Dr. Ankit Sharma	gurukul.ankit@gmail.com, 97604492192
		Internal Examiner 1. Mr. Vinod Kumar	Vinod.kumar@shobhituniversity.ac.in 9758749227
		2. Ms. Sumika Jain	Sumika.jai@shobhituniversity.ac.in 9456666326
6	SCAC-202: UNIX/LINUX	External Examiner	

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E-mail: registrargangoh@shobhituniversity.ac.in
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	Programming	1. Dr. Abahay Bhatia	dr.abhay@ritrookee.ac.in, 9837386973
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com, 97604492192
		3.Dr Mamta	mamta.bansal345@gmail.com,9997025606
		Internal Examiner 1. Mr. Vinod Kumar	Vinod.kumar@shobhituniversity.ac.in, 9758749227
		2. Ms. Sumika Jain	Sumika.jai@shobhituniversity.ac.in 9456666326
7	GCAC-202: Discrete Structure	External Examiner 1. Dr. Ankit Sharma	gurukul.ankit@gmail.com, 97604492192
		2. Dr. Abahay Bhatia	dr.abhay@ritrookee.ac.in 9837386973
		3.dr Mamta	mamta.bansal345@gmail.com 9997025606
		Internal Examiner 1. Mr. Vinod Kumar	Vinod.kumar@shobhituniversity.ac.in, 9758749227
		2. Ms. Sumika Jain	Sumika.jai@shobhituniversity.ac.in 9456666326
8	CCAC-302: Artificial Intelligence	External Examiner 1. Dr. Abahay Bhatia	dr.abhay@ritrookee.ac.in 9837386973
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com, 97604492192
		3. Dr. Mamta	mamta.bansal345@gmail.com,9997025606
		Internal Examiner 4. Dr. Tarun Kumar Sharma	Tarun.sharma@shobhituniversity.ac.in, 9456086759
		5. Mr. Vinod Kumar	Vinod.kumar@shobhituniversity.ac.in

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247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

			9758749227
9	CCAC-304: Computer Graphics	External Examiner 1. Dr. Ankit Sharma	gurukul.ankit@gmail.com, 97604492192
		2. Dr. Mamta	
		3. Dr. Abahay Bhatia	dr.abhay@ritrookee.ac.in, 9837386973
		Internal Examiner 1. Dr. Tarun Kumar Sharma	Tarun.sharma@shobhituniversity.ac.in, 9456086759
		2. Mr. Vinod Kumar	Vinod.kumar@shobhituniversity.ac.in, 9758749227
10	SCAC-302: Management Information system	External Examiner 1. Dr. Ankit Sharma	gurukul.ankit@gmail.com, 97604492192
		2. Dr. Abahay Bhatia	dr.abhay@ritrookee.ac.in 9837386973
		3. Dr. Mamta	mamta.bansal345@gmail.com,9997025606
		Internal Examiner 1. Mr. Kuldeep Chauhan	Kuldeep.chauhan@shobhituniversity.ac.in 9756997090
		2. Mr. Nitin Kumar	nitin.kumar@shobhituniversity.ac.in 9758170029
11	SCAC-304 : Software Testing	External Examiner 1. Dr. Abahay Bhatia	dr.abhay@ritrookee.ac.in 9837386973
		2. Dr. Mamta	mamta.bansal345@gmail.com 9997025606
		3. Dr. Ankit Sharma	gurukul.ankit@gmail.com, 97604492192
		Internal Examiner 1. Dr. Tarun Kumar	Tarun.sharma@shobhituniversity.ac.in,

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional
Area Gangoh, Distt. Saharanpur (U.P.)
247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

		Sharma	9456086759
		2. Mr. Vinod Kumar	Vinod.kumar@shobhituniversity.ac.in 9758749227
12	SCAC-306 Soft Computing	External Examiner 1. Dr. Abahay Bhatia	dr.abhay@ritrookee.ac.in 9837386973
		2. Dr. Ankit Sharma	gurukul:ankit@gmail.com, 97604492192
		3. Dr. Mamta	mamta.bansal345@gmail.com,9997025606
		Internal Examiner 1. 1.Mr. Kuldeep Chauhan	Kuldeep.chauhan@shobhituniversity.ac.in 9756997090
		2. 2.Mr. Nitin Kumar	nitin.kumar@shobhituniversity.ac.in 9758170029
MCA List of Examiners (2020-2021)			
Sr. No.	Course code with Title	Name, Designation, Institution and Correspondence address of the Paper Setter/Examiner	Contact number with E. Mail ID
1	Network Security & Cryptography (CCA 502)	External Examiner 1. Dr. Abhay Bhatia	Dr.abhay@ritroorkee.ac.in 9837386973
		2. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		3. Dr. Mamta Bansal	Mamta.bansal345@gmail.com 9997025606
		Internal Examiner 1. Mr. Jitendra K. Saini	Jitendra.saini@shobhituniversity.ac.in 7669110295
		2. Mr. Shahnawaaj	Mohd.shahnawaz@shobhituniversity.ac.in 9536940100
2.	Compiler Design (CCA 504)	External Examiner 1. Dr. Ankit Sharma	Gurukul.ankit@gmail.com 9760492192
		2. Dr. Arun Giri	Arungiri123@yahoo.com 981880953

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional
Area Gangoh, Distt. Saharanpur (U.P.)
247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

		3. Dr. Nidhi Tyagi	Nidhi.tyagi9785@gmail.com 9927007273
		Internal Examiner 1. Dr. Varun Bansal	Varun.bansal@shobhituniversity.ac.in 9675478559
		2. Mr. Shubham Kumar	Shubham.k@shobhituniversity.ac.in 7895408519
3.	Knowledge Management & Expert System (CCA 506)	External Examiner 1. Dr. Ankit Sharma	Gurukul.ankit@gmail.com 9760492192
		2. Dr. Arun Giri	Arungiri123@yahoo.com 981880953
		3. Dr. Nidhi Tyagi	Nidhi.tyagi9785@gmail.com 9927007273
		Internal Examiner 1. Dr. Tarun Kumar Sharma	Tarun.sharma@shobhituniversity.ac.in 9456086759
		2. Mr. Vinod Kumar	Vinod.kumar@shobhituniversity.ac.in 9758749227
4.	Mobile Computing (CCA 510)	External Examiner 1. Dr. Nidhi Tyagi	Nidhi.tyagi9785@gmail.com 9927007273
		2. Dr. Mamta Bansal	Mamta.bansal345@gmail.com 9997025606
		3. Dr. Abhay Bhatia	Dr.abhay@ritroorkee.ac.in 9837386973
		Internal Examiner 1. Mr. Jitendra K. Saini	Jitendra.saini@shobhituniversity.ac.in 7669110295
		2. Dr. Tarun Kumar Sharma	Tarun.sharma@shobhituniversity.ac.in 9456086759
5.	Software Project Management (UCA 506)	External Examiner 1. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		2. Dr. Ankit Sharma	Gurukul.ankit@gmail.com 9760492192
		3. Dr. Arun Giri	Arungiri123@yahoo.com 981880953
		Internal Examiner 1. Dr. Varun Bansal	Varun.bansal@shobhituniversity.ac.in 9675478559

Shobhit University
EDUCATION · EMPOWERS
Babu Vijendra Marg, Adarsh Institutional
Area Gangoh, Distt. Saharanpur (U.P.)
247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

		2. Mr. Jitendra K. Saini	Jitendra.saini@shobhituniversity.ac.in 7669110295
6.	Dissertation (CCA 602)	External Examiner 1. . Dr. Ankit Sharma	Gurukul.ankit@gmail.com 9760492192
		2. Dr. Arun Giri	Arungiri123@yahoo.com 981880953
		3. Dr. Nidhi Tyagi	Nidhi.tyagi9785@gmail.com 9927007273
		Internal Examiner 1. Dr. Varun Bansal	Varun.bansal@shobhituniversity.ac.in 9675478559
		2. Ms. Sumika Jain	Sumika.jain@shobhituniversity.ac.in 9456666326
7.	Seminar and Progress Reports (CCA 604)	External Examiner 1. Dr. Nidhi Tyagi	Nidhi.tyagi9785@gmail.com 9927007273
		2. Dr. Mamta Bansal	Mamta.bansal345@gmail.com 9997025606
		3. Dr. Abhay Bhati	Dr.abhay@ritroorkee.ac.in 9837386973
		Internal Examiner 1. Mr. Jitendra K. Saini	Jitendra.saini@shobhituniversity.ac.in 7669110295
		2. Mr. Shahnawaj	Mohd.shahnawaz@shobhituniversity.ac.in 9536940100

M.Tech List of Examiners (2020-2021)

Sr. No.	Course code with Title	Name, Designation, Institution and Correspondence address of the Paper Setter/Examiner	Contact number with E. Mail ID
1.	Resource Management of Computer Systems	External Examiner 1. Dr. Arun Giri	arungiri123@yahoo.com 9818809053
		2. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional
Area Gangoh, Distt. Saharanpur (U.P.)
247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

	CE- 502		9927007273
		3. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		Internal Examiner 1. Ms. Sumika Jain	sumika.jain@shobhituniversity.ac.in 9456666326
		2. Mr. Raveendra Kr. Bharati	raveendra.bharati@shobhituniversity.ac.in 9953328744
2.	Soft Computing CE-504	External Examiner 1. Dr. Abhay Bhatia	dr.abhav@ritroorkee.ac.in 9837386973
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192
		3. Dr. Mamta Bansal	mamta.bansal345@gmail.com 9997025606
		Internal Examiner 1. Mr. Raveendra Kr. Bharati	anil.nishad@shobhituniversity.ac.in 8171418088
		2. Mr. Kuldeep Chauhan	kuldeep.chauhan@shobhituniversity.ac.in 9756997090
3.	High Performance Computer Architecture CE- 506	External Examiner 1. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		2. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		3. Dr. Abhay Bhatia	dr.abhav@ritroorkee.ac.in 9837386973
		Internal Examiner	varun.bansal@shobhituniversity.ac.in

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

		1. Mr. Varun Bansal	9675478559
		2. Mr. Nitin Kumar	nitin.kumar@shobhituniversity.ac.in 9758170029
4.	Mobile & Wireless Communication CE-522	External Examiner 1. Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192
		2. Dr. Mamta Bansal	mamta.bansal345@gmail.com 9997025606
		3. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		Internal Examiner 1. Mr. Raveendra Kr. Bharati	anil.nishad@shobhituniversity.ac.in 8171418088
		2. Mr. Kuldeep Chauhan	kuldeep.chauhan@shobhituniversity.ac.in 9756997090
5.	Operating systems Lab CE-552	External Examiner 1. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192
		3. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		Internal Examiner 1. Mr. Vinod Kumar	vinod.kumar@shobhituniversity.ac.in 9758749227
		2. Ms. Sumika Jain	sumika.jain@shobhituniversity.ac.in 9456666326
6.	Seminar-II CE-582	External Examiner	dr.abhay@ritroorkee.ac.in

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional
Area Gangoh, Distt. Saharanpur (U.P.)
247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

		1. Dr. Abhay Bhatia	9837386973
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192
		3. Dr. Mamta Bansal	mamta.bansal345@gmail.com 9997025606
		Internal Examiner 1. Mr. Madhav P. Namdev	Madhav.namdev@shobhituniversity.ac.in 94572731592
		2. Mr. Raveendra Kr. Bharati	raveendra.bharati@shobhituniversity.ac.in 9953328744
7.	Dissertation CE- 692	External Examiner 1. Dr. Arun Giri	arungiri123@yahoo.com 9818809053
		2. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		3. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		Internal Examiner 1. Mr. Varun Bansal	varun.bansal@shobhituniversity.ac.in 9675478559
		2. Mr. Nitin Kumar	nitin.kumar@shobhituniversity.ac.in 9758170029

B.tech CSE (Examiner)

Sr. No.	Course code with Title	Name, Designation, Institution and Correspondence address of the Paper Setter/Examiner	Contact number with E. Mail ID

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

1.	MATHEMATICS-II (CMAN 102)	External Examiner 4. Dr. Arun Giri	arungiri123@yahoo.com 9818809053
		5. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		6. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		Internal Examiner 1. Dr. Vishvas Chand	vishvas.chand@shobhituniversity.ac.in 9286093196
		2. Mr. Abdulla Khan	abdulla.khan@shobhituniversity.ac.in 7454976780
2.	ENGINEERING PHYSICS (CPHN 102)	External Examiner 4. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		5. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		6. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		Internal Examiner 1. Mohd Ahamad	mohd.ahamad@shobhituniversity.ac.in 9548159750
		2. Mr. Hamid Ali	hamid.ali@shobhituniversity.ac.in 9759302770
3.	COMPUTER FUNDAMENTALS AND	External Examiner 4. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

	PROGRAMMING USING-C (CCSN 102)	5. Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192
		6. Dr. Mamta Bansal	mamta.bansal345@gmail.com 9997025606
		Internal Examiner 1. Mr. Varun Bansal	varun.bansal@shobhituniversity.ac.in 9675478559
		2. Mr. Kuldeep Chauhan	kuldeep.chauhan@shobhituniversity.ac.in 9756997090
4.	BASICS OF ELECTRICAL ENGINEERING (CEEN 102)	External Examiner 1. Dr. Arun Giri	arungiri123@yahoo.com 9818809053
		2. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		3. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		Internal Examiner 1. Dr. Jasvir Singh Rana	jasvirsingh.rana@shobhituniversity.ac.in 9759233859
		2. Mr. Shoyab Hussain	shoyab.hussain@shobhituniversity.ac.in 9837446390
5.	TECHNICAL COMMUNICATION (CPCN 102)	External Examiner 1. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		2. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

		3. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		Internal Examiner 1. Mr. Dhruv Joshi	dhruv.joshi@shobhituniversity.ac.in 7302702677
		2. Ms. Abhilasha R. Goel	abhilasha.goyal@shobhituniversity.ac.in 8392821112
6.	ENGINEERING PHYSICS LAB (CPHN 152)	External Examiner 1. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192
		3. Dr. Mamta Bansal	mamta.bansal345@gmail.com 9997025606
		Internal Examiner 1. Mohd Ahamad	mohd.ahamad@shobhituniversity.ac.in 9548159750
		2. Mr. Hamid Ali	hamid.ali@shobhituniversity.ac.in 9759302770
7.	COMPUTER PROGRAMMING USING C LAB (CCSN 152)	External Examiner 1. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		2. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		3. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

		Internal Examiner 1. Mr. Varun Bansal	varun.bansal@shobhituniversity.ac.in 9675478559
		2. Mr. Kuldeep Chauhan	kuldeep.chauhan@shobhituniversity.ac.in 9756997090
8.	BASIC ELECTRICAL ENGINEERING LAB (CEEN 152)	External Examiner 1. Dr. Arun Giri	arungiri123@yahoo.com 9818809053
		2. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		3. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		Internal Examiner 1. Dr. Jasvir Singh Rana	jasvirsingh.rana@shobhituniversity.ac.in 9759233859
		2. Mr. Shoyab Hussain	shoyab.hussain@shobhituniversity.ac.in 9837446390
9.	OBJECT ORIENTED PROGRAMMING USING C++ (CCSN 202)	External Examiner 1. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192
		3. Dr. Mamta Bansal	mamta.bansal345@gmail.com 9997025606
		Internal Examiner 1. Dr. Tarun Kumar	tarun.sharma@shobhituniversity.ac.in 9456086759

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional
Area Gangoh, Distt. Saharanpur (U.P.)
247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

		Sharma	
		2. Mr. Vinod Kumar	vinod.kumar@shobhituniversity.ac.in 9758749227
10.	DESIGN AND ANALYSIS OF ALGORITHMS (CCSN 204)	External Examiner 1. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		2. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		3. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		Internal Examiner 1. Mr. Varun Bansal	varun.bansal@shobhituniversity.ac.in 9675478559
		2. Mr. Nitin Kumar	nitin.kumar@shobhituniversity.ac.in 9758170029
11.	INTERNET AND WEB TECHNOLOGY (CCSN 206)	External Examiner 1. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192
		3. Dr. Mamta Bansal	mamta.bansal345@gmail.com 9997025606
		Internal Examiner 1. Mr. Varun Bansal	varun.bansal@shobhituniversity.ac.in 9675478559
		2. Mr. Kuldeep Chauhan	kuldeep.chauhan@shobhituniversity.ac.in

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

			9756997090
12.	COMPUTER NETWORKS (CCSN 208)	External Examiner 1. Dr. Arun Giri	arungiri123@yahoo.com 9818809053
		2. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		3. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		Internal Examiner 1. Mr. Varun Bansal	varun.bansal@shobhituniversity.ac.in 9675478559
		2. Mr. Kuldeep Chauhan	kuldeep.chauhan@shobhituniversity.ac.in 9756997090
13.	FORMAL LANGUAGES & AUTOMATION THEORY (CCSN 210)	External Examiner 1. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		2. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		3. Dr. Abhay Bhatia	dr.abhav@ritroorkee.ac.in 9837386973
		Internal Examiner 1. Mr. Nitin Kumar	nitin.kumar@shobhituniversity.ac.in 9758170029
		2. Ms. Sumika Jain	sumika.jain@shobhituniversity.ac.in 9456666326
14.	TECHNICAL	External Examiner	arungiri123@yahoo.com

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

	ENGLISH (CBSN 202)	1. Dr. Arun Giri	9818809053
		2. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		3. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		Internal Examiner 1. Dr. Jasvir Singh Rana	jasvirsingh.rana@shobhituniversity.ac.in 9759233859
		2. Mr. Shoyab Hussain	shoyab.hussain@shobhituniversity.ac.in 9837446390
15.	OBJECT ORIENTED PROGRAMMING USING C++ LAB (CCSN 252)	External Examiner 1. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192
		3. Dr. Mamta Bansal	mamta.bansal345@gmail.com 9997025606
		Internal Examiner 1. Dr. Tarun Kumar Sharma	tarun.sharma@shobhituniversity.ac.in 9456086759
		2. Mr. Vinod Kumar	vinod.kumar@shobhituniversity.ac.in 9758749227
16.	DESIGN AND ANALYSIS OF ALGORITHMS	External Examiner 1. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

	LAB (CCSN 254)	2. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		3. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		Internal Examiner 1. Mr. Varun Bansal	varun.bansal@shobhituniversity.ac.in 9675478559
		2. Mr. Nitin Kumar	nitin.kumar@shobhituniversity.ac.in 9758170029
17.	INTERNET AND WEB TECHNOLOGY LAB (CCSN 256)	External Examiner 1. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192
		3. Dr. Mamta Bansal	mamta.bansal345@gmail.com 9997025606
		Internal Examiner 1. Mr. Varun Bansal	varun.bansal@shobhituniversity.ac.in 9675478559
		2. Mr. Kuldeep Chauhan	kuldeep.chauhan@shobhituniversity.ac.in 9756997090
18.	COMPUTER GRAPHICS (CCSN 302)	External Examiner 1. Dr. Arun Giri	arungiri123@yahoo.com 9818809053
		2. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U: www.sug.ac.in

		3. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		Internal Examiner 1. Dr. Tarun Kumar Sharma	tarun.sharma@shobhituniversity.ac.in 9456086759
		2. Ms. Sumika Jain	sumika.jain@shobhituniversity.ac.in 9456666326
19.	DATA WAREHOUSING & DATA MINING (CCSN 304)	External Examiner 1. Dr. Abhay Bhatia	dr.abhav@ritroorkee.ac.in 9837386973
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192
		3. Dr. Mamta Bansal	mamta.bansal345@gmail.com 9997025606
		Internal Examiner 1. Mr. Varun Bansal	varun.bansal@shobhituniversity.ac.in 9675478559
		2. Ms. Sumika Jain	sumika.jain@shobhituniversity.ac.in 9456666326
20.	MOBILE COMPUTING (CCSN 306)	External Examiner 1. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		2. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		3. Dr. Abhay Bhatia	dr.abhav@ritroorkee.ac.in 9837386973

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional
Area Gangoh, Distt. Saharanpur (U.P.)
247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

		Internal Examiner 1. Ms. Sumika Jain	sumika.jain@shobhituniversity.ac.in 9456666326
		2. Mr. Nitin Kumar	nitin.kumar@shobhituniversity.ac.in 9758170029
21.	KNOWLEDGE MANAGEMENT & EXPERT SYSTEM (CCSN 308)	External Examiner 1. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192
		3. Dr. Mamta Bansal	mamta.bansal345@gmail.com 9997025606
		Internal Examiner 1. Dr. Mahipal Singh	registrargangh@shobhituniversity.ac.in 9759174581
		2. Dr. Shri Kant Gupta	shrikant.gupta@shobhituniversity.ac.in 8279909590
22.	SOFTWARE PROJECT MANAGEMENT (CUCS 342)	External Examiner 1. Dr. Arun Giri	arungiri123@yahoo.com 9818809053
		2. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		3. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		Internal Examiner 1. Mr. Kuldeep	kuldeep.chauhan@shobhituniversity.ac.in

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional
Area Gangoh, Distt. Saharanpur (U.P.)
247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

		Chauhan	9756997090
		2. Ms. Sumika Jain	sumika.jain@shobhituniversity.ac.in 9456666326
23.	ENVIRONMENTAL STUDIES (CBSN 302)	External Examiner 1. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192
		3. Dr. Mamta Bansal	mamta.bansal345@gmail.com 9997025606
		Internal Examiner 1. Dr. Jasvir Singh Rana	jasvirsingh.rana@shobhituniversity.ac.in 9759233859
		2. Mr. Shoyab Hussain	shoyab.hussain@shobhituniversity.ac.in 9837446390
24.	COMPUTER GRAPHICS LAB (CCSN 352)	External Examiner 1. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192
		3. Dr. Mamta Bansal	mamta.bansal345@gmail.com 9997025606
		Internal Examiner 1. Dr. Tarun Kumar Sharma	tarun.sharma@shobhituniversity.ac.in 9456086759

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.s ug.ac.in

		2. Ms. Sumika Jain	sumika.jain@shobhituniversity.ac.in 9456666326
25.	DATA WAREHOUSING & DATA MINING LAB (CCSN 354)	External Examiner 1. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		2. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		3. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		Internal Examiner 1. Mr. Varun Bansal	varun.bansal@shobhituniversity.ac.in 9675478559
		2. Ms. Sumika Jain	sumika.jain@shobhituniversity.ac.in 9456666326
26.	MINI PROJECT (CCSN 356)	External Examiner 1. Dr. Arun Giri	arungiri123@yahoo.com 9818809053
		2. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		3. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		Internal Examiner 1. Dr. Tarun Kumar Sharma	tarun.sharma@shobhituniversity.ac.in 9456086759
		2. Mr. Varun Bansal	varun.bansal@shobhituniversity.ac.in 9675478559

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EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional
Area Gangoh, Distt. Saharanpur (U.P.)
247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

27.	INTERNSHIP AND Report Presentation (CCSN 462)	External Examiner 1. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		2. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		3. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		Internal Examiner 1. Dr. Mahipal Singh	registrargangh@shobhituniversity.ac.in 9759174581
		2. Dr. Tarun Kumar Sharma	tarun.sharma@shobhituniversity.ac.in 9456086759

Shobhit University
EDUCATION EMPOWERS

Babu Vijendra Marg, Adarsh Institutional
Area Gangoh, Distt. Saharanpur (U.P.)
247341, India
Tel. +91 7830810052
E-mail: registrargango@shobhituniversity.ac.in
U: www.shu.ac.in

SHOBHIT UNIVERSITY GANGOH
School of Engineering and Technology

Date: 15/06/2021

NOTICE

Subject: Meeting of the Board of Studies

All members of the Board of Studies are hereby informed that a meeting will be held as per the following details:

Date: 28/06/2021
Time: 10.00 AM
Venue: SOET, Shobhit University, Gangoh

Agenda:

1. Confirmation of minutes of the previous meeting
2. Approval of Scheme & Syllabi of BCA 1st to 6th Semester updated w. e. f. the academic session 2021-22
3. Approval of Scheme & Syllabi of MCA 1st to 4th Semester updated w. e. f. the academic session 2021-22
4. Approval of Scheme of B.Tech 1st,3rd,5th & 7th Semester w. e. f. the academic session 2021-22
5. Approval of the inclusion of Interdisciplinary courses (CE-511D) in 1st semester of M.Tech
6. Approval of Examiners (Theory & Practical) and Paper Setters for the odd semester courses in BCA, MCA, B.Tech & M.Tech for session **July to Dec. 2021.**
7. Discussion on the value Added courses offered for students and ratification of the same.
8. Any other matter with the permission of the Chair

All members are requested to make it convenient to attend the meeting and come prepared with relevant documents and suggestions.

Prof.(Dr.) Tarun Kumar Sharma
Chairperson Board of Studies
Head of the Department
15/06/2021

Shobhit University
EDUCATION EMPOWERS

Babu Vijendra Marg, Adarsh Institutional
Area Gangoh, Distt. Saharanpur (U.P.)
247341, India
Tel: +91 78369 10052
E-mail: registrar.gangoh@shobhituniversity.ac.in
U: www.su.ac.in

SHOBHIT UNIVERSITY GANGOH
School of Engineering and Technology

Date: 15/06/2021

To
Dr. Anil Lamba
Professor and Head
School of Computer Science and Application
Geeta University

Subject: Invitation to Attend the Board of Studies Meeting

Dear Sir

Greetings from School of Engineering and Technology

We are pleased to invite you to participate as an external subject expert in the upcoming meeting of the Board of Studies for the School of Engineering and Technology, scheduled as follows:

Date: 28/06/2021
Time: 10.00 AM
Mode: SOET, Shobhit University, Gangoh

The meeting will deliberate on important academic matters including syllabus revision, new course proposals, and academic planning for the upcoming session. Your expert insights and contributions would be invaluable to the academic enrichment of our programs.

We request you to kindly confirm your availability and mode of attendance at your earliest convenience. For online participation, a meeting link will be shared upon confirmation. If attending in person, necessary hospitality arrangements will be made.

We look forward to your positive response and support.

Thank you.

Warm regards,

Prof. (Dr.) Tarun Kumar Sharma
Chairperson, Board of Studies

Shobhit University
EDUCATION EMPOWERS

Babu Jagendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U: www.su.ac.in

SHOBHIT UNIVERSITY GANGOH
School of Engineering and Technology

Date: 15/06/2021

To
Dr. Amit Goyal
Professor and Head
School of Computer Science and Engineering
Chandigarh University

Subject: Invitation to Attend the Board of Studies Meeting

Dear Sir

Greetings from School of Engineering and Technology

We are pleased to invite you to participate as an external subject expert in the upcoming meeting of the Board of Studies for the School of Engineering and Technology, scheduled as follows:

Date: 28/06/2021
Time: 10.00 AM
Mode: SOET, Shobhit University, Gangoh

The meeting will deliberate on important academic matters including syllabus revision, new course proposals, and academic planning for the upcoming session. Your expert insights and contributions would be invaluable to the academic enrichment of our programs.

We request you to kindly confirm your availability and mode of attendance at your earliest convenience. For online participation, a meeting link will be shared upon confirmation. If attending in person, necessary hospitality arrangements will be made.

We look forward to your positive response and support.

Thank you.

Warm regards,

Prof.(Dr.) Tanuj Kumar Sharma
Chairperson, Board of Studies

Shobhit University
EDUCATION EMPOWERS

Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: reg.sraxgangoh@shobhituniversity.ac.in
U: www.sug.ac.in

SHOBHIT UNIVERSITY GANGOH

School of Engineering and Technology

Date: 28/06/2021

Attendance Sheet (School of Engineering and Technology, BOS Meeting on 28/06/2021)

Sr. No	Name	External/Internal Member	Signature
1	Prof.(Dr.) Anil Lamba	External Expert	
2	Dr. Amit Goyal	External Expert	
3	Dr. Jasvir Singh Rana	Internal Member	
4	Mr. Anil Kumar	Internal Member	

Chairman

School of Engineering and Technology ★ Shobhit University Gangoh ★

Shobhit University
EDUCATION EMPOWERS
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247341, India
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U.: www.sug.ac.in

School of Engineering & Technology

Date: 28.06.2021

Minutes of the Meeting of Board of Studies

17th meeting of the Board of Studies of the School of Engineering and Technology, Shobhit University Gangoh was organized on 28th June 2021 at 10:00 am onwards. The following members were present in the meeting:

1.	Prof.(Dr.) Tarun Kumar Sharma Head of the Department (Computer Science and Engineering) Shobhit University Gangoh	Chairperson
2.	Prof.(Dr.) Anil Lamba Professor and Head School of Computer Science and Application Geeta University	External expert
3.	Dr. Amit Goyal Professor and Head School of Computer Science and Engineering Chandigarh University	External Expert
4.	Dr. Jasvir Singh Rana Associate Professor School of Engineering and Technology Shobhit University Gangoh	Member
5.	Mr. Anil Kumar Assistant Professor School of Engineering and Technology Shobhit University Gangoh	Member

Welcome address by Chairman
The Chairman extended a warm welcome to all the members of Board of Studies and the following information was tabled before the members of the Board of Studies:

Input given by the Subject Experts on the Scheme and syllabi of the ongoing Batches.

The following discussed and approved on Choice Based Credit System:
Item BOS 17.1: Approval of the Minutes of the 16th BOS Meeting held on 29 Dec.2020
Was circulated among the members and the same were notified after the approval of the Board of Studies. {Annexure- 1}

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Babu Vijendra Marg, Adarsh Institutional
Area Gangoh, Distt. Saharanpur (U.P.)
247341, India
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U.: www.sug.ac.in

Item BOS 17.2: Approval of Scheme & Syllabi of BCA 1st to 6th Semester updated w. e. f. the academic session 2021-22.

- **BOS approved Scheme & Syllabi of BCA 1st to 6th Semester {Annexure-2}**

Item BOS 17.3: Approval of the Scheme & Syllabi of MCA 1st to 4th Semester updated w. e. f. the academic session 2021-22.

- **BOS approved Scheme & Syllabi of MCA 1st to 4th Semester {Annexure-3}**

Item BOS 17.4: Approval of Syllabus update in B. Tech 1st,3rd, 5th & 7th semester w. e. f. the academic session 2021-22.

- **BOS members approved Syllabus update in B. Tech 1st,3rd, 5th & 7th semester {Annexure-4}**

Item BOS 17.5: Approval of the inclusion of Interdisciplinary course (CE-511D) in 1st semester of M. Tech

- **BOS members approved syllabus of Interdisciplinary course (CE-511D) in 1st semester of M. Tech. {Annexure-5}**

Item BOS 17.6: Approval of Examiners (Theory & Practical) and Paper Setters for the odd semester courses in BCA , MCA , B. Tech & M. Tech for session **July to Dec.. 2021**. The same is being sent to the Controller of Examinations, Shobhit University Gangoh, in a sealed cover. {Annexure-6}

Item BOS 17.7: Discussion on the Value Added courses offered for students and ratification of the same.

- BOS members approved the list of Value added courses offered to students.

The meeting ended with a vote of thanks to the Chairman, Board of Studies.

The suggestions given by the panel of BOS have been discussed with the Vice Chancellor and Dean Academics. The action taken on the suggestions has been approved by competent authorities.

Signed by:

(Chairman, BOS)

(Vice Chancellor)

(Dean Academics)

Shobhit University
EDUCATION EMPOWERS
Bnbu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.suu.ac.in

17th Meeting of BOS (Item No. 17.1 Annexure -1)
School of Engineering & Technology

Date: 29.12.2020

Minutes of the Meeting of Board of Studies

16th meeting of the Board of Studies of the School of Engineering and Technology, Shobhit University Gangoh was organized on 29th Dec. 2020 at 11:30 am online through Google meet. The following members were present in the meeting:

1.	Prof.(Dr.) Tarun Kumar Sharma Head of the Department (Computer Science and Engineering) Shobhit University Gangoh	Chairperson
2.	Prof.(Dr.) Anil Lamba Professor and Head School of Computer Science and Application Geeta University	External expert
3.	Dr. Amit Goyal Professor and Head School of Computer Science and Engineering Chandigarh University	External Expert
4.	Dr. Jasvir Singh Rana Associate Professor School of Engineering and Technology Shobhit University Gangoh	Member
5.	Mr. Anil Kumar Assistant Professor School of Engineering and Technology Shobhit University Gangoh	Member

Welcome address by Chairman

The Chairman extended a warm welcome to all the members of Board of Studies and the following information was tabled before the members of the Board of Studies:

Input given by the Subject Experts on the Scheme and syllabi of the ongoing Batches.

The following discussed and approved on Choice Based Credit System:

Item BOS 16.1: Approval of the Minutes of the 15th BOS Meeting held on 26 June 2020

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EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
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E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

Was circulated among the members and the same were notified after the approval of the Board of Studies. {Annexure- 1}

Item BOS 16.2: New Interdisciplinary Courses to be added in BCA, and B. Tech 4th Sem. {Annexure-2}

- **BOS approved syllabus of GCAC-201 D & GCAC-201 E in BCA 4th Sem.**
- **BOS approved syllabus of CBSN-202 D in B. Tech 4th Sem.**

Item BOS 16.3: Analysis of Students' feedback & Action taken report:

- BOS Chairman has expressed that the student feedback and action taken report process is done at the end of semester. The BOS members noted the same.

Item BOS 16.4: Analysis of the feedback on curriculum from stakeholders:

- The BOS chairman presented the analysis report of stakeholders' feedback on curriculum. The BOS members noted the same and advised to incorporate the suggestions as per the feasibility. The Action Taken Report is enclosed herewith. {Annexure-3}

Item BOS 16.5: Approval of Examiners (Theory & Practical) and Paper Setters for the even semester courses in BCA, MCA, M.Tech and B. Tech for session **Jan. to June. 2021.** The same is being sent to the Controller of Examinations, Shobhit University Gangoh, in a sealed cover. {Annexure-4}

Item BOS 16.6: Discussion on the Value Added courses offered for students and ratification of the same.

- BOS members approved the list of Value added courses offered to students.

The meeting ended with a vote of thanks to the Chairman. Board of Studies.
The suggestions given by the panel of BOS have been discussed with the Vice Chancellor and Dean Academics. The action taken on the suggestions has been approved by competent authorities.

Signed by:

(Chairman, BOS)

SHOBHIT UNIVERSITY GANGOH 247341

(Vice Chancellor)

SHOBHIT UNIVERSITY GANGOH 247341

(Dean Academics)

SHOBHIT UNIVERSITY GANGOH 247341

17th Meeting of BOS (Item No. 17.2 Annexure -2)

Shobhit University

EDUCATION EMPOWERS

Shobhit University, Gangoh

(Established by UP Shobhit University Act No. 3, 2012)

School of School of Engineering and Technology

Ordinances, Regulations & Syllabus

For

Bachelor of Computer Application (BCA) Three Year Programme

Semester System

(w.e.f. session 2013-14)

Approved and adopted in the year 2021 (17th Meeting, Board of Studies)

Programme Educational Objectives (PEOs)

PEO1: To facilitate in development of strong basic fundamentals of Computer Applications that fit as a perfect foundation towards a beginning a professional career in industry.

PEO2: To develop programming skills in learners by using fundamental knowledge of computer Science.

PEO3: To apply new designs and solutions to complex real life problems using existing and/or novel technologies.

PEO4: To play a creative role during professional life through turning problems to opportunities and foster personal and organizational growth

PEO5: To inculcate comprehensive communication ability that is useful during professional communication and leading of teams in future

Programme Specific Objectives (PSO's)

PSO 1 Students will able to understand, analyze and develop computer programs in the areas related to algorithm, web design and networking for efficient design of computer based system.

PSO 2 Apply standard software engineering practices and strategies in software project development using open source programming environment to deliver a quality of product for business success.

PSO 3 Student will able to know various issues, latest trends in technology development and thereby innovate new ideas and solutions to existing problems.

PSO 4 Analyze and design solutions for real-world problems using computational techniques.

PSO 5 Explore trends in AI, Machine Learning, Cloud Computing, and Big Data.

Programme Outcome (PO's)

PO1 Basic Knowledge in Computing- Will demonstrate basic knowledge in computing discipline.

PO2 Design and Conduct Experiments- Will demonstrate the ability to design and conduct experiments, interpret and analyze data, and report results.

PO3 Software Design and Development- Will demonstrate the ability to design and develop software that meets the Software industry demands.

PO4 Problem Analysis and Formulation- Capacity to analyze a problem, and identify and formulate the computing requirements appropriate to its solution.

PO5 Design and Evaluation of Computer Based Systems- Capacity to design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs with appropriate consideration for public health and safety, cultural, societal and environmental considerations

PO6 Professional and Ethical Responsibilities- Will demonstrate an understanding of their professional and ethical responsibilities.

PO7 Effective Communication- Will be able to communicate effectively in both verbal and written forms.

PO8 Global and Societal Contexts in Engineering- Will have the confidence to apply engineering solutions in global and societal contexts.

PO9 Self-Education and Lifelong Learning- Should be capable of self-education and clearly understand the value of lifelong learning.

PO10 Continuing Professional Development - Awareness of the need for and an ability to engage in continuing professional development.

PO11 Engineering and Management Principles - A skill of engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects.

PO12 Independent and Lifelong Learning - Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Shobhit University, Gangoh (Saharanpur)
Teaching Scheme
Effective from 2021

BCA
I Semester

Subject Code	Subject	L	T	P	Cr.
BCA-101	Fundamental of Computer and C Programming	4			4
BCA-102	Problem Solving using Computer	4			4
BCA-103 BCA-103 A BCA-103 B BCA-103 C	Professional Communication English Technical Communication Human Values, Deaddiction and Traffic Rules	4			4
BCA-104 BCA-104 A BCA-104 B BCA-104 C	Mathematics Basic Mathematics Mathematics-I Advanced Applied Mathematics	4			4
BCA-151	Fundamental of Computer and C Programming Lab			4	2
BCA-152	Software Lab using Python			4	2
BCA-153 BCA-153 A BCA-153 B BCA-153 C	English Communication Lab English Technical Communication Human Values, Deaddiction and Traffic Rules (Lab)			4	2
BCA-154	Seminar Based on Learning			4	2
	Total Credits	**16**		**16**	**24**

Shobhit University, Gangoh (Saharanpur)
Teaching Scheme
Effective from 2021

II Semester

Subject Code	Subject	L	L	P	Cr.
BCA-201	OOPS Using C++	4			4
BCA-202	Database Management Systems	4			4
BCA-203	Web & E-Commerce Technologies	4			4
BCA-204 BCA-204 A BCA-204 B BCA-204 C	Discrete Structures Set Theory Graph Theory Discrete Probability	4			4
BCA-205 BCA-205 A BCA-205 B BCA-205 C	Environmental Studies Environmental Science Natural Resource Management Pollution Control	4			4
BCA-251	OOPS Using C++ Lab			4	2
BCA-252	Database Management Systems Lab			4	2
BCA-253	Seminar Based on Learning			4	2
Total Credits		**20**		**12**	**26**

Shobhit University, Gangoh (Saharanpur)
Teaching Scheme
Effective from 2021

BCA
III Semester

Subject Code	Subject	L	T	P	Cr.
BCA-301	Operating Systems	4			4
BCA-302	HTML, DHTML and CSS Programming	4			4
BCA-303	Theory of Computation	4			4
BCA-304	Multimedia and Applications	4			4
BCA-305 BCA-305 A BCA-305 B BCA-305 C BCA-305 D	Optimization Techniques Elements of Statistics Combinatorial Optimization Multi-objective Optimization Biostatistics	4			4
BCA-351	Operating Systems Lab			4	2
BCA-352	HTML Programming Lab			4	2
BCA-353	Seminar Based on Learning			4	2
	Total Credits (5 Theory + 2 Lab)	**20**		**12**	**26**

Shobhit University, Gangoh (Saharanpur)
Teaching Scheme
Effective from 2021

IV Semester

Subject Code	Subject	L	T	P	Cr.
BCA-401	Data Structures	4			4
BCA-402	Java Programming	4			4
BCA-403	Computer System Architecture	4			4
BCA-404 **BCA-404 A** **BCA-404 B** **BCA-404 C** **BCA-404 D**	Knowledge Management Knowledge Transfer Knowledge Mapping Knowledge Management Systems Information Systems for KM	4			4
BCA-451	Data Structures Lab			4	2
BCA-452	Java Programming Lab			4	2
BCA-453	Computer System Architecture Lab			4	2
BCA-454	Seminar Based on Learning			4	2
	Total Credits (4 Theory + 3 Lab)	**16**		**16**	**24**

Shobhit University, Gangoh (Saharanpur)
Teaching Scheme
Effective from 2021

BCA
V Semester

Subject Code	Subject	L	T	P	Cr.
BCA-501	Software Engineering	4			4
BCA-502	Analysis of Algorithms & Data Structures	4			4
BCA-503	Mobile Computing	4			4
BCA-504	Big Data and Machine Learning	4			4
BCA-551	Software Engineering Lab			4	2
BCA-552	Algorithms and Data Structures with C++ Lab			4	2
BCA-558	Research Project-I			4	2
	Total Credits (5 Theory + 2 Lab)	**16**		**12**	**22**

Shobhit University, Gangoh (Saharanpur)
Teaching Scheme
Effective from 2021

VI Semester

Subject Code	Subject	L	T	P	Cr.
BCA-601	Data Communication and Computer Networks	4			4
BCA-602	Artificial Intelligence	4			4
BCA-603	Cyber Security & Cyber Laws	4			4
BCA-604	Software Project management	4			4
BCA-651	Computer Networks Lab			4	2
BCA-656	Seminar and Group Discussion			4	2
BCA-658	Research Project-II			4	2
	Total Credits (4 Theory + 3 Lab)	**16**		**12**	**22**

Fundamental of Computer and Programming in C

BCA-101

L	T	P	Cr
4	0	0	4

Course Outcomes:

At the end of this course, Students will demonstrate the ability to:
CO1: Understand basic computer systems and software types.
CO2: Learn the fundamentals of C programming and data types.
CO3: Master control structures, arrays, and string handling in C.
CO4: Develop user-defined functions and understand recursion and pointers.
CO5: Implement structures, unions, and file management in C.

Unit-I

Introduction to computer System: Definition of a Computer, Characteristics and Limitations of computer, Block diagram of computer, Types of computers Types of Software: system software, Application software, Commercial, Open source, Domain and Freeware software.
Types of programming languages: Assembler, Compiler, Interpreter, Linker, Loader (Definitions only),**Number system**: Decimal, Binary Octal and Hexadecimal number,Interconversion of decimal to binary and vice-versa, ASCII codes, Flowchart-definition,Symbols used in writing the flow-chart Writing an algorithm and flow-chart of simple
problems.

Unit-II

Fundamentals of 'C': Features of C language, Structure of C program, Writing the first C Program, Comments, Header files, Data types, Constants and Variables, Operators, Expressions, Evaluation of expressions, Type conversion and Type casting, Precedence and Associativity, I/O functions, Definition of Macro and Pre-Processor Directives.

Unit-III

Decision Control and Looping Statements: Introduction to Decision Control Statements, Conditional Branching Statements, Iterative Statements, Nested Loops, Break and Continue Statement, Goto Statement, **Array & String:** Concept of array, One and Two-dimensional arrays, declaration and initialization of arrays, String, String storage, Built-in string functions

Unit-IV

Functions: Concept of user defined functions, prototype, definition of function, parameters, parameter passing, calling a function, Macros, Pre-processing, **Recursion:** Definitions, recursive function, Examples, Applications, **Pointers:** Basics of pointers, pointer to pointer, pointer and array, pointer to array, array of pointers, function returning a pointer.

Unit-V

Structure and Union: Basics of structure, structure members, accessing structure members, nested structures, array of structures, structure and functions, structures and pointers, unions, bit-fields, **File Management:** Introduction to file management, Simple file management functions for text files, Reading from and writing to files.

Reference:

1. Fundamentals of Computers, V. Rajaraman.
2. Computer Concepts and C Programming, P.B. Kotur
3. Let us C,YashwanthKanetkar
4. ANSI C, Balagurusamy

Problem Solving using Computer

BCA-102

L	T	P	Cr
4	0	0	4

Course Outcomes:

At the end of this course, Students will demonstrate the ability to:
CO1: Understand computer fundamentals and basic program planning.
CO2: Apply problem-solving techniques like flowcharting and algorithm design.
CO3: Get hands-on experience with Python programming basics.
CO4: Work with Python structures, functions, and file handling.
CO5: Explore advanced Python topics like OOP, regular expressions, and GUI programming.

Unit-I

Computer Fundamentals: Introduction to Computers: Characteristics of Computers, Uses of computers, Types and generations of Computers. **Basic Computer Organization** - Units of a computer, CPU, ALU, memory hierarchy, registers, I/O devices. **Planning the Computer Program:** Concept of problem solving, Problem definition, Program design, Debugging, Types of errors in programming, Documentation.

Unit-II

Techniques of Problem Solving: Flowcharting, decision table, algorithms, Structured programming concepts, Programming methodologies viz. top-down and bottom-up programming.**Overview of Programming:** Structure of a Python Program, Elements of Python, IDEs for python, Python Interpreter, Using Python as calculator, Python shell, Indentation.

Unit-III

Introduction to Python: Atoms, Identifiers and keywords, Literals, Strings, Operators (Arithmetic operator, Relational operator, Logical or Boolean operator, Assignment, Operator, Ternary operator, Bit wise operator, Increment or Decrement operator).
Creating Python Programs: Input and Output Statements, Control statements (Looping- while Loop, for Loop, Loop Control, Conditional Statement- if...else, Difference between break, continue and pass).

Unit-IV

Structures: Numbers, Strings, Lists, Tuples, Dictionary, Date & Time, Modules, Defining Functions, Exit function, default arguments. File handling in python.

Unit-V

Introduction to Advanced Python: Objects and Classes, Inheritance, Regular Expressions, Event Driven Programming, GUI Programming. Basic concepts of concepts of Package and modules

References:

1. P. K. Sinha & Priti Sinha, "Computer Fundamentals", BPB Publications, 2007.
2. Dr. Anita Goel, Computer Fundamentals, Pearson Education, 2010.
3. T. Budd, Exploring Python, TMH, 1st Ed, 2011
4. Python Tutorial/Documentation www.python.or 2010
5. Allen Downey, Jeffrey Elkner, Chris Meyers, how to think like a computer scientist: learning with Python, Freely available online.2012
6. Rober Sedgewick, K Wayne -Introduction to Programming in Python: An interdisciplinary Approach" Pearson India

Professional Communication

BCA-103

L	T	P	Cr
4	0	0	4

Course Outcomes:

At the end of this course, Students will demonstrate the ability to:

CO1: Develop effective verbal and written communication skills.

CO2: Improve technical writing and documentation for professional contexts.

CO3: Understand non-verbal communication and body language.

CO4: Gain skills for job applications, resumes, group discussions, and interviews.

CO5: Learn organizational communication and communication network strategies.

UNIT 1

Effective communication: Meaning, Barriers, Types of communication and Essentials. Interpersonal Communication skills. Effective Spoken Communication: Understanding essentials of spoken communication, Public speaking, Discussion Techniques, Presentation strategies.

UNIT 2

Effective Professional and Technical writing: Paragraph development, Forms of writing, Abstraction and Summarization of a text; Technicalities of letter writing, internal and external organizational communication. Technical reports, proposals and papers.

UNIT 3

Effective non-verbal communication: Knowledge and adoption of the right non-verbal cues of body language, interpretation of the body language in professional context. Understanding Proxemics and other forms of non-verbal communication.

UNIT 4

Communicating for Employment: Designing Effective Job Application letter and resumes; Success strategies for Group discussions and Interviews

UNIT5

Communication Networks in organizations: Types, barriers and overcoming the barriers.

Laboratory work:

- Needs-assessment of spoken and written communication and feedback.
- Training for Group Discussions through simulations and role plays.
- Training for effective presentations.
- Project based team presentations.
- Proposals and papers-review and suggestions

Text Books:

1. Lesikar V. R. and Flately M. E., Basic Business Communication Skills for the Empowering the Internet Generation, Tata Mc Graw Hill, New Delhi (2006).
2. Raman M & Sharma S., Technical Communication Principles and Practice, Oxford University Press, New Delhi (2015) 3rd ed.
3. Mukherjee S. H., Business Communication-Connecting at Work, Oxford University Press, New Delhi (2013).

English

BCA-103 A

L	T	P	Cr
4	0	0	4

Course Outcomes:

At the end of this course, Students will demonstrate the ability to:
CO1: Improve grammar, vocabulary, and style in English.
CO2: Develop skills in reading comprehension and interpreting visual information.
CO3: Strengthen business writing, including job applications and reports.
CO4: Enhance speaking skills for business etiquette, debates, and presentations.
CO5: Improve listening skills through business-related exercises.

Unit 1: Grammar
Expressing in Style; Words often confused; One-word substitution; Phrases; Idioms.

Unit II: Advanced Reading
Paraphrasing; interpreting visual information: Tables, Graphs, Charts; Speed Reading. Comprehension and Analysis of the book, "Who Moved My Cheese."

Unit III: Effective Writing
Business Correspondences: Fax, Email; Taking Notes; Making Inquiries; Placing Orders; Asking Giving Information; Registering Complaints; Handling Complaints; Drafting Notices; Job Applications; Expository Composition; Argumentative Composition; Techniques of Argument; Logical Presentation; Descriptive Composition; Narrative Composition; Summary Writing, Proposal; Abstract, Agenda, Minutes.

Unit IV: Speaking
Business Etiquettes; Impromptu Speech; Debate; Role Play; Presentations.

Unit V: Listening
Business-related Conversation Exercises.

Reference Books:

1. Spencer Johnson; Who Moved My Cheese; Vermilion; (2009).
2. Balasubramanian, T., A Textbook of English Phonetics for Indian Students; Macmillan India, Delhi (1998).
3. McLearn, Stephen., Writing Essays and Report: A Student's Guide; Viva Books, New Delhi (2011).
4. Burton Roberts, N., Analysing Sentences; Longman, London (1986).
5. Wekker, H. And Haegeman, L., A Modern Course in English Syntax; Croom Helm, London (1985).

Technical Communication

BCA-103 B

L	T	P	Cr
4	0	0	4

Course Outcomes:

At the end of this course, Students will demonstrate the ability to:
CO1: Understand the principles and formats of technical writing for clear and effective communication.
CO2: Develop skills to create user manuals, reports, proposals, and technical documentation.
CO3: Use visuals like charts, diagrams, and tables to enhance the clarity of technical content.
CO4: Apply audience analysis to tailor technical information for specific readers or stakeholders.
CO5: Practice editing and proofreading to ensure accuracy, consistency, and professionalism in technical documents.

UNIT: 1

Technical Documentation Presentation :Accuracy and Conciseness in Technical English, Structure Format etc. for Technical Reports & Thesis, Comparing and Contractive other aspects of short reports and long dissertations.

UNIT: 2

Communication Skills: Communication Process: Concept & importance, System of communication: Formal & internal. Barrier to effective communication.

UNIT: 3

Principles of Business Communication: Planning and conduction conversations, interviews and Discussion. The preparation of oral statements, effective listening, telephonic communication.

UNIT: 4

Written Communication: Guides to effective writing for business correspondence including letter and job application Memorandum, Office orders, Reports.

UNIT: 5

Non-Verbal Communication: Importance and Type-Cluster and congruency. Kinetics VoalCUes. Modern Forms of Communication: Telex, Fax, Telegram & Teleconferencing & E-mail.

SUGGESTED READINGS:-

1. Lesikar " Business Communication" AITBC

2. S. M. Ray "Business Communication" HP

Human Values, De-addiction and Traffic Rules

BCA-103 C

L	T	P	Cr
4	0	0	4

Course Outcomes:

At the end of this course, Students will demonstrate the ability to:
CO1: Understand the need and process for value education.
CO2: Learn harmony in self and relationships with family and society.
CO3: Grasp the interconnectedness of nature and existence.
CO4: Apply holistic understanding to professional ethics.
CO5: Explore human values, ethical conduct, and humanistic education.

Module 1: Course Introduction - Need, Basic Guidelines, Content and Process for Value Education

1. Understanding the need, basic guidelines, content and process for Value Education

2. Self-Exploration–what is it? - Its content and process; 'Natural Acceptance' and Experiential Validation- as the mechanism for self-exploration

3. Continuous Happiness and Prosperity- A look at basic Human Aspirations

4. Right understanding, Relationship and Physical Facilities- the basic requirements for Fulfillment of aspirations of every human being with their correct priority

5. Understanding Happiness and Prosperity correctly- A critical appraisal of the current Scenario

6. Method to fulfill the above human aspirations: understanding and living in harmony At various levels.

Module 2: Understanding Harmony in the Human Being - Harmony in Myself!

7. Understanding human being as a co-existence of the sentient 'I' and the material 'Body'

8. Understanding the needs of Self ('I') and 'Body' - Sukh and Suvidha

9. Understanding the Body as an instrument of 'I' (I being the doer, seer and enjoyer)

10. Understanding the characteristics and activities of 'I' and harmony in 'I'

11. Understanding the harmony of I with the Body: Sanyam and Swasthya; correct Appraisal of Physical needs, meaning of Prosperity in detail

12. Programs to ensure Sanyam and Swasthya

- Practice Exercises and Case Studies will be taken up in Practice Sessions.

Module 3: Understanding Harmony in the Family and Society- Harmony in HumanHuman Relationship

13. Understanding harmony in the Family- the basic unit of human interaction

14. Understanding values in human-human relationship; meaning of Nyaya and program for its fulfillment to ensure Ubhay-tripti;

Trust (Vishwas) and Respect (Samman) as the foundational values of relationship

15. Understanding the meaning of Vishwas; Difference between intention and competence

16. Understanding the meaning of Samman, Difference between respect and differentiation; the other salient values in relationship

17. Understanding the harmony in the society (society being an extension of family): Samadhan, Samridhi, Abhay, Sah-astitva as comprehensive Human Goals

18. Visualizing a universal harmonious order in society- Undivided Society (Akhand Samaj), Universal Order (SarvabhaumVyawastha)- from family to world family!

- Practice Exercises and Case Studies will be taken up in Practice Sessions.

Module 4: Understanding Harmony in the Nature and Existence - Whole existence as Co-existence

19. Understanding the harmony in the Nature

20. Interconnectedness and mutual fulfillment among the four orders of naturerecyclability and self-regulation in nature

21. Understanding Existence as Co-existence (Sah-astitva) of mutually interacting units in all-pervasive space

22. Holistic perception of harmony at all levels of existence

- Practice Exercises and Case Studies will be taken up in Practice Sessions.

Module 5: Implications of the above Holistic Understanding of Harmony on Professional Ethics

23. Natural acceptance of human values

24. Definitiveness of Ethical Human Conduct

25. Basis for Humanistic Education, Humanistic Constitution and Humanistic Universal

Text Book

R R Gaur, R Sangal, G P Bagaria, 2009, A Foundation Course in Value Education.

Reference Books

1. Ivan Illich, 1974, Energy & Equity, The Trinity Press, Worcester, and HarperCollins, USA

2. E.F. Schumacher, 1973, Small is Beautiful: a study of economics as if people mattered, Blond & Briggs, Britain.

3. A Nagraj, 1998, JeevanVidyaekParichay, Divya Path Sansthan, Amarkantak.

4. Sussan George, 1976, How the Other Half Dies, Penguin Press. Reprinted 1986, 1991

5. PL Dhar, RR Gaur, 1990, Science and Humanism, Commonwealth Purblishers.

6. A.N. Tripathy, 2003, Human Values, New Age International Publishers.

7. Subhas Palekar, 2000, How to practice Natural Farming, Pracheen(Vaidik) KrishiTantra Shodh, Amravati.

Mathematics

BCA-104

L	T	P	Cr
4	0	0	4

Course Outcomes:

At the end of this course, Students will demonstrate the ability to:

CO1: Understand determinants, matrices, and their properties.

CO2: Learn limits, continuity, and their applications.

CO3: Master differentiation, including chain rule, Rolle's theorem, and maxima/minima.

CO4: Apply integration techniques such as substitution, parts, and reduction formulas

CO5: Study vector algebra, including scalar and vector products, and their applications.

UNIT-I

DETERMINANTS: Definition, Minors, Cofactors, Properties of Determinants MATRICES: Definition, Types of Matrices, Addition, Subtraction, ScalarMultiplication and Multiplication of Matrices, Adjoint, Inverse, Cramers Rule, Rank of Matrix Dependence of Vectors, Eigen Vectors of a Matrix, Caley-Hamilton Theorem (without proof).

UNIT-II

LIMITS & CONTINUITY: Limit at a Point, Properties of Limit, Computation of Limits of Various Types of Functions, Continuity at a Point, Continuity Over anInterval, Intermediate Value Theorem, Type of Discontinuities

UNIT-III

DIFFERENTIATION: Derivative, Derivatives of Sum, Differences, Product & Quotients, Chain Rule, Derivatives of Composite Functions, LogarithmicDifferentiation, Rolle's Theorem, Mean Value Theorem, Expansion of Functions (Maclaurin's & Taylor's), Indeterminate Forms, L'Hospitals Rule, Maxima & Minima, Curve Tracing, Successive Differentiation & Leibnitz Theorem.

UNIT-IV

INTEGRATION: Integral as Limit of Sum, Fundamental Theorem of Calculus (without proof.), Indefinite Integrals, Methods of Integration Substitution, By Parts, Partial Fractions, Reduction Formulae for Trigonometric Functions, Gamma and Beta Functions(definition).

UNIT-V

VECTOR ALGEBRA: Definition of a vector in 2 and 3 Dimensions; Double and Triple Scalar and Vector Product and physical interpretation of area andvolume.**Matrices:** Matrix, sub matrix, types of matrices, such as symmetric, square, diagonal Matrices, singular and non -singular matrices. Addition, subtraction, multiplication of matrices. Rank of a matrix, Matrix equation, solution by Cramer's rule and Gauss elimination method.

Referential Books:

1. B.S. Grewal, "Elementary Engineering Mathematics", 34th Ed., 1998.
2. Shanti Narayan, "Integral Calculus", S. Chand & Company, 1999
3. H.K. Dass, "Advanced Engineering Mathematics", S. Chand & Comp
4. J.P. Chauhan "BCA Mathematics Volume -1", Krishna Publications.

Basic Mathematics

BCA-104 A

L	T	P	Cr
4	0	0	4

Course Outcomes:

At the end of this course, Students will demonstrate the ability to:
CO1: Grasp symbolic logic, set theory, and relations.
CO2: Learn differentiation and applications like tangents, normals, and maxima/minima..
CO3: Understand integral calculus, including multiple integrals and transformations.
CO4: Study 2D analytical geometry, including lines, circles, and conic sections.
CO5: Apply functions and relations in areas like coding theory and equivalence.

MODULE I: SYMBOLIC LOGIC & SET THEORY:
Proposition, Logical operators, conjunction, disjunction, negation, conditional and bi-conditional Operators, converse, Inverse, Contra Positive, logically equivalent, tautology and contradiction. Arguments and validity of arguments. Set operations, Venn diagram, Properties of sets, number of elements in a set, Cartesian product, relations & functions, Relations: Equivalence relation. Equivalence class, partially and totally Ordered sets, Functions: Types of Functions, Composition of Functions.

MODULE II: DIFFERENTIAL CALCULUS
Differentiation, successive differentiation, Leibnitz theorem, partial differentiation, Applications of differentiation, Tangent and normal, angle between two curves, Maximum and Minimum values(Second derivative test), Curvature and radius of Curvature (Cartesian coordinates), Envelopes.

MODULE III : INTEGRAL CALCULUS
Definite Integral and its application for area, length and volume. Multiple Integrals. Change of Order of Integration. Transformation of integral from Cartesian to polar. Applications in Areas, Volume and surfaces.

MODULE IV : TWO DIMENSIONALANALYTICAL GEOMETRY
Straight Lines .Pair Straight Lines .Circles.

MODULE V :FUNCTION AND RELATION : Injective and surjective functions, composition of function, Inverse function, Use of
function in coding theory, Relation composition of relation, Equivalence relation.

Text Books:

1. Das BC and Mukherjee, Differential Calculus, Calcutta, U.N. Dhar Publishers
2. Das BC and Mukherjee, Integral Calculus, Calcutta, U.N. Dhar Publishers
3. Grewal B.S., Higher Engineering Mathematics, Delhi Khanna Publishers.

Mathematics – I

BCA - 104 B

L	T	P	Cr
4	0	0	4

Course Outcomes:

At the end of this course, Students will demonstrate the ability to:
CO1: Understand basic concepts in sets, relations, and functions.
CO2: Study limits, continuity, and discontinuities.
CO3: Learn differential calculus, including Leibnitz's theorem and partial differentiation.
CO4: Master integration techniques, including reduction formulae and applications.
CO5: Understand vector calculus, differential equations, and coordinate geometry.

UNIT : 1

BASIC CONCEPTS: Definition of Sets, Number systems, Relations Functions.

LIMIT CONTINUITY: Definition of limit, Limit of a function, Right and Left hand Limits, Algebra of limits, General principle for existence of limit, limit of inequalities, Method of finding limits, Continuity of functions, Cauchy's definition, graphical meaning of continuity, Kinds of discontinuities.

DIFFERENTIAL CALCULUS: Successive differentiation, Leibnitz theorem, Partial differentiation, Euler's Theorem, change of variables, Jacobian theorem.

UNIT : 2

INTEGRAL CALCULUS: Integration of rational and Irrational functions, Reduction Formulae, Definite Integral, Rectification; Quadrature, volumes and surfaces of Revolution, Simple applications of integration & simple problems of double and triple integrals.

UNIT : 3

DIFFERENTIAL EQUATION: Differential equations of first order, Differential equations of 2nd order, Differential of 2nd order with constant coefficients.

UNIT : 4

VECTOR CALCULUS AND ALGEBRA: Vectors, Differentiation and partial differentiation of vector functions, derivative of sum, Dot product and cross product of two vectors, gradient, divergence and curl.

UNIT : 5

COORDINATE GEOMETRY: Straight lines, Circles and the system of circles; standard equations and properties of Parabola. Ellipse and Hyperbolas, General equation of second degree in two variables, tracing of simple conic section.

Suggested Readings :

1. E. Kreyzig, "Engineering Mathematics".

2. B.S. Grewal, "Higher Engineering Mathematics"

3. Shanti Narayan, "Differential Calculus"

4. K.P. Gupta. "Vector Calculus"

Advanced Applied Mathematics

BCA-104 C

L	T	P	Cr
4	0	0	4

Course Outcomes:

At the end of this course, Students will demonstrate the ability to:
CO1: Study multivariable calculus, gradients, divergence, and theorems like Green's and Stokes'.
CO2: Learn methods of solving ordinary and partial differential equations.
CO3: Understand linear algebra, including vector spaces, eigenvalues, and diagonalization.
CO4: Apply numerical methods, error analysis, and computational mathematics.
CO5: Study probability, statistics, and stochastic processes, including regression and Markov chains.

Unit 1: Advanced Calculus and Analysis

Multivariable calculus: gradients, divergence, and curl Theorems of Green, Stokes, and Gauss Metric spaces and Convergence, Functions of several variables: continuity, Differentiability, Optimization techniques: Lagrange multipliers

Unit 2: Differential Equations

Ordinary differential equations (ODEs): existence and Uniqueness, Systems of ODEs and stability analysis, Partial differential equations (PDEs): classification and methods of Solution, Fourier series and transforms, Numerical methods for ODEs and PDEs

Unit 3: Linear Algebra and Matrix Theory

Vector spaces and subspaces, linear transformations and their properties, Eigenvalues and eigenvectors, Diagonalization and spectral theorem, Applications to systems of equations and optimization problems

Unit 4: Numerical Methods and Computational Mathematics

Numerical analysis: error analysis and convergence, Root-finding algorithms (Newton's method, bisection), Numerical integration and differentiation, Finite difference methods for PDEs, Introduction to MATLAB/Python for mathematical modelling

Unit 5: Probability, Statistics, and Stochastic Processes:

Probability theory: distributions, expected values, and variance, Statistical inference: hypothesis testing, confidence intervals, Regression analysis and time series forecasting, Markov chains and stochastic processes, Applications in finance, engineering, and science

BCA-151

Fundamental of Computer and C Programming Lab

L	T	P	Cr
0	0	4	2

Course Outcomes:

At the end of this course, Students will demonstrate the ability to:
CO1: Understand the basics of computer hardware, software, and operating systems.
CO2: Develop problem-solving skills using C programming language constructs.
CO3: Write, compile, and debug simple C programs using control structures and functions.
CO4: Implement arrays, strings, and pointers for efficient data handling in C.
CO5: Apply file handling concepts to create, read, and write data to files using C.

S.N	List of Practical Programs
1	Write a program to print "hello world" in C.
2	Write a program to insert a new line using \n.
3	Write a program to make a line Single-line comment.
4	Write a program to make a line multi-line comment.
5	Write a program to create a variableand assign values to variables.
6	Write a program to create a variableand assign values to variables using scanf() function.
7	Write a program toprint other types, use %c for char and %f for float.
8	Write a program to declare more than one variable of the same type.
9	Write a program to calculate the area of a rectangle.
10	Write a program to perform operations on variables and values (+ , - , *, / ,%).
11	Write a program to perform addition assignment operator (+=) adds a value to a variable
12	Write a program to find out if a person is old enough to vote using Scanf() function using if-else.
13	Write a program to check even or odd no using while loop in C.
14	Write a program to print 1 to 50 using do while loop in C.
15	Write a program to print 5 to 10 using for loop in C.
16	Write a program to print 1 to 5 using array in C.
17	Write a program to create structure in C.
18	Write a program to create union in C.
19	Write a program to using pointer in C.
20	Write a program to create user define function in C.

Software Lab using Python

BCA-152

L	T	P	Cr
0	0	4	2

Course Outcomes:

At the end of this course, Students will demonstrate the ability to:
CO1: Understand Python syntax, data types, and control structures for basic programming tasks.
CO2: Develop programs using functions, modules, and exception handling for modular coding.
CO3: Implement data structures like lists, tuples, dictionaries, and sets for effective data management.
CO4: Use file handling and regular expressions for processing and manipulating text data.
CO5: Apply object-oriented programming concepts to design and build real-world Python applications.

1. Write a program to demonstrate basic data type in python.
2. Demonstrate the working of following functions in Python.
   i) id( ) ii) type( ) iii) range( )
3. Create a list and perform the following methods
   (a) Insert (b) remove (c) append (d) pop (e) clear
4. Write a Python program to demonstrate various ways of accessing the string.
   i) By using Indexing (Both Positive and Negative) ii) By using Slice Operator
5. Create a tuple and perform the following methods.
   (a) Add items (b) len (c) Check for item in tuple (d) Access items
6. Demonstrate the following functions/methods which operates on dictionary in Python
   i) print dictionary items ii) len( ) iii) clear( ) iv) get( ) v) pop( ) vi) change values
7. Demonstrate the following Conditional statements in Python with suitable examples.
   i) if statement ii) if else statement iii) if – elif – else statement
8. write a program to print a number is positive/negative using while loop.
9. Write a program to demonstrate for loop in python.
10. Write Python program to demonstrate use of nested loop statements: print the following pattern

```
*
* *
* * *
* * * *
* * * * *
```

11. Demonstrate the following control transfer statements in Python with suitable examples.
    i) break ii) continue iii) pass
12. Write a Python program to perform read and write operations on a file.
13. Demonstrate the following kinds of Parameters used while writing functions in Python.
    i) Positional Parameters ii) Default Parameters iii)Keyword Parameters iv) Variable length Parameters
14. Write a python program to demonstrate inheritance.

English Communication lab

BCA 153

L	T	P	Cr
0	0	4	2

Course Outcomes:

At the end of this course, Students will demonstrate the ability to:
CO1: Develop listening skills through audio-visual materials and language lab activities.
CO2: Enhance speaking abilities with focus on pronunciation, intonation, and fluency.
CO3: Practice effective verbal communication through presentations, role plays, and group discussions.
CO4: Build confidence in public speaking and interpersonal communication.
CO5: Improve language proficiency using interactive exercises in grammar and vocabulary.

1	Self-Introduction and Group Interaction
2	Role Play: Telephone Etiquette
3	Debate: Discussing Current Issues
4	Storytelling Skills Development
5	Persuasive Speech Practice
6	Listening Comprehension: News Analysis
7	Group Discussion: Analyzing Advertisements
8	Job Interview Simulation
9	Film Scene Analysis and Discussion
10	Pronunciation Practice and Phonetics
11	Formal and Informal Letter Writing
12	Creative Writing: Dialogue Creation

English lab

BCA 153 A

L	T	P	Cr
0	0	4	2

Course Outcomes:

At the end of this course, Students will demonstrate the ability to:
CO1: Improve pronunciation, accent, and intonation through speech practice.
CO2: Develop listening comprehension using audio materials and lab tools.
CO3: Enhance speaking skills through conversations, role plays, and presentations.
CO4: Strengthen grammar, vocabulary, and sentence structure for effective communication.
CO5: Build confidence in using English for academic and professional interactions.

Practicals

1. Listening Skills

• The student should be able to listen to s text read aloud in normal speed with focus on intonation.

• After listening the student can fill-in-blanks, choose a suitable title, make a summary, supply required information and be able to answer comprehension questions from the passage read aloud.

2. Speaking Skill

• Reading aloud of dialogues, texts, poems, speeches focusing on intonation.

• Self-introduction • Role plays on any two-situations.

• Telephonic Conversations.

3. Personality Development

• Initiation

• Physical Appearance

• Audience Purpose

4. Interpersonal Skills

• Appropriate use of non-verbal skills in face to face communication [i.e. Viva –Voce, group – interviews, GDs and seminars.]

5. Presenting in GD, Seminars and Conferences.

• Leadership Quality

• Time Management

• Achieving the target

Technical Communication Lab

BCA 153 B

L	T	P	Cr
0	0	4	2

Course Outcomes:

At the end of this course, Students will demonstrate the ability to:
CO1: Develop proficiency in writing technical documents such as reports, manuals, and proposals.
CO2: Practice effective oral communication through presentations and technical discussions.
CO3: Use visual aids like charts and diagrams to support technical content clearly.
CO4: Enhance editing and proofreading skills for accuracy and clarity in documentation.
CO5: Apply technical writing principles to tailor content for specific audiences and purposes.

Interactive and Communicative Practical with emphasis on Oral Presentation/Spoken Communication based on International Phonetic Alphabets (I.P.A.)

LIST OF PRACTICALS

1. Group Discussion: Practical based on Accurate and Current Grammatical Patterns.

2. Conversational Skills for Interviews under suitable Professional Communication Lab conditions with emphasis on Kinesics.

3. Communication Skills for Seminars/Conferences/Workshops with emphasis on Paralinguistic /Kinesics.

4. Presentation Skills for Technical Paper/Project Reports/ Professional Reports based on proper Stress and Intonation Mechanics.

5. Official/Public Speaking based on suitable Rhythmic Patterns.

6. Theme- Presentation/Key-Note Presentation based on correct argumentation methodologies.

7. Individual Speech Delivery/Conferencing with skills to defend Interjections/Quizzes.

8. Argumentative Skills/Role Play Presentation with Stress and Intonation.

9. Comprehension Skills based on Reading and Listening Practical's on a model Audio-visual Usage.

Reference Books

1. Bansal R.K. & Harrison: A manual of Speech & Phonetics, Orient Black Swan Pvt. Ltd. New Delhi, 2010.

2. Sethi & Dhamija: A Course in Phonetics and Spoken English, Prentice Hall, New Delhi, 2011.

3. L.U.B.Pandey: Practical Communication-Process & Practice, A.I.T.B.S. Pub. India Ltd. Krishan Nagar, Delhi, 2013.

4. Joans Daniel, English Pronouncing Dictionary, Cambridge Univ. Press. 2007.

Human Values, Deaddiction and Traffic Rules Lab

BCA 153 C

L	T	P	Cr
0	0	4	2

Course Outcomes:

At the end of this course, Students will demonstrate the ability to:

CO1: Understand the importance of human values and ethics in personal and professional life.

CO2: Learn about the causes, effects, and prevention of substance abuse and addiction.

CO3: Develop awareness about responsible behavior and mental well-being.

CO4: Gain knowledge of traffic rules, signals, and the importance of road safety.

CO5: Promote responsible citizenship through discussions and activities on social and legal responsibilities.

Course Objectives:

- To install human values and ethics.
- To understand the impact of addiction and methods for deaddiction.
- To educate students on traffic rules and safe driving practices.

Module 1: Human Values

1. **Introduction to Human Values**
   - Definition and importance
   - Types of human values (e.g., honesty, respect, empathy)
2. **Ethics in Everyday Life**
   - Decision-making and moral dilemmas
   - Case studies and discussions
3. **Community Service**
   - Organizing and participating in community outreach programs
   - Reflective practices on service experiences

Module 2: Deaddiction

1. **Understanding Addiction**
   - Definition and types of addiction (substance and behavioral)
   - Psychological and social impacts of addiction
2. **Deaddiction Strategies**
   - Methods and approaches to deaddiction
   - Role of family and community support
3. **Workshops and Guest Lectures**
   - Inviting health professionals and recovering individuals
   - Interactive sessions on coping strategies

Module 3: Traffic Rules

1. **Introduction to Traffic Rules**
    - Importance of traffic regulations
    - Basic traffic signs and signals
2. **Road Safety Practices**
    - Safe driving techniques
    - Pedestrian safety and awareness
3. **Practical Lab Sessions**
    - Simulated driving scenarios (using simulators or practical demonstrations)
    - Role-playing exercises for emergency situations

Assessment and Evaluation

- Participation in discussions and activities
- Practical assessments (lab performance)
- Group projects or presentations on chosen topics

Additional Resources

- Recommended readings and online resources
- Community organizations related to deaddiction and road safety

Seminar Based on Learning

BCA- 154

L	T	P	Cr
0	0	4	2

Course Outcomes:

At the end of this course, Students will demonstrate the ability to:
CO1: Enhance research skills by exploring topics relevant to academic and professional fields.
CO2: Develop effective presentation and public speaking abilities.
CO3: Foster critical thinking through analysis and interpretation of information.
CO4: Improve confidence and communication through structured seminar delivery.
CO5: Encourage peer learning and feedback through group interactions and discussions.

- **Educational technology**

  A common topic at EdCamps, this includes practical examples of using modern tools in the classroom and how to solve problems that technology can cause.

- **Current events**

  Students can track current events and create a news show or podcast about them.

- **Artificial intelligence**

  Seminars can help you learn about responsible AI development and deployment, and build a professional network.

- **Case studies and debates**

  These activities can help students engage with the material and develop communication, critical analysis, and teamwork skills.

- **Classroom management**

  This includes strategies and techniques for creating a learning environment that reduces disruptions.

- **Global issues in education and research**

  This can include topics such as the impact of crisis on education, ethical issues in education, and technology in teaching and learning.

- **Psychology**
  This includes core areas such as biological, cognitive, developmental, social, and individual differences.

Object Oriented Programming System Using C++

BCA-201

L	T	P	Cr
4	0	0	4

Course Outcomes:

At the end of this course, Students will demonstrate the ability to:
CO1: Understand OOP concepts and differences between procedural and object-oriented programming.
CO2: Work with control structures, arrays, pointers, structures, and functions in C++.
CO3: Learn about classes, objects, constructors, destructors, and operator overloading.
CO4: Implement inheritance, polymorphism, and virtual functions in C++.
CO5: Perform file handling operations and manage I/O in C++.

UNIT 1

Introduction to Object Oriented Programming: Basic concept of OOP, Comparison of Procedural Programming and OOP, Benefits of OOP,C++ compilation, Difference betweenC and C++, **Tokens and identifiers:** Character set and symbols, Keywords, C++ identifiers, Variables andConstants, Integer, character and symbolic constants; Dynamic initialization of variables,Reference variables, Basic data types in C++, Streams in C++, Operators, Types of operators in C++, Precedence and associativity of operators, Manipulators.

UNIT 2

Decision and Control Structures: if statement, if-else statement, switch statement, Loop: while, do-while, for; Jump statements:break, continue, go to, Array, Pointer and StructureArrays, pointers, structures, unions;Functions, main() function, components of function: prototype, function call, definition, parameter;passing arguments; types of function, inline function, function overloading.**Classes and Objects:** Classes in C++, class declaration, declaring objects, Defining Member functions, Inlinemember function, Array of objects, Objects as function argument, Static data member andmember function, Friend function and friend class.

UNIT 3

Constructors and Destructors: Constructors, Instantiation of objects, Default constructor, Parameterized constructor, Copyconstructor and its use, Destructors, Constraints on constructors and destructors, Dynamicinitialization of objects.**Operator Overloading:** Overloading unary operators: Operator keyword, arguments and return value; overloadingunary and binary operators: arithmetic operators, manipulation of strings using operators;Type conversions.

UNIT 4

Inheritance and Polymorphism: Derived class and base class, Defining a derived class, Accessing the base class member,**Inheritance:** multilevel, multiple, hierarchical, hybrid; Virtual base class, Abstract class, Virtual Functions and Polymorphism, Virtual functions, pure virtual functions; **Polymorphism:** Categorization of polymorphismtechniques: Compile time polymorphism, Run time polymorphism

UNIT 5

File Handling: File classes, Opening and Closing a file, File modes, Manipulation of file pointers, Functionsfor I/O operations.

BOOKS SUGGESTED

1) E. Balaguruswami – Object Oriented programming with C++
2) Kris James – Success with C++
3) David Parsons – Object Oriented programming with C++

Database Management Systems

BCA-202

L	T	P	Cr
4	0	0	4

Course Outcomes:

At the end of this course, Students will demonstrate the ability to:
CO1: Grasp fundamental DBMS concepts, architecture, and data modeling.
CO2: Understand relational databases, relational algebra, and relational calculus.
CO3: Master normalization (1NF to 5NF) and de-normalization techniques.
CO4: Learn indexing, transaction management, and concurrency control.
CO5: Develop proficiency in SQL, PL/SQL, and database implementation techniques.

UNIT-I

Database Concepts:
Data, Database and DBMS, Comparison between traditional file V/s DBMS, Characteristics of detain database, Components of database system environment, Functions of DBMS, Advantages and disadvantages of the DBMS, DBMS users, Database administrator, Role of DBA, 3-schema architecture, Database development process - conceptual data modelling, logical database design, physical database design, database implementation, database maintenance.

UNIT-II

Database Analysis: Conceptual data modelling using E-R data model -entities, attributes, relationships, generalization, specialization, specifying constraints, 5-6 practical problems based on E-R data model.

UNIT-III

Relational Database: Relational data model: Introduction to relational database theory: definition of relation, relational model integrity rules, relational algebra and relational calculus.
Relational Database Design: Normalization- 1NF, 2NF, 3NF, BCNF, 4NF and 5NF. Concept of De-normalization and practical problems based on these forms.

UNIT-IV

Indexing of Data: Impact of indices on query performance, basic structure of an index, creating indexes with SQL, Types of Indexing and its data structures.
Transaction Management and Concurrency Control: Transaction, Concurrency control, Concurrency control with locking Methods, Concurrency control with time stamping methods, Concurrency control with optimistic methods, database recovery management.

UNIT-V

Database Implementation: Introduction to SQL, DDL aspect of SQL, DML aspect of SQL – Update, insert, delete & various form of SELECT- simple, using special operators, aggregate Functions, group by clause, sub query, joins, co-related sub query, union clause, exist operator. PL/SQL - cursor, stored function, stored procedure, triggers, error handling, and package.

Text Books:

1. Silverschatz A., Korth F. H. and Sudarshan S., Database System Concepts, Tata McGrawHill (2010) 6th ed.
2. Elmasri R. and Navathe B. S., Fundamentals of Database Systems, Pearson (2016) 7th ed.

Reference Books:

1. Bayross I., SQL, PL/SQL the Programming Language of Oracle, BPB Publications (2009)4th ed.
2. Hoffer J., Venkataraman, R. and Topi, H., Modern Database Management, Pearson (2016)12th ed.

Web and E-Commerce Technologies

BCA-203

L	T	P	Cr
4	0	0	4

Course Outcomes:

At the end of this course, Students will demonstrate the ability to:
CO1: Understand the basics of e-commerce, its applications, and business models.
CO2: Learn how to build and promote websites and understand web design principles.
CO3: Study internet security, encryption, decryption, and privacy measures.
CO4: Understand Electronic Data Exchange (EDI) and electronic payment systems.
CO5: Explore planning for e-commerce, internet marketing, and e-governance.

UNIT-I

An introduction to Electronic commerce: What is E-Commerce (Introduction and Definition), Main activities E-Commerce, Goals of E-Commerce, Technical Components of E-Commerce, Functions of E-Commerce, Advantages and disadvantages of E-Commerce, Scope of E-Commerce, Electronic Commerce Applications, Electronic Commerce and Electronic Business(C2C)(2G, G2G, B2G, B2P,B2A, P2P, B2A, C2A, B2B, B2C)

UNIT-II

Building Own Website: Reasons for building own website, Benefits of Website, Cost, Time, Reach, Registering a Domain Name, Web promotion, Target email, Baner Exchange, Shopping Bots

UNIT-III

Internet Security: Secure Transaction, Computer Monitoring, Privacy on Internet, Corporate Email privacy, Computer Crime(Laws, Types of Crimes), Threats, Attack on Computer System, Software Packages for privacy, Hacking, Computer Virus(How it spreads, Virus problem, virus protection, Encryption and Decryption, Secret key Cryptography, DES, Public Key Encryption, RSA ,Authorisation and Authentication, Firewall, Digital Signature(How it Works)

UNIT-IV

Electronic Data Exchange: Introduction, Concepts of EDI and Limitation, Applications of EDI, Disadvantages of EDI, EDI model, Electronic Payment System, Types of Electronic Payment System, Payment Types, Traditional Payment, Value Exchange System, Credit Card System, Electronic Fund Transfer, Paperless bill, Modern Payment Cash, Electronic Cash

UNIT-V

Planning for Electronic Commerce: Planning Electronic Commerce initiates, Linking objectives to business strategies, Measuring cost objectives, Comparing benefits to Costs, Strategies for developing electronic commerce web sites, Internet Marketing, The PROS and CONS of online shopping, The cons of online shopping, Justify an Internet business, Internet marketing techniques, The E-cycle of Internet marketing, Personalisation e-commerce.
E – Governance for India: Governance of India, Indian customer EDI System, Service centre, Imports, Exports.

Recommended Books :

1. E-Commerce Concepts, Models, Strategies- :- G.S.V.Murthy Himalaya Publishing House
2. E- Commerce :- Kamlesh K Bajaj and Debjani Nag
3. Electronic commerce :- Gray P. Schneider
4. E-Commerce, Fundamentals &Applications : Chand (Wiley)

Discrete Structures

BCA-204

L	T	P	Cr
4	0	0	4

Course Outcomes:

At the end of this course, Students will demonstrate the ability to:
CO1: Learn propositional logic, truth tables, and proof techniques.
CO2: Understand set theory, relations, functions, and partially ordered sets.
CO3: Explore graph theory, including types of graphs, paths, and circuits.
CO4: Study trees, binary trees, traversal, and spanning trees.
CO5: Learn lattice theory, including bounded lattices and duals.

UNIT-I

Propositional logic: Logical connectives, Truth tables, Normal forms, Proof Techniques: Notions of implication, equivalence converse, inverse, contra positive, negation, and contradiction.

UNIT-II

Set Theory: Introduction, Combination of sets, Multisets, Orderedpairs. Proofs of some general identities on sets. **Relations:** Definition,Operations on relations, Properties of relations, Composite Relations, Order ofrelations.**Functions:**Definition,Classificationoffunctions,Operations on functions, Partially Ordered Set, Totally Ordered Set, Hasse Diagram, Minimal and Maximal Elements, Upper Bound and Lower Bound, Infimum & Suprimum

UNIT-III

Graphs Theory: Representation, Type of Graphs, Paths and Circuits: Euler Graphs, Hamiltonian Paths & Circuits; Definition and terminology, Representationof graphs, Multigraphs, Bipartite graphs, Planar graphs,Isomorphism and Homeomorphism of graphs.

UNIT-IV

Trees: Definition, Binary tree, Binary tree traversal, Binarysearch tree, Cut-sets, Connectivity and Separability, Isomorphism.

UNIT-V

Lattice: Lattice as a poset, Bounded Lattice, Lattice as algebraic system, Dual of a lattice, Complete Lattice

Text Books: 1. Rosen, K.H., Discrete Mathematics and its Applications, McGraw Hill (2011), 7th ed. 2. Tremblay, J.P. and Manohar R., "Discrete Mathematical Structures with Applications to Computer Science", Tata McGraw Hill (2007), 1st ed.

Reference Books: 1. Haggard G., Schlipf J. and Whitesides, Sue, Discrete Mathematics for Computer Science, Cengage Learning, (2008), 2nd ed. 2. Johnsonbaugh R., Discrete Mathematics, Pearson Education, (2007), 7th edt

Set Theory

BCA-204 A

L	T	P	Cr
4	0	0	4

Course Outcomes:

At the end of this course, Students will demonstrate the ability to:

1. A set is a collection of distinct elements.
2. Set operations include union (∪), intersection (∩), and complement (').
3. Venn diagrams visually represent set relationships.
4. Set laws include commutative, associative, and distributive properties.
5. The power set contains all subsets, and the Cartesian product forms ordered pairs.

Unit 1: Introduction to Set Theory

Definition of sets and elements, Notation and terminology (subsets, proper subsets),Venn diagrams and visual representations of sets, Operations on sets (union, intersection, difference, complement),Cartesian products

Unit 2: Types of Sets and Functions

Finite vs. infinite sets, Countable and uncountable sets, Power sets, Introduction to functions (one-to-one, onto, bisections),Relationships between sets and functions

Unit 3: Relations and Cardinality

Definitions and examples of relations, Properties of relations (reflexivity, symmetry, transitivity),Equivalence relations and partitions, Cardinality: comparing sizes of sets, Cantor's theorem and the concept of infinity

Unit 4: Axiomatic Set Theory

Introduction to axiomatic systems, Zermelo-Fraenkel set theory (ZF) and the Axiom of Choice (AC),Basic axioms and their implications, Alternative set theories (e.g., Von Neumann-Bernays-Gödel set theory),Paradoxes in set theory (Russell's paradox, Burali-Forti paradox)

Unit 5: Applications and Advanced Topics

Applications of set theory in mathematics and computer science, Fuzzy sets and their applications, Set theory in probability and statistics, Introduction to ordinal and cardinal numbers, Discussion of open problems and recent developments in set theory

Graph Theory

BCA-204 B

L	T	P	Cr
4	0	0	4

Course Outcomes:

At the end of this course, Students will demonstrate the ability to:

1. A graph consists of vertices (nodes) and edges (connections between nodes).
2. Types of graphs include undirected, directed, weighted, and unweighted graphs.
3. Degree of a vertex is the number of edges incident to it.
4. Path in a graph is a sequence of vertices connected by edges.
5. A tree is a connected acyclic graph, and a cycle is a closed path in a graph.

UNIT-I what is graph Application of graphs, Finite and Infinite graphs, Incidence & Degree, Isolated vertex, Pendant Vertex, and Null Graph.
UNIT-II Isomorphism, Sub graphs, A puzzle with multicolored Cubes, walks, Path, and circuits connected graph, Disconnected graphs and Components, Euler graphs, Operations on graphs more on Euler Graphs, Hamiltonian paths and circles.

UNIT-III Tree, some properties of trees, pendant Vertices in a tree, Distance and centers in a tree Rooted and Binary trees, Spanning trees, fundamental circuits, Finding all spanning tree of a graph.

UNIT-IV Cut-Sete, Some Properties of Cut-Set, All Cut-Sets in a graph, Path-Sets, some properties of paths sets in a graph, fundamental Circuits & Cut-Set, Connectively and separability. Directed graph, undirected graph. Matrix representation of graph.

Text Books:

1. NarsinghDeo, "Graph Theory", Prentice Hall of India

Discrete Probability

BCA-204 C

L	T	P	Cr
4	0	0	4

Course Outcomes:

At the end of this course, Students will demonstrate the ability to:

1. Understand basic probability concepts, events, and probability rules.
2. Learn mathematical expectation, variance, and properties of random variables.
3. Study discrete distributions such as Poisson and hypergeometric distributions.
4. Explore negative binomial and geometric distributions.
5. Apply probability theory and distributions to solve related problems.

UNIT 1:- PROBABILITY; Introduction to Probability, Terms Used in Probability Random Experiment Sample Space Event and Definition of Various Events, Mathematical, Statistical and Axiomatic Definitions of Probability, Addition Rule, Multiplication Rule and Sub Rules of the Probability (Without Proof), Conditional Probability, Bayes' theorem (without proof) and its application up to three events, Simple numerical examples based on the above concepts 25%

UNIT 2:- MATHEMATICAL EXPECTATION (For Discrete Random Variable), Meaning of Discrete Random variable, Meaning of Probability Distribution, Meaning of Mathematical Expectation Properties of Mathematical Expectation (Without Proof), Variance of a Discrete Random Variable Properties of Variance (without proof), Mean and Variance of Linear Combination of Two Independent Variables, Examples based on the above Concepts 25%

UNIT 3:- DISCRETE DISTRIBUTIONS -I ; Concept of Probability Mass Function , Introduction to Poisson Distribution Properties and Uses of Poisson Distribution , Introduction to Hyper geometric Distribution Properties and Uses of Hyper geometric Distribution , Examples Related to these Distributions 25%

UNIT 4 :- DISCRETE DISTRIBUTIONS -II ; Introduction to Negative Binomial Distribution Properties and Uses of Negative Binomial Distribution 25% ŧWĂŐĞ , Geometric Distribution Properties and Uses of Geometric Distribution , Examples Related to these Distributions

REFERENCE BOOKS 1. "Introduction to Probability and Mathematical Statistics" by PrasannaSahoo (published by CRC Press) 2. "Probability and Statistics" by T.K. V. Iyengar (published by S. Chand Publishing) 3. "Fundamentals of Probability, with Stochastic Processes" by Saeed Ghahramani (published by PHI Learning Private Limited) 4. "Probability and Random Processes" by S.V. Prabhu and P.G. Sankaran (published by John Wiley & Sons India Pvt. Ltd.) 5. "A First Course in Probability and Statistics" by B.L.S. Prakasa Rao (published by Universities Press)

Environmental Studies

BCA-205

L	T	P	Cr
4	0	0	4

Course Outcomes:
At the end of this course, Students will demonstrate the ability to:

1. Understand the causes and impacts of environmental pollution, including air, water, and land pollution.
2. Learn the structure, function, and dynamics of ecosystems, as well as energy flow in natural systems.
3. Gain knowledge about the sustainable use of natural resources and the relationship between human and environmental resources.
4. Analyze the environmental effects of agricultural and industrial systems and their interactions with natural ecosystems.
5. Explore various energy technologies and their environmental impact, with a focus on sustainable energy sources.

UNIT-I
Environment pollution, global warming and climate change: Air pollution (local, regional and global); Water pollution problems; Land pollution and food chain contaminations; Carbon cycle, greenhouse gases and global warming; Climate change – causes and consequences; Carbon footprint; Management of greenhouse gases at the source and at the sinks.

UNIT-II
Ecology, Structure and functioning of natural ecosystems: Ecology, ecosystems and their structure, functioning and dynamics; Energy flow in ecosystems;Biogeochemical cycles and climate; Population and communities.

UNIT-III
Natural resources: Human settlements and resource consumption; Biological, mineral and energy resources; Land, water and air; Natural resources vis-à-vis human resources and technological resources; Concept of sustainability; Sustainable use of natural resources.

UNIT-IV
Agricultural, industrial systems and environment: Agricultural and industrial systems visà-vis natural ecosystems; Agricultural systems, and environment and natural resources; Industrial systems and environment.

UNIT-V
Energy technologies and environment: Electrical energy and steam energy; Fossil fuels, hydropower and nuclear energy; Solar energy, wind energy and biofuels; Wave, ocean thermal, tidalenergy and ocean currents; Geothermal energy; Future energy sources; Hydrogen fuels; Sustainable energy.

Text Books: Bharucha, E., Textbook of Environmental Studies, Universities Press (2005). Chapman, J.L. and Reiss, M.J., Ecology-Principles and Application, Cambridge University Press (LPE) (1999). Joseph, B., Environmental Studies, Tata McGraw-Hill (2006).

Reference Books: Miller, G.T., Environmental Science- Working with Earth, Thomson (2006). Wright, R.T., Environmental Science-Towards a sustainable Future, Prentice Hall (2008) 9th ed.

Environmental Science

BCA-205 A

L	T	P	Cr
4	0	0	4

Course Outcomes:
At the end of this course, Students will demonstrate the ability to:

1. Understand the multidisciplinary nature and importance of environmental studies, and the need for public awareness.
2. Study the exploitation and conservation issues surrounding forest and water resources, including their overuse.
3. Learn the structure and function of various ecosystems and their energy flow, along with ecological succession.
4. Explore the concept of biodiversity and its conservation through in-situ and ex-situ methods, focusing on endangered species.
5. Investigate environmental pollution, its causes, and effects, including case studies on air, water, and soil pollution.

UNIT-1: THE MULTIDISCIPLINARY NATURE OF ENVIRONMENTAL STUDIES
Definition, Scope and Importance, Need for Public Awareness.

UNIT-2: NATURAL RESOURCES: - Renewable and Non-renewable Resources: Natural resources and associated problems: - a) FOREST RESOURCES: use and over-exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forests and tribal people.

b) WATER RESOURCES: use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems.

UNIT-3: ECOSYSTEMS:- Concept of an ecosystem, Structure and function of an ecosystem, Producers, consumers and decomposers, Energy flow in the ecosystem, Ecological succession, Food chains, food webs and ecological pyramids, Introduction, types, characteristic features, structure and function of the following ecosystem: - a) Forest ecosystem b) Grassland ecosystem c) Desert ecosystem d) Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)

UNIT-4: BIODIVERSITY AND ITS CONSERVATION :-Introduction – Definition: genetic, species and ecosystem diversity, Bio geographical classification of India, Value of biodiversity: Consumptive use, productive use, social, ethical, and aesthetic and option values, Biodiversity at global, National and local levels, India as a mega-diversity nation ,Hot-sports of biodiversity, Threats to biodiversity: Habitat loss, poaching of wildlife, man-wildlife conflicts, Endangered and endemic species of India, Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.

UNIT-5: ENVIRONMENTAL POLLUTION DEFINITION: Causes, effects and control measures of: - a) Air pollution b) Water pollution c) Soil pollution d) Marine pollution e) Noise pollution f) Thermal pollution g) Nuclear pollution, Solid waste Management: Causes, effects and control measures of urban and industrial wastes, Role of an individual in prevention of pollution, Pollution case studies, Disaster Management: Floods, earthquake, cyclone and landslides.

TEXT BOOKS:-

1."Environmental Studies: From Crisis to Cure":- Author: R. Rajagopalan, Publisher: Oxford University Press
2."Environmental Studies":- Author: ErachBharucha, Publisher: University Grants Commission (UGC)
3. "Textbook of Environmental Studies for Undergraduate Courses":- Authors: Benny Joseph, Publisher: McGraw Hill Education
4. "Environmental Science: A Global Concern":- Authors: William P. Cunningham, Mary Ann Cunningham, Publisher: McGraw-Hill

Natural Resource Management

BCA-205 B

L	T	P	Cr
4	0	0	4

Course Outcomes:
At the end of this course, Students will demonstrate the ability to:

1. Understand the types of natural resources, their renewable and non-renewable nature, and human impact on these resources.
2. Learn about land degradation, desertification, soil erosion, and the reclamation and management of wastelands.
3. Study various energy resources and their environmental impacts, focusing on sustainable energy options like solar, wind, and biomass.
4. Examine forest resources, the impact of deforestation, and the management practices for sustainable forestry.
5. Understand the intersection of economics, development, and natural resource conservation, including ecotourism and sustainable fisheries management.

UNIT 1: Resources: Types, Renewable & non-renewable resources; resource degradation and conservation; Human impact on natural resources.
Land resources: Land degradation and desertification; Soil erosion and control; reclamation & management of waste lands with special reference to India.
Water resources: Pools of water and hydrological cycle; Surface water, ground water, Human use of freshwater. Rain water harvesting; watershed management

UNIT 2:- Energy resources: Fossil fuels, nuclear energy, solar energy, wind energy, tidal energy, geothermal energy, and hydropower. Global energy consumption; Environmental impacts of various forms of energy use.
Hydrogen as a source of energy, energy from biomass, bioconversion technology, energy plantations and petro-crops. Bioenergy-Prospects in India.
Mineral resource conservation & recycling, bacterial leaching of metals from low grade ores.

UNIT 3:- Forest resources: Forests, their importance, types, global distribution; primary and secondary products, forest resources of India. Impact of deforestation; Sustainable forest Forest Management.
Range lands: Types, uses, grassland types and management in India.
Medicinal plant resources and bioprospecting-a brief account.
Fisheries and Marine resources- a general account; aquaculture

UNIT 4: Economics, environment and development: Economic categories of resources; the market, environment and natural resources; the economics theory- market, demand and supply relationships.

The limit of growth; cost benefit ratio; natural resources accounting; market based mechanisms for environmental protection.

Economically sustainable forest management designs- green certification, resource conservation, community forest management; ecotourism.

Economic efficient model of sustainable fisheries; designs for renewable energy resources.

TEXT BOOKS:-

1. "Natural Resource Management for Sustainable Development": -Author: B.D. Dhawan, Focus: Sustainable development and conservation strategies in natural resource management.
2. "Integrated Watershed Management: Principles and Practice":- Authors: Isobel W. Heathcote
3. "Natural Resource and Environmental Economics":-Authors: Roger Perman, Yue Ma, Michael Common, David Maddison, James McGilvray
4."Principles of Environmental and Resource Economics":-Authors: HenkFolmer, Landis Gabel, Shelby Gerking, Adam Rose
5. "Natural Resource Management: The Human Dimensions":- Authors: Alan W. Ewert, Deborah J. Chavez, Arthur W. Magill

Pollution Control

BCA-205 C

L	T	P	Cr
4	0	0	4

Course Outcomes:
At the end of this course, Students will demonstrate the ability to:

1. Understand the types, causes, and effects of pollution, including air, water, soil, and noise pollution.
2. Learn methods of controlling air pollution, including filtration, electrostatic precipitators, and catalytic converters.
3. Gain knowledge on water and wastewater treatment processes, including coagulation, filtration, and disinfection techniques.
4. Study solid waste management practices, such as waste reduction, recycling, and disposal methods, as well as noise pollution control.
5. Explore environmental policies, sustainable development, and the role of renewable energy in pollution control.

Unit 1: Introduction to Pollution and Environmental Issues
Definition and Types of Pollution:-Air Pollution, Water Pollution, Soil Pollution, Noise Pollution, Thermal Pollution
Sources and Causes of Pollution:-Natural vs. Anthropogenic sources
Impacts of Pollution on Environment and Human Health
Global Environmental Issues:-Ozone depletion, Global warming, Acid rain, Eutrophication

Unit 2: Air Pollution Control
Air Pollutants:-Types (Particulate matter, gases, etc.), Primary vs. Secondary pollutants
Sources and Health Effects of Air Pollutants
Air Quality Standards: -WHO and National Standards, Monitoring Air Quality
Air Pollution Control Technologies:-Filtration (Cyclones, bag filters), Electrostatic precipitators, Scrubbers (Wet and dry), Catalytic converters

Unit 3: Water and Wastewater Treatment
Water Pollution:-Sources (Industrial, domestic, agricultural), Types of water pollutants (Physical, chemical, biological)
Water Quality Standards and Monitoring
Water Treatment Processes:-Coagulation and flocculation, Filtration
Sedimentation, Disinfection methods (Chlorination, UV, ozone)
Wastewater Treatment Techniques:-Primary, Secondary, and Tertiary treatments, Biological processes (Activated sludge, trickling filters), Advanced treatment (Membrane filtration, adsorption)

Unit 4: Solid Waste Management and Noise Pollution Control
Solid Waste Management:-Types of Solid Waste (Municipal, Industrial, Hazardous), Collection, transportation, and disposal of solid waste, Waste reduction and recycling, Landfills and composting, Incineration and waste-to-energy technologies
Noise Pollution:- Sources of Noise Pollution, Effects on Human Health and Environment, Noise Measurement and Control Methods, Soundproofing, barriers, and zoning

Unit 5: Environmental Policies and Sustainable Development

Environmental Legislation and Policies:-National Environmental Policies, International Conventions and Protocols (Kyoto Protocol, Paris Agreement)

Environmental Impact Assessment (EIA):- Process and Importance, Case Studies

Sustainable Development:-Principles of sustainability, Role of renewable energy in pollution control, Green technologies and innovations, Circular Economy concepts (Reduce, Reuse, Recycle)

TEXT BOOKS:-

1. Air Pollution Control Engineering:-Author: Noel De Nevers, Publisher: McGraw-Hill
2. Wastewater Engineering: Treatment and Reuse:-Authors: Metcalf & Eddy, George, chobanoglous, Publisher: McGraw-Hill
3. Environmental Pollution Control Engineering:-Author: C.S. Rao, Publisher: New Age International Publishers
4. Solid Waste Management:-Authors: K. Sasi kumar, Sanoop Gopi Krishna, Publisher: PHI Learning Pvt. Ltd.

OOPS Using C++ Lab

BCA-251

L	T	P	Cr
0	0	4	2

Course Outcomes:
At the end of this course, Students will demonstrate the ability to:

1. Understand the fundamental concepts of object-oriented programming using C++.
2. Implement classes, objects, inheritance, polymorphism, and encapsulation in C++ programs.
3. Develop modular and reusable code using constructors, destructors, and operator overloading.
4. Apply file handling techniques for data storage and retrieval in C++.
5. Debug, test, and document object-oriented applications for real-world problem solving.

S.N	PRACTICAL PROGRAMS FILE
1	Write a program to print "HELLO" in C++.
2	Write a program to addition of two numbers using C++.
3	Write a program to find factorial number of 5 in C++.
4	Write a program to Find Simple Interest in C++.
5	Write a program to Check Even or Odd Integers using if and else in C++.
6	Write a program to print 1 to 10 using array in C++.
7	Write a program to create function overloading in C++.
8	Write a program to print 20 to 1 using while loop in C++.
9	Write a program to using single inheritance in ++.
10	Write a program to create private function and call using C++.
11	Write a program to create default constructor in C++.
12	Write a program to using friend function in C++.
13	Write a program to create function overriding in C++.
14	Write a program to print matrix in C++.
15	Write a program to print addition of a single dimensional array in C++
16	Write a program to check even or odd using for loop in C++.
17	Write a program to print 1 to 20 using do while loop in C++
18	Write a program to using switch case in C++;
19	Write a program to find multilevel inheritance in C++.
20	Write a program to create operator overloading in C++.

DBMS Lab

BCA-252

L	T	P	Cr
0	0	4	2

Course Outcomes:
At the end of this course, Students will demonstrate the ability to:

1. Understand the fundamentals of relational databases and SQL for data management.
2. Develop skills in designing and implementing database schemas and normalization.
3. Execute SQL queries for data manipulation, retrieval, and transaction management.
4. Implement database security features like user authentication and access control.
5. Use database management systems (DBMS) tools to optimize database performance and troubleshoot issues.

List of Experiments:

1. Introduction SQL-SQL*Plus
2. Road way travels E-R Diagrams
3. Various Data Types
4. Tables
5. My SQL Installation
6. DDL and DML Commands with Examples
7. Key Constrains-Normalization
8. Aggregate functions
9. Joins
10. Views
11. Index
12. PL/ SQL
13. Exception handling
14. Triggers
15. Cursors
16. Subprograms-procedure PL/ SQL
17. Functions of PL/ SQL

Seminar Based on Learning

BCA-253

L	T	P	Cr
0	0	4	2

Course Outcomes:
At the end of this course, Students will demonstrate the ability to:

1. Develop research skills by selecting, analyzing, and presenting a relevant topic.
2. Enhance public speaking abilities through structured seminar presentations.
3. Improve critical thinking by evaluating and synthesizing information from various sources.
4. Encourage peer-to-peer learning through discussions, feedback, and knowledge sharing.
5. Foster confidence in communicating complex ideas in an engaging and understandable manner.

- **Educational technology**

  A common topic at EdCamps, this includes practical examples of using modern tools in the classroom and how to solve problems that technology can cause.

- **Current events**

  Students can track current events and create a news show or podcast about them.

- **Artificial intelligence**

  Seminars can help you learn about responsible AI development and deployment, and build a professional network.

- **Case studies and debates**

  These activities can help students engage with the material and develop communication, critical analysis, and teamwork skills.

- **Classroom management**

  This includes strategies and techniques for creating a learning environment that reduces disruptions.

Operating Systems

BCA-301

L	T	P	Cr
4	0	0	4

Course Outcomes:
At the end of this course, Students will demonstrate the ability to:

1. Understand the fundamentals of operating systems and their functions.
2. Learn process management and CPU scheduling algorithms.
3. Analyze deadlock prevention, avoidance, and recovery methods.
4. Grasp memory management techniques like paging and fragmentation.
5. Learn file and device management, along with disk scheduling.

UNIT-I
Introduction to the Operating System (OS), Types of Operating System: Batch System, Time Sharing System, Real Time System. Multi Programming, Distributed System, Functions and Services of OS.

UNIT - II
Process Management: Process Concept, Process State, Process Control Block, ProcessScheduling, CPU Scheduling - Scheduling Criteria, Scheduling Algorithms, Pre-emptive &Non-Preemptive Scheduling.

UNIT - III
Deadlocks-System model, Characterization, Deadlock Prevention, Deadlock Avoidance andDetection, Recovery from deadlock.

UNIT - IV
Memory Management: Logical Address, Physical Address, External and Internal Fragmentation.Concept of paging, Page table structure - Hierarchical Paging, Hashed Page Tables, Inverted PageTable.

UNIT -V
Information Management: File Concept, Access Methods, Directory Structure. DeviceManagement: Disk Structure, Disk Scheduling Algorithms.

Text Books:

1. Silbershatz and Galvin," Operating System Concept", Addition We seley, 2002.
2. Nutt, G., "Operating Systems", Addison-Wesley.
3. GodboleAhyut, "Operating System", PHI, 2003.

Reference Books:

1. Flynn, Mchoes, "Understanding Operating System", Thomson Press, Third Edition, 2003
2. Tannenbaum,"Operating System Concept", Addition Weseley, 2002.
3. Joshi, R. C. and Tapaswi, S., "Operating Systems", Wiley Dreamtech.

HTML, DHTML and CSS Programming

BCA-302

L	T	P	Cr
4	0	0	4

Course Outcomes:
At the end of this course, Students will demonstrate the ability to:

1. Master HTML tags, text formatting, and creating web page structures.
2. Understand the use of tables, frames, and hyperlinks in web pages.
3. Learn CSS to style text, backgrounds, borders, and layout.
4. Gain knowledge of JavaScript for enhancing webpage behavior.
5. Understand web hosting, domain registration, and FTP for website deployment.

UNIT-I

Introduction: Overview of HTML, need of HTML, Use of it,HTML Tags: concept of Tag, types of HTML tags, structure of HTML program, Text formatting through HTML: Paragraph breaks, line breaks, background and BGcolorattributes, Emphasizing material in a web page: Heading styles, drawing lines, text styles, Text styles and other text effects-centering, spacing, controlling font size &color, Lists: Using unordered, ordered, definition listsAdding Graphics To HTML Documents: Using Image tag, attributes of Image tag, changing width& height of image

UNIT-II
Tables, Frames and Linking Documents: Handling Tables: To define header rows & data rows, use of table tag and its attributes. Use ofcaption tagLinking Documents: Concept of hyperlink, types of hyperlinks, linking to the beginning ofdocument, linking to a particular location in a document, Images as hyperlinksFrames: Introduction To frames, using frames & frameset tags, named frames how to fix the sizeof a frame, targeting named frames.

UNIT-III
Introduction to CSS: Introducing CSS, font attributes, color and background attributes, textattributes, border attributes, margin related attributes, list attributes Using class and span tag,External Style Sheets, Creating Divs with ID style, Creating Tag& Class style, creating borders, Navigation links,creating effects with CSS.

UNIT-IV
Introduction to JavaScript:use of JavaScript in web pages. Understand JavaScript event model,use some basic event and control webpage behavior.Variable declaration, Operators, , ControlStatements, Error Handling, Understanding arrays, Function Declaration,Built In Functions,Standard Date and Time Functions,Working with Objects, Call method in JavaScript.

UNIT-V
Web hosting - what is domain? Introduction to DNS, how to register a domain ?, what is webhosting ?, how to get a web hosting ?, host your website on web server.FTP - FTP introduction, FTP commands viewing files and directories, FTP commands transferand rename files, FTP with WS FTP/ CuteFTP, Filezilla on Windows.

References:

1. HTML and CSS, Jon Duckett, John Wiely, 2012
2. Achyut S Godbole and AtulKahate, "Web Technologies", Tata McGraw Hill
3. Gopalan N P, Akilandeswari "Web Technology: a Developer S Perspective", PHI
4. H.M. Deitel, P.J. Deitel, a.B. Goldberg-Internet & World Wide Web How to Program,Pearson Education, 3rd Edition,
5. C. Xavier, "Web Technology &Design ", Tata McGraw Hill.
6. Ivan Bay Ross, "HTML,DHTML,JavaScript,Perl CGI", BPB.
7. Web Technologies, Black Book, Dreamtech Press
8. HTML 5, Black Book, Dreamtech Press
9. Joel Sklar -Web Design,, Cengage Learning
10. Harwani-Developing Web Applications in PHP and Ajax, Mcgrawhill
11. Learn HTML IN A Weekend By Steven E. Callihan, PHI

Theory of Computation

BCA-303

L	T	P	Cr
4	0	0	4

Course Objectives:

The objectives of this course are to:

1. Introduce the student to the concepts of theory of computation in computer science.
2. Acquire insights into the relationship among formal languages, formal grammars, and automata.
3. Learn to design automats and Turing machine.

Course Outcomes:
At the end of this course, Students will demonstrate the ability to:

1. Understand DFA, NFA, and their equivalence, and apply automata theory.
2. Learn about regular languages, regular expressions, and pumping lemma.
3. Grasp context-free grammars and their applications in push-down automata.
4. Study Turing machines and their variations for problem-solving.
5. Analyze the concept of uncomputability and unsolvable problems.

Unit-I

Introduction: Alphabets, Strings and Languages; Automata and Grammars, Deterministic finite Automata (DFA)- Formal Definition, Simplified notation: State transition graph, Transition table, Language of DFA, Non deterministic finite Automata (NFA), NFA with epsilon transition, Language of NFA, Equivalence of NFA and DFA, Minimization of Finite Automata, Myhill-Nerode Theorem, Finite State Machine with output- Moore machine and Melay Machine, Properties and Limitations of Finite state machine, Conversion of Moore machine to Melay Machine & Vice-Versa, Application of Finite Automata.

Unit-II

Properties of Regular languages: Regular Expressions, Definition, Operators of regular expression and their precedence, Chomsky Hierarchy, Conversion of DFA to Regular Expression, Arden Theorem, Pumping Lemma, Decision properties of Regular Languages,

Init-III

Context Free Grammar and Push Down Automata: Context Free Grammar, Derivation tree and Ambiguity, Application of Context free Grammars, Chomsky and Greibach Normal form, Properties of context free grammar, Decidable properties of Context free Grammar, Pumping Lemma for Context free grammar, Push down Stack Machine, Design of Deterministic and Non-deterministic Push-down stack.

Unit-IV

Turing Machine: Turing machine definition and design of Turing Machine, Church-Turing Thesis, Variations of Turing Machines, combining Turing machine, Universal Turing Machine, Post Machine, Post correspondence problem.

Unit-V

Uncomputability: Halting Problem, Turing enumerability, Turing Acceptability and Turing decidabilities, unsolvable problems about Turing machines, Rice's theorem.

Textbooks:

1. Hopcroft E.J.,Ullman D.J. and Motwani R., Introduction to Automata Theory ,Languages and Computation , Pearson Education (2007)3rd ed.
2. Martin C. J., Introduction to Languages and the Theory of Computation, McGraw-Hill Higher Education (2011)4thed.
3. Lewis H.C., Elements of the Theory of Computation, Prentice Hall (1998) 2nded.

Reference Books:

1. Introduction to Languages and the Theory of Computation, John C Martin, TMH.
2. Introduction to Computer Theory, Daniel I.A. Cohen, John Wiley.
3. A Textbook on Automata Theory, P. K. Srimani, Nasir S.F.B, Cambridge University Press.
4. Introduction to the Theory of Computation, Michael Sipser, 3rd edition, Cengage Learning.
5. Introduction to Formal languages Automata Theory and Computation Kamala Krithivasan, Rama R, Pearson.

NPTEL Links:

https://www.youtube.com/results?search_query=AUTOMATA+NPTEL

https://www.youtube.com/watch?v=S3cOulqSAmU&list=PLidiQIHRzpXLOB6lg8hGUKLbbyekRz7JQ

Slide-ShareLinks: https://

www.slideshare.net/marinasantini1/automata45326059

https://www.slideshare.net/jenadgeorge/automata-250139119

Multimedia and Applications

BCA-304

L	T	P	Cr
4	0	0	4

Course Outcomes:
At the end of this course, Students will demonstrate the ability to:

Understand the basic concepts and types of multimedia.
Learn about multimedia hardware, software, and authoring tools.
Explore the creation and editing of multimedia elements (text, images, sound).
Learn the role of multimedia in the internet and web development.
Understand emerging multimedia technologies like virtual reality and digital communication.

UNIT-I
Introductory Concepts: Multimedia - Definitions, Basic properties and mediumtypes(Temporal and non-temporal), Multimediaapplications, Uses of Multimedia, Introduction to making multimedia - The Stages of project, therequirements to make good multimedia, Multimedia skills and training.

UNIT-II
Multimedia-Hardware and Software: Multimedia Hardware - Macintosh and Windowsproduction Platforms, Hardware peripherals - Connections, Memory and storage devices,Media software - Basic tools, making instant multimedia, Multimedia software andAuthoring tools, Production Standards.

UNIT-III
Multimedia building blocks Creating & Editing Media elements: Text, image, Sound,animation Analog/ digital video Data Compression: Introduction, Need, Difference oflossless/lossy compression techniques. Brief overview to different compression algorithmsconcern to text, audio, video and images etc.

UNIT-IV
Multimedia and the Internet: History, Internet working, Connections, InternetServices, The World Wide Web, Tools for the WWW - Web Servers, Web Browsers, Webpage makers and editors, Plug-Ins and Delivery Vehicles, HTML, Designing for theWWW -Working on the Web, Multimedia Applications - Media Communication,Media Consumption, Media Entertainment, Media games.

UNIT-V
Multimedia-looking towards Future: Digital Communication and New Media, InteractiveTelevision, Digital Broadcasting, Digital Radio, Multimedia Conferencing, Virtual Reality,Digital Camera. Assembling and delivering a Multimedia project-planning and costing,Designing and Producing, content and talent, Delivering, CD-ROM: The CD family,production process, CD-i – Overview – Media Types Technology.

TEXTBOOKS:

1. Tay Vaughan, "Multimedia: Making it work", TMH, 1999.
2. Ralf Steinmetz and KlaraNaharstedt, "Multimedia: Computing, Communications Applications",Pearson, 2001.

REFERENCES:

1. Keyes, "Multimedia Handbook", TMH, 2000.
2. Steve Heath, "Multimedia & Communication Systems", Focal Press, UK, 1999.
3. K.Andleigh and K. Thakkar, "Multimedia System Design", PHI, PTR, 2000.
4. Steve Rimmer, "Advanced Multimedia Programming", MHI, 2000

Optimization Techniques

BCA-305

L	T	P	Cr
4	0	0	4

Course Outcomes:
At the end of this course, Students will demonstrate the ability to:

Learn central tendency and dispersion measures for data analysis.
Apply correlation and regression analysis in business decision-making.
Master linear programming and queuing models for optimization.
Solve transportation and assignment problems in business operations.
Apply optimization techniques for practical problem-solving.

UNIT – I
Measures of Central Tendency & Dispersion: Definition, Importance & Limitation. Collection of data and formation of frequencydistribution. Graphic presentation of frequency distribution – graphics, Bars, Histogram,Diagrammatic. Measures of central tendency – mean, median and mode, partition values –quartiles, deciles and percentiles. Measures of variation – range, IQR, quartile, deciles andpercentiles.

UNIT – II
Correlation/Regression: Correlation Coefficient; Assumptions of correlation analysis; coefficients of determination andcorrelation; measurement of correlation- Karl Person's Methods; Spearman's rank correlation;concurrent deviation the correlation coefficient; Pitfalls and limitations associated withregression and correlation analysis; real world application using IT tools.

UNIT – III
Linear Programming & Queuing: Concept a assumptions usage in business decision making linear programming problem:formulation, methods of solving: graphical and simplex, problems with mixed constraints:duality; concept, significance, usage & application in business decision making.Queuing Models: Basic structure of queuing models, Birth-Death queuing models and itssteady state solution, M/M/1 and M/M/C models with infinite/finite waiting space, PERT,CPM

UNIT – IV
Transportation & Assignment Problem: General structure of transportation problem, solution procedure for transportation problem,methods for finding initial solution, test for optimality. Maximization of transportationproblem, transportation problem.

UNIT – V
Assignment Problem: Assignment problem approach of the assignment model,solution methods of assignment problem, maximization in an assignment, unbalancedassignment problem, restriction on assignment.

TEXT BOOKS

1. Sharma, J.K.; Operations Research: problems & solutions; Macmillan India
2. Gupta, S.P. and Gupta, P.K.; Quantitative Techniques and Operations Research,Sultan Chand & Sons
3. Vohra, N.D.; Quantitative Techniques in Management 2003.
4. Gupta, S.P. Statistical Methods, Sultan Chand &Sons.2004
5. A.M. Natarajan, P Balasubramani A. Tamilarasi, Operations Research, Pearson 2005

REFERENCE BOOKS

1. R.L.Rardin, Optimization in Operations Research, Prentice Hall.
2. A.Racindran, D.T.Phillips, J.S.Solberg, Second edition, John Wiley.

Elements of Statistics

BCA-305 A

L	T	P	Cr
4	0	0	4

Course Outcomes:
At the end of this course, Students will demonstrate the ability to:

1. Understand the basics of statistics and types of data.
2. Apply measures of central tendency and dispersion for data interpretation.
3. Grasp probability theory and various probability distributions.
4. Learn different sampling methods and estimation techniques.
5. Study correlation, regression, and time series analysis for statistical modeling.

Unit - I

Introduction to Statistics:

Definition and scope of statistics, Importance of statistics in decision making, Types of data: Primary and secondary data, Methods of data collection, Classification and tabulation of data,

Frequency distribution.

Unit – II

Measures of Central Tendency and Dispersion:

Measures of Central Tendency: Mean, Median, Mode, Properties and applications of central tendency, Measures of Dispersion: Range, Variance, Standard Deviation, Quartiles, Coefficient of variation, Moments, Skewness, and Kurtosis.

Unit - III

Probability and Probability Distributions:

Introduction, Basic concepts: Sample space, Events, Probability axioms, Conditional probability, Independent events, Bayes' theorem, Random variables: Discrete and Continuous, Probability distributions: Binomial, Poisson, and Normal distributions.

Unit - IV

Sampling and Estimation

Sampling methods: Simple random sampling, Stratified sampling, Systematic sampling, Sampling and non-sampling errors, Point and Interval estimation, Properties of estimators: Unbiasedness, Efficiency, Consistency, and Introduction to Hypothesis testing

Unit – V

Correlation, Regression, and Time Series Analysis: Types, Karl Pearson's correlation coefficient, Spearman's rank correlation, Simple and Multiple regression analysis, Time series analysis: Components of time series, Methods of measuring trends: Moving averages, Least squares method, Applications of correlation, regression.

TEXT BOOKS:

1. S.C. Gupta: **Fundamentals of Statistics**, Himalaya Publishing House
2. R.S. Bhardwaj: **Business Statistics**, Excel Books
3. Goon, A.M., Gupta, M.K. and Dasgupta, B.: **Fundamentals of Statistics**, Vol I, The World Press.
4. Richard A. Johnson: **Probability and Statistics for Engineers**, Pearson Education

Reference Books:

1. Murray R. Spiegel: **Schaum's Outline of Probability and Statistics**, McGraw-Hill
2. A.M. Mood, F.A. Graybill: **Introduction to the Theory of Statistics**, McGraw-Hill
3. Taro Yamane: **Statistics: An Introductory Analysis**, Harper and Row
4. Sheldon M. Ross: **Introduction to Probability and Statistics for Engineers and Scientists**, Academic Press

Combinatorial Optimization

BCA-305 B

L	T	P	Cr
4	0	0	4

Course Outcomes:
At the end of this course, Students will demonstrate the ability to:

1. Understand the basics and real-world applications of combinatorial optimization.
2. Learn about greedy algorithms and dynamic programming techniques.
3. Apply network flow algorithms to solve optimization problems.
4. Study approximation algorithms and their applications in optimization.
5. Explore heuristic methods like genetic algorithms and simulated annealing for large-scale problems

Unit – I

Introduction to Combinatorial Optimization:

Basics of combinatorial optimization, Problem-solving strategies in combinatorial optimization

Introduction to graphs and networks, Linear programming and integer programming, Applications of combinatorial optimization in real-world problems.

Unit – II

Greedy Algorithms and Dynamic Programming:

Greedy algorithm principles, Applications of greedy methods: Minimum spanning tree Huffman coding, Dynamic programming techniques, Examples: Knapsack problem, shortest paths, Comparison of greedy algorithms and dynamic programming.

Unit - III

Network Flow and Matching:

Basics of network flow problems, Maximum flow problem: Ford-Fulkerson method, Bipartite matching and assignment problems, Minimum-cost flow problem, Applications of network flow in optimization.

Unit – IV

Approximation Algorithms and Heuristics:

Concept of approximation algorithms, Polynomial-time approximation schemes (PTAS)

Heuristic methods for optimization: Genetic algorithms, Simulated annealing, Traveling salesman problem (TSP) and its approximations, Applications of heuristic methods in large-scale optimization problems.

Text Books

1. Bernhard Korte, Jens Vygen: Combinatorial Optimization: Theory and Algorithms, Springer
2. Christos H. Papadimitriou, Kenneth Steiglitz: Combinatorial Optimization: Algorithms and Complexity, Dover Publications
3. William J. Cook, William H. Cunningham: Combinatorial Optimization, Wiley-Interscience
4. Michael R. Garey, David S. Johnson: Computers and Intractability: A Guide to the Theory of NP-Completeness, W.H. Freeman

Reference Books

1. R. K. Ahuja, Thomas L. Magnanti, James B. Orlin: Network Flows: Theory, Algorithms, and Applications, Prentice Hall
2. Jon Kleinberg, ÉvaTardos: Algorithm Design, Pearson Education
3. Vangelis Th. Paschos: Concepts of Combinatorial Optimization, Wiley
4. Robert Sedgewick, Kevin Wayne: Algorithms, Addison-Wesley

Multi-Objective Optimization

BCA-305 C

L	T	P	Cr
4	0	0	4

Course Outcomes:

At the end of this course, Students will demonstrate the ability to:

1. Understand the basics of multi-objective optimization and Pareto optimality.
2. Learn techniques like weighted sum, ε-constraint, goal programming, and evolutionary algorithms.
3. Develop skills in multi-criteria decision-making (MCDM) and methods like AHP and TOPSIS.
4. Apply optimization techniques to real-world problems in engineering, finance, and logistics.
5. Explore advanced topics like fuzzy multi-objective optimization and hybrid optimization techniques.

Unit – I

Introduction to Multi-objective Optimization:

Basics of optimization, Single vs. multi-objective optimization, Concept of Pareto optimality

Formulation of multi-objective optimization problems, Applications of multi-objective optimization in real-world scenarios.

Unit – II

Techniques for Multi-objective Optimization:

Weighted sum method, ε-constraint method, Goal programming, Evolutionary algorithms for multi-objective optimization, Examples and case studies.

Unit - III

Decision Making in Multi-objective Optimization:

Ranking and selection of solutions, Multi-criteria decision-making (MCDM)

Methods: Analytic Hierarchy Process (AHP), Technique for Order of Preference by Similarity to Ideal Solution (TOPSIS), Trade-offs and decision making in multi-objective problems.

Unit – IV

Applications and Advanced Topics:

Real-world applications in engineering, finance, and logistics, Introduction to hybrid optimization techniques, Fuzzy multi-objective optimization, Case studies in multi-objective optimization.

Text Books

1. Kalyanmoy Deb: **Multi-objective Optimization Using Evolutionary Algorithms**, Wiley
2. Carlos M. Fonseca: **Evolutionary Multi-objective Optimization**, Springer
3. Matthias Ehrgott: **Multicriteria Optimization**, Springer
4. CoelloCoello, Carlos A., Lamont, Gary B.: **Applications of Multi-objective Evolutionary Algorithms**, World Scientific

Reference Books

1. Jeffrey Horn: **Multi-objective Problem Solving from Nature**, Springer
2. Masatoshi Sakawa: **Fuzzy Multi-objective and Goal Programming**, Springer
3. Paolo Vercellis: **Multi-objective Combinatorial Optimization**, Wiley
4. AndrzejJaszkiewicz: **Genetic and Evolutionary Algorithms for Multi-objective Optimization**,

Biostatistics

BCA-305 D

L	T	P	Cr
4	0	0	4

Course Outcomes:

At the end of this course, Students will demonstrate the ability to:

1. Grasp the fundamentals of biostatistics and types of data in biological sciences.
2. Learn key probability distributions (Normal, Binomial, Poisson) and their biological applications.
3. Master hypothesis testing, including t-tests, chi-square, ANOVA, and confidence intervals.
4. Understand regression and correlation techniques for biological and medical research.
5. Apply biostatistical methods to analyze data and support decision-making in biology and healthcare.

Unit - I

Introduction to Biostatistic:

Definition and scope of biostatistics, Types of data: Qualitative and quantitative

Data collection methods in biological sciences, Descriptive statistics: Mean, median, mode, standard deviation, Introduction to probability theory.

Unit - II:

Probability Distributions:

Basic probability concepts, Normal distribution, binomial distribution, Poisson distribution

Application of probability distributions in biology, Sampling methods and sample size determination, Central limit theorem and its importance.

Unit - III

Hypothesis Testing:

Null and alternative hypotheses, Types of errors (Type I and Type II), t-test, chi-square test, and ANOVA, Confidence intervals, Applications of hypothesis testing in biological research.

Unit - IV: Regression and Correlation:

Simple linear regression, Multiple regression analysis, Correlation coefficient: Pearson and Spearman, Logistic regression in biological data, Applications of regression in biological and medical research.

Text Books

1. Kalyanmoy Deb: **Multi-objective Optimization Using Evolutionary Algorithms**, Wiley
2. Carlos M. Fo Wayne W. Daniel: **Biostatistics: A Foundation for Analysis in the Health Sciences**, Wiley
3. Harvey Motulsky: **Intuitive Biostatistics**, Oxford University Pressnseca: **Evolutionary Multi-objective Optimization**, Springer
4. Matthias Ehrgott: **Multicriteria Optimization**, Springer
5. CoelloCoello, Carlos A., Lamont, Gary B.: **Applications of Multi-objective Evolutionary Algorithms**, World Scientific.

Reference Books

1. P. S. S. Sunder Rao, J. Richard: **An Introduction to Biostatistics**, PHI Learning
2. Robert R. Sokal, F. James Rohlf: **Biometry: The Principles and Practice of Statistics in Biological Research**, W.H. Freeman
3. John A. Rice: **Mathematical Statistics and Data Analysis**, Cengage Learning
4. Jerrold H. Zar: **Biostatistical Analysis**, Pearson

Operating Systems Lab

BCA-351

L	T	P	Cr
0	0	4	2

Course Outcomes:
At the end of this course, Students will demonstrate the ability to:

1. Understand the basic functions and components of operating systems, including memory management and file systems.
2. Develop skills in process management, including creation, scheduling, and termination of processes.
3. Implement system-level programming to manage hardware resources and perform I/O operations.
4. Practice using OS commands and utilities for troubleshooting and system monitoring.
5. Analyze and simulate operating system algorithms such as CPU scheduling and page replacement.

1. Basics of MS-Dos commands and Implementation
2. Implementation of CPU Scheduling.
   i. FCFS
   ii. SJF
   iii. Round Robin
   iv. Priority.
3. Simulate algorithm for deadlock prevention and detection
4. Simulate the algorithm for deadlock avoidance
5. Simulate algorithm for deadlock recovery
6. Simulate page replacement algorithms:
   i. FIFO
   ii. LRU
   iii. Optimal
7. Implementation of Disk Scheduling using
   i. FCFS,
   ii. SCAN
   iii. C-SCAN algorithm

8. Implementation of Disk Scheduling using
    i. LOOK
    ii. C-LOOK
    iii. SSTF algorithm

HTML, DHTML and CSS Programming

BCA 352

L	T	P	Cr
0	0	4	2

Course Outcomes:
At the end of this course, Students will demonstrate the ability to:

1. Understand the fundamentals of HTML and its role in web development.
2. Develop skills in creating and structuring web pages using HTML tags and attributes.
3. Implement multimedia elements like images, audio, and video in web pages.
4. Use HTML forms to gather user input and interact with web applications.
5. Apply best practices for creating accessible, responsive, and well-structured web content.

List of Programs

1. Program to describe various text formatting commands.
2. Program to create an unordered list.
3. Program to create an ordered list.
4. Program to create a Table.
5. Program to create a simple form.
6. Program to create a Hyperlink.
7. Program to insert an image to Web page.
8. Program to insert scrolling text using Marquee tag.
9. Program to divide a page into Frames.
10. Program to create a simple layout of Webpage.
11. Program to insert a Video element.
12. Implement the CSS functioning with any of the program.
13. Program to calculate the length of the given string.
14. Apply the User consent option with the web page.
15. Insert the current date and time in the web page.

Seminar Based on Learning

BCA 352

L	T	P	Cr
0	0	4	2

Course Outcomes:

At the end of this course, Students will demonstrate the ability to:

1. Develop research and analytical skills by selecting and exploring relevant topics.
2. Enhance presentation and communication skills through structured seminar delivery.
3. Strengthen critical thinking by evaluating sources and synthesizing information.
4. Foster peer learning through group discussions, feedback, and knowledge sharing.
5. Build confidence in presenting complex ideas clearly and engagingly to an audience.

Module 1: Seminar Preparation

1. **Introduction to Seminar Topics**
   - Overview of themes and subject areas.
   - Guidelines for topic selection.
2. **Research Skills**
   - Finding credible sources (books, journals, online databases).
   - Evaluating and synthesizing information.
3. **Creating Effective Presentations**
   - Designing visual aids (slides, posters).
   - Tips for effective public speaking and engagement.

Module 2: Seminar Execution

1. **Presentation Skills**
   - Delivering content clearly and confidently.
   - Engaging the audience through questions and discussions.
2. **Peer Feedback Mechanism**
   - Constructive feedback techniques.
   - Self-assessment and reflection post-presentation.
3. **Group Dynamics**
   - Working in teams to prepare collaborative seminars.
   - Assigning roles and responsibilities within groups.

Module 3: Topics for Seminars

1. **Interdisciplinary Themes**
    - Examples: Technology in Education, Environmental Sustainability, Mental Health Awareness.
    - Encouraging connections across various disciplines.
2. **Current Events and Issues**
    - Analyzing recent developments and their implications.
    - Encouraging critical discourse around current affairs.

Data Structures

BCA-401

L	T	P	Cr
4	0	0	4

Course Outcomes:
At the end of this course, Students will demonstrate the ability to:

1. Understand basic data types, memory allocation, and recursion.
2. Implement stacks, queues, and linked lists with applications.
3. Master binary trees and various tree operations.
4. Analyze and implement sorting algorithms for efficiency.
5. Develop searching techniques with optimization in mind.

UNIT 1
Introduction: Data types, structures, review of data structures in C/C++, static and dynamic memory allocation, recursion, Tower of Hanoi problem.

UNIT 2
Stacks & Queues: Concept, operations and representation in C/C++, application to evaluation of post fix expressions, conversion from in fix to post fix representation. Queues-Sequential representation, operations, priority queues, and array implementation.

UNIT 3
Linked Lists & Binary Trees: Concept, operations, stacks and queues as lists, array and dynamic representation circular lists, doubly linked lists, Josephus problem. Binary treesdefinition, array and dynamic representations, operations, lists as trees. Almost complete binary trees, threaded binary trees, Games Trees.

UNIT 4
Sorting: Efficiency considerations, Onotation, Bubblesort, Quicksort, Selection sort, binary trees or Heap, heapsort, heapasapriority queue, Insertion sort, Shellsort, Mergesort, Radixsort.

UNIT5
Searching: Sequential searching, indexed Sequential searching, binary search, interpolation search, binary tree searching, insertion and deletion, Optimum search trees, height balanced trees, single and double rotations, Multiway, search trees, B-trees, B+- trees, Hashing methods of resolving clashes, methods of choosing hash functions.

Laboratory work:
Implementation of Arrays, Recursion, Stacks, Queues, Lists, Binary trees, Sorting techniques, Searching techniques. Implementation of all the algorithmic techniques.

Text Books: Kruse, R.L., Leung, B.P. and Tondo, C.L., Data Structures and Program Design in C, Dorling Kindersley (2008). • Langsam, Y. and Augenstein, M.J., Data Structures Using C and C++, Dorling Kindersley (2008) 2nd ed.

Reference Books:• Trembley, J.P., Sorenson, P.G., An introduction to data structures with applications, Tata McGraw Hill (2008) 2nd ed. • Sahni, Sartaj, Data Structures, Algorithms and Applications in C++, Universities Press (2005) 2nd ed.

JAVA Programming

BCA-402

L	T	P	Cr
4	0	0	4

Course Outcomes:
At the end of this course, Students will demonstrate the ability to:

1. Grasp fundamentals of Java programming, classes, and inheritance.
2. Understand Java library functions, including string handling and I/O.
3. Learn exception handling, multithreading, and synchronization.
4. Explore software development using applets, AWT, and Swing controls.
5. Implement networking basics, JDBC, and Java servlets.

UNIT-I
Java Programming: Introduction, Data types, accesspecifiers, operators,control statements, arrays.Classes: Fundamentals, objects, methods,constructors.Inheritance: Super class,subclass,this and superoperator,methodoverriding, use of final, packages, abstract class, interface.Polymorphism: Method overloading, constructor overloading.

UNIT – II
Java Library: String handling (only main functions), String Buffer class.Elementary conceptsof Input/Output :byte and character streams, System .inand System .out, print and println, reading from a file and writing in a file.

UNIT – III
Exception Handling: Exception Class, built in checked and uncheckedexceptions, user defined exceptions, use of try, catch, throw, throws, finally.Multi threaded programming: Overview, comparison with multiprocessing, Thread class and runnable interface, life cycle, creation of single and multiplethreads, thread priorities, overview of Synchronization.

UNIT-IV
Software Development using Java: Applets :Introduction, Life cycle, creation and implementation,AWT controls: Button, Label,TextField, TextArea, Choice lists, list, scrollbars,check boxes, Layout managers,Elementary concepts of Event Handling :Delegation Event Model, Event classesand listeners, Adapter classes, Inner classes.Swings: Introduction and comparison with AWT controls.

UNIT-V
Networking Basics: Socket (datagram and TCP/IP based client and serversocket), factory methods, InetAddressJDBC: JDBC Architecture, JDBC Drivers, Connecting to the Database
Introduction to Java Servlets: Life cycle,Interfaces and classes injavax.servlet package(only description) Creating a simple servlet

TEXT BOOKS:

1. Patrick Naughton and Herbert Schildt, "Java-2 The Complete Reference",TMH.
2. Y. Daniel Liang, "Introduction to Java Programming, ComprehensiveVersion, 7/e" Pearson.

REFERENCE BOOKS: -

1. Krishnamoorthy R, Prabhu S ,"Internet and Java Programming", New AgeIntl.
2. David Flanagan, Jim Farley, William Crawford and Kris Magnusson, "JavaEnterprise in a Nutshell", O'Reilly.

Computer System Architecture

BCA-403

L	T	P	Cr
4	0	0	4

Course Outcomes:
At the end of this course, Students will demonstrate the ability to:

1. Learn about register transfer, micro-operations, and memory transfers.
2. Study basic computer organization and design principles.
3. Understand microprogrammed control units and CPU organization.
4. Analyze computer arithmetic, I/O organization, and DMA.
5. Explore memory organization and management techniques.

UNIT-I
Register Transfer and Micro-operations: Register Transfer Language, Register Transfer, Busand Memory Transfers, Arithmetic Micro-operations, Logic Micro-operations, ShiftMicrooperations, Arithmetic logic shift unit

UNIT-II
Basic Computer Organizations and Design: Instruction Codes, Computer Registers,Computer Instructions, Timing and Control, Instruction Cycle, Memory-ReferenceInstructions, Register reference instructions, Input - Output Instructions, Design ofAccumulator Logic.

UNIT-III
Design of Microprogrammed Control Unit
Central Processing Unit: Introduction, General Register Organization, Stack Organization,Instruction Formats, Addressing Modes. Difference between RISC and CISC.
Pipeline and Vector Processing: Arithmetic and Instruction pipeline, Vector operations,Matrix Multiplication, memory interleaving.

UNIT-IV
Computer Arithmetic: Introduction, Multiplication Algorithms, Division Algorithms, forfixed point-members.
Input-Output Organization: Peripheral Devices, Input-Output Interfaces, Asynchronous Data Transfer, Modes of Transfer, Priority Interrupt, Direct Memory Access (DMA)

UNIT-V
Memory Organization: Memory Hierarchy, Main Memory, Auxiliary Memory, AssociativeMemory, Cache Memory, Virtual Memory, Memory Management Hardware.

TEXT BOOKS :

1. Morris Mano, Computer System Architecture, 3rd Edition, Prentice-Hall of IndiaPrivate Limited, 1999.

REFERENCE BOOKS:

1. WIliam Stallings, Computer Organization and Architecture, 4th Edition, Prentice Hallof India Private Limited, 2001
2. Subrata Ghosal," Computer Architecture and Organization" , Pearson 2011
3. Malvino, "Digital Computer Electronics: An Introduction to Microcomputers",McGraw Hill,

Knowledge Management

BCA-404

L	T	P	Cr
4	0	0	4

Course Outcomes:
At the end of this course, Students will demonstrate the ability to:

1. Understand the foundations, culture, and challenges of knowledge management.
2. Build a learning organization and foster knowledge sharing.
3. Study tools and technologies supporting knowledge management.
4. Apply knowledge management strategies in real-world scenarios.
5. Evaluate future trends and case studies in knowledge management.

UNIT I
INTRODUCTION
An Introduction to Knowledge Management - The foundations of knowledge management- including cultural issues- technology applications organizational concepts and processes- management aspects- and decision support systems. The Evolution of Knowledge management : From Information Management to Knowledge Management - Key Challenges Facing the Evolution of Knowledge Management - Ethics for Knowledge Management.

UNIT II
CREATING THE CULTURE OF LEARNING AND KNOWLEDGE SHARING
Organization and Knowledge Management - Building the Learning Organization. Knowledge Markets: Cooperation among Distributed Technical Specialists – Tacit Knowledge and Quality Assurance.

UNIT III
KNOWLEDGE MANAGEMENT-THE TOOLS
Telecommunications and Networks in Knowledge Management - Internet Search Engines and Knowledge Management - Information Technology in Support of Knowledge Management - Knowledge Management and Vocabulary Control - Information Mapping in Information Retrieval - Information Coding in the Internet Environment - Repackaging Information.

UNIT IV
KNOWLEDGEMANAGEMENT-APPLICATION
Components of a Knowledge Strategy - Case Studies (From Library to Knowledge Center, Knowledge Management in the Health Sciences, Knowledge Management in Developing Countries).

UNIT V

FUTURE TRENDS AND CASE STUDIES

Advanced topics and case studies in knowledge management - Development of a knowledge management map/plan that is integrated with an organization's strategic and business plan - A case study on Corporate Memories for supporting various aspects in the process life -cycles of an organization.

TEXT BOOK:

1. Srikantaiah.T. K., Koenig, M., "Knowledge Management for the Information Professional" Information Today, Inc., 2000.

REFERENCE:

1. Nonaka, I., Takeuchi, H., "The Knowledge-Creating Company: How Japanese Companies Create the Dynamics of Innovation", Oxford University Press, 1995.

Knowledge Transfer

BCA-404 A

L	T	P	Cr
4	0	0	4

Course Outcomes:

At the end of this course, Students will demonstrate the ability to:

1. Grasp the importance and scope of knowledge transfer.
2. Study models like SECI, Wiig's Cycle, and communities of practice.
3. Learn techniques for effective knowledge transfer (e.g., mentoring, workshops).
4. Understand the role of leadership and culture in knowledge transfer.
5. Explore emerging technologies and case studies in knowledge transfer.

Unit - I

Fundamentals of Knowledge Transfer

Definition and scope of knowledge transfer, Importance of knowledge sharing in organizations

Types of knowledge: Tacit and Explicit, Knowledge transfer vs. Knowledge management, Barriers to effective knowledge transfer.

Unit – II

Models and Frameworks of Knowledge Transfer

SECI model (Socialization, Externalization, Combination, Internalization), Wiig's Knowledge Management Cycle, Nonaka and Takeuchi's Knowledge Creation Model, Communities of practice (CoP), Knowledge transfer strategies in organizations.

Unit - III

Techniques for Knowledge Transfer

mentoring and coaching methods, Storytelling as a knowledge transfer tool, Use of technology: Wikis, blogs, and forums, Workshops and seminars for knowledge dissemination, Knowledge repositories and databases.

Unit - IV

Knowledge Transfer in Organizations

Knowledge-sharing culture, Role of leadership & knowledge transfer, Cross-functional knowledge sharing, and measuring knowledge transfer effectiveness, Legal and ethical considerations in knowledge transfer.

Unit – V

Knowledge Transfer and Emerging Technologies

Artificial Intelligence and knowledge transfer, Data mining and knowledge discovery, Virtual teams and remote collaboration, Future trends in knowledge transfer, Case studies of knowledge transfer in modern organizations.

TEXT BOOKS:

5. IkujiroNonaka and Hirotaka Takeuchi: **The Knowledge-Creating Company**, Oxford University Press
6. Elias M. Awad and Hassan Ghaziri: **Knowledge Management**, Pearson Education
7. J. W. Cortada and J. A. Woods: **The Knowledge Management Yearbook**, Butterworth-Heinemann
8. Thomas H. Davenport and Laurence Prusak: **Working Knowledge**, Harvard Business Review Press

Reference Books:

1. AmritTiwana: **The Knowledge Management Toolkit**, Pearson Education
2. Michael Polanyi: **The Tacit Dimension**, University of Chicago Press
3. Karl M. Wiig: **Knowledge Management Foundations**, Schema Press
4. Mark W. McElroy: **The New Knowledge Management**, Butterworth-Heinemann
5. Alex Bennet and David Bennet: **Organizational Survival in the New World**, Routledge

Knowledge Mapping

BCA-404 B

L	T	P	Cr
4	0	0	4

Course Outcomes:

At the end of this course, Students will demonstrate the ability to:

1. Understand the concept and purpose of knowledge mapping in organizing and visualizing information.
2. Develop skills in creating visual representations of knowledge using tools like mind maps and concept maps.
3. Analyze the relationships between different pieces of knowledge to enhance learning and problem-solving.
4. Apply knowledge mapping techniques to simplify complex topics and improve comprehension.
5. Use knowledge maps for effective knowledge sharing and decision-making in team environments.

Module 1: Introduction to Knowledge Mapping

1. **Understanding Knowledge Mapping**
   - Definition and purpose of knowledge mapping.
   - Types of knowledge maps (concept maps, mind maps, flowcharts).
2. **Tools and Technologies**
   - Overview of digital tools for knowledge mapping (e.g., MindMeister, XMind, Lucidchart).
   - Introduction to paper-based mapping techniques.

Module 2: Creating Knowledge Maps

1. **Basic Techniques**
   - Identifying key concepts and relationships.
   - Structuring information hierarchically.
2. **Practical Lab Sessions**
   - Hands-on workshops to create individual knowledge maps.
   - Group activities to develop collaborative knowledge maps.
3. **Applying Knowledge Mapping**
   - Mapping for different purposes (study aids, project planning, brainstorming).
   - Case studies on effective knowledge mapping.

Module 3: Analyzing and Sharing Knowledge Maps

1. **Evaluating Knowledge Maps**
    - Criteria for assessing clarity, completeness, and organization.
    - Peer review sessions for constructive feedback.
2. **Presenting Knowledge Maps**
    - Techniques for effectively presenting and explaining maps.
    - Role-playing to simulate audience engagement.
3. **Reflection and Iteration**
    - Importance of revisiting and updating knowledge maps.
    - Reflective practices on personal learning and mapping experiences.

Assessment and Evaluation

- Grading based on creativity, clarity, and effectiveness of knowledge maps.
- Participation in group activities and peer evaluations.

Knowledge Management Systems

BCA-404 C

L	T	P	Cr
4	0	0	4

Course Outcomes:

At the end of this course, Students will demonstrate the ability to:

1. Understand the key concepts and components of knowledge management systems (KMS).
2. Develop skills to design and implement systems for capturing, storing, and sharing organizational knowledge.
3. Analyze the role of technology in enhancing knowledge sharing and collaboration within organizations.
4. Apply strategies for managing both tacit and explicit knowledge in a business context.
5. Evaluate the effectiveness of KMS in improving decision-making, innovation, and organizational learning.

Module 1: Introduction to Knowledge Management

1. **Understanding Knowledge Management (KM)**
   - Definition and importance of KM.
   - Types of knowledge (tacit vs. explicit).
2. **KM Frameworks and Models**
   - Overview of key KM theories and frameworks.
   - Case studies on successful KM implementations.

Module 2: Knowledge Management Tools and Technologies

1. **Overview of KM Systems**
   - Types of KM systems (content management systems, collaborative tools, etc.).
   - Comparison of popular KM tools (e.g., SharePoint, Confluence, Notion).
2. **Hands-On Lab Sessions**
   - Setting up a KM system using selected tools.
   - Practical exercises in content creation and management.
3. **Data Management and Organization**
   - Best practices for organizing and tagging knowledge.
   - Introduction to metadata and taxonomies.

Module 3: Designing and Implementing KM Solutions

1. **Identifying Knowledge Needs**
    - Conducting needs assessments for KM systems.
    - Engaging stakeholders in the KM process.
2. **Creating a KM Strategy**
    - Steps for developing a KM strategy.
    - Aligning KM initiatives with organizational goals.
3. **Project Work**
    - Group projects to design and propose a KM solution for a hypothetical organization.
    - Presentations of project findings and proposed implementations.

Assessment and Evaluation

- Grading based on participation, project work, and practical assignments.
- Peer feedback on group projects.

Information Systems for KM

BCA-404 D

L	T	P	Cr
4	0	0	4

Course Outcomes:
At the end of this course, Students will demonstrate the ability to:

1. Understand the role of information systems in supporting knowledge management (KM) processes.
2. Develop skills in designing and implementing information systems that facilitate knowledge sharing and collaboration.
3. Analyze various types of information systems used for managing organizational knowledge, such as intranets and databases.
4. Apply tools and technologies like content management systems (CMS) and knowledge repositories to enhance knowledge accessibility.
5. Evaluate the effectiveness of information systems in improving decision-making, innovation, and organizational performance.

Module 1: Introduction to Information Systems in KM

1. **Understanding Information Systems**
   - Definition and components of information systems.
   - The relationship between information systems and knowledge management.
2. **Types of Information Systems for KM**
   - Overview of various systems (e.g., databases, document management systems, collaborative tools).
   - The role of decision support systems in KM.

Module 2: Knowledge Management System Components

1. **Core Components of KM Systems**
   - Data management and storage.
   - Knowledge repositories and databases.
   - User interfaces and access controls.
2. **Tools and Technologies**
   - Introduction to popular KM tools (e.g., SharePoint, Knowledge Owl, Trello).
   - Hands-on exercises with selected KM software.

Module 3: Designing KM Information Systems

1. **System Design Principles**
   - User-cantered design and usability.
   - Best practices for designing intuitive interfaces.
2. **Lab Activities**
   - Group projects to create prototypes of KM systems.
   - Exercises in data modelling and knowledge mapping.
3. **Implementation Strategies**
   - Steps for deploying a KM information system.
   - Change management considerations in KM implementation.

Module 4: Evaluating KM Information Systems

1. **Assessment Criteria**
    - Evaluating the effectiveness of KM systems.
    - Metrics for measuring user satisfaction and knowledge utilization.
2. **Feedback Mechanisms**
    - Implementing feedback loops for continuous improvement.
    - Conducting user testing and gathering insights.

Assessment and Evaluation

- Grading based on participation, project quality, and practical assignments.
- Peer reviews of group projects.

Data Structure Lab

BCA-451

L	T	P	Cr
0	0	4	2

Course Outcomes:
At the end of this course, Students will demonstrate the ability to:

1. Understand the implementation and application of basic data structures like arrays, stacks, and queues.
2. Develop skills in using linked lists, trees, and graphs for organizing and manipulating data.
3. Apply algorithms for sorting, searching, and traversal in different data structures.
4. Practice memory management and optimization techniques to improve data structure performance.
5. Implement and test real-world applications using appropriate data structures for problem-solving.

Program 1:-To search an element in the array using Linear Search.
Program 2:-Tosearchanelementinthe2-dimensional array using Linear Search.
Program 3:-To merge two sorted array in to one sorted array.
Program 4:-To perform the following operation in Matrix 1.Addition 2.Subtraction 3.Multiplication 4.Transpose
Program 5: - To perform the swapping of two numbers using call by value and call by reference
Program 6:-To perform following operation on strings using string functions 1.Addition 2.Copying 3.Reverse 4.Length of String
Program 7:-To search an element in the array using Iterative Binary Search.
Program 8:-To search an element in the array using Recursive Binary Search.
Program 9:-To implement Bubble Sort.
Program 10:-To implement Selection Sort.

Program 11:-To implement Insertion Sort.
Program 12:-To implement Quick Sort.
Program 13:-To implement Merge Sort.
Program 14:-To implement Stack using array.
Program 15:-To implement Queue using array.

JAVA Programming Lab

BCA-452

L	T	P	Cr
0	0	4	2

Course Outcomes:
At the end of this course, Students will demonstrate the ability to:

1. Understand the fundamentals of Java programming, including syntax, data types, and control structures.
2. Develop skills in object-oriented programming concepts like classes, objects, inheritance, and polymorphism.
3. Apply exception handling, file I/O, and multi-threading techniques in Java programs.
4. Practice designing and implementing GUI applications using Java frameworks like Swing.
5. Debug, test, and optimize Java code for performance and functionality.

S.NO	PRACTICAL PROGRAMS
1.	Write a program to create class and object in java.
2.	Write a program to create user define function in a user define class in java.
3.	Write a program to find function overloading in java.
4.	Write a program to to create function overriding in java.
5.	Write a program to create single inheritance in java.
6.	Write a program to create multilevel inheritance in java.
7.	Write a program to create multiple inheritance in case of interface in java.
8.	Write a program to create abstract class and abstract function in java.
9.	Write a program to create parameterized constructor in java.
10.	Write a program to create Button using awt in java.
11.	Write a program to using JDBC in java.
12.	Write a program to crate Multithreading in java.

13.	Write a program to create Event handling in java.
14.	Write a program to print matrix in java.
15.	Write a program to print addition of two matrix in java.

Computer System Architecture Lab

BCA-453

L	T	P	Cr
0	0	4	2

Course Outcomes:
At the end of this course, Students will demonstrate the ability to:

1. Understand the basic components and architecture of a computer system, including CPU, memory, and I/O devices.
2. Develop skills in simulating and analyzing the operation of different computer system components.
3. Apply concepts of instruction set architecture (ISA) and assembly language programming.
4. Practice performance measurement and optimization techniques for hardware and software systems.
5. Implement simple hardware-software interactions and analyze their impact on system performance.

Program 1:-Program to implement basic logic gates like AND, OR, NOT, NAND, NOR, XOR using HDL (Verilog/VHDL).
Program 2:- Design and simulate half adder and full adder circuits.
Program 3:- Write programs to implement multiplexer and demultiplexer circuits.
Program 4:- Design a 4-bit binary adder/subtractor using Verilog or VHDL.
Program 5:- Develop a program to implement a simple ALU that performs basic arithmetic and logical operations.
Program 6:- Implement flip-flops using HDL and simulate their behavior.
Program 7:- Design and simulate a 4-bit synchronous up/down counter.
Program 8:- Program to simulate registers and shift registers using Verilog/VHDL.
Program 9:- Simulate the working of RAM/ROM using hardware description languages (HDL).
Program 10:- Design and implement a finite state machine (FSM) for sequence detection.
Program 11:- Write and simulate Booth's algorithm for signed binary multiplication.
Program 12:- Develop a basic CPU design that can execute simple instructions like ADD, SUB, and LOAD using HDL.

Program 13:- Simulate a custom instruction set architecture (ISA) with simple operations.
Program 14:- Implement a basic instruction pipeline to simulate how pipelining works in processors.
Program 15:- Simulate cache memory using various mapping techniques (direct mapping, associative mapping).

Seminar Based on Learning

BCA-454

L	T	P	Cr
0	0	4	2

Course Outcomes:

At the end of this course, Students will demonstrate the ability to:

1. Enhance research skills by selecting, analyzing, and synthesizing relevant topics.
2. Develop public speaking and presentation skills through structured seminar delivery.
3. Strengthen critical thinking and evaluation abilities when discussing complex subjects.
4. Encourage peer-to-peer learning by facilitating group discussions and sharing insights.
5. Build confidence in presenting ideas clearly and engagingly to diverse audiences.

- **Educational technology**

A common topic at EdCamps, this includes practical examples of using modern tools in the classroom and how to solve problems that technology can cause.

- **Current events**

Students can track current events and create a news show or podcast about them.

- **Artificial intelligence**

Seminars can help you learn about responsible AI development and deployment, and build a professional network.

- **Case studies and debates**

These activities can help students engage with the material and develop communication, critical analysis, and teamwork skills.

- **Classroom management**

This includes strategies and techniques for creating a learning environment that reduces disruptions.

- **Global issues in education and research**

This can include topics such as the impact of crisis on education, ethical issues in education, and technology in teaching and learning.

- **Psychology**

This includes core areas such as biological, cognitive, developmental, social, and individual differences.

Software Engineering

BCA-501

L	T	P	Cr
4	0	0	4

Course Outcomes:
At the end of this course, Students will demonstrate the ability to:

1. Grasp software engineering principles, evolution, and process models.
2. Analyze and document software requirements and specifications.
3. Apply system design principles like object-oriented and event-driven design.
4. Implement testing strategies and perform software verification and validation.
5. Manage software projects using tools like COCOMO and CASE, focusing on quality control and assurance.

UNIT 1
Software Engineering and Processes: Introduction to Software Engineering, Software Evolution, Software Characteristics, Software Crisis: Problem and Causes, Software process models (Waterfall, Incremental, and Evolutionary process models and Agile), Software quality concepts, process improvement, software process capability maturity models, Personal Software process and Team Software Process, Overview of Agile Process.

UNIT 2
Requirements Engineering: Problem Analysis, Requirement elicitation and Validation. Requirements modelling: Scenarios, Information and analysis classes, flow and behavioralmodeling, documenting Software Requirement Specification (SRS).

UNIT 3
Software Design and construction: System design principles: levels of abstraction (architectural and detailed design), separation of concerns, information hiding, coupling and cohesion, Structured design (top-down functional decomposition), object-oriented design, event driven design, component-level design, test driven design, function oriented, service oriented, Design patterns.

UNIT 4
Software Verification and Validation: Levels of Testing, Functional Testing, Structural Testing, Test Plan, Test Case Specification, Software Testing Strategies, Verification & Validation, Unit, Integration Testing, Top Down and Bottom-Up Integration Testing, Alpha & Beta Testing, White box and black box testing techniques, System Testing and Debugging.

UNIT5

Software Project Management: (COCOMO models), Quality Management, Plan for software Quality Control and Assurance, Earned Value Analysis. Advanced Topics: Formal specification, CASE Tools, Software Business Process Reengineering, Configuration Management.

Laboratory work:

Implementation of Software Engineering concepts and exposure to CASE tools like Rational Software suit, Turbo Analyst, Silk Suite. Follow entire SDLC depending on project domain.

Text Books: 1. Pressman S. R. and Maxim R. B., Software Engineering, A Practitioner's Approach, McGraw Hill International (2015) 8th Edition. 2. Sommerville I., Software Engineering, Addison-Wesley Publishing Company (2011) 9th Edition.

Reference Book: 1. Foster C. E., Software Engineering: A Methodical Approach, Apress (2014)1st ed. 2. Booch G., Rambaugh J., Jacobson I., The Unified Modeling Language User Guide (2005) 2nd Edition.

Analysis of Algorithm and Data Structures

BCA-502

L	T	P	Cr
4	0	0	4

Course Outcomes:
At the end of this course, Students will demonstrate the ability to:

1. Implement and analyze linear and non-linear data structures.
2. Apply Big O and other asymptotic notations for algorithm complexity analysis.
3. Solve problems using algorithmic strategies like divide-and-conquer and dynamic programming.
4. Implement sorting, searching, and graph algorithms effectively.
5. Understand and solve NP-complete problems using approximation and intelligent algorithms.

UNIT 1
Linear Data Structures: Arrays, Records, Strings and string processing, References and aliasing, Linked lists, Strategies for choosing the appropriate data structure, Abstract data types and their implementation: Stacks, Queues, Priority queues, Sets, Maps.

UNIT 2
Basic Analysis: Differences among best, expected, and worst-case behaviours of an algorithm, Asymptotic analysis of upper and expected complexity bounds, Big O notation: formal definition and use, Little o, big omega and big theta notation, Complexity classes, such as constant, logarithmic, linear, quadratic, and exponential, Time and space trade-offs in algorithms, Recurrence relations, Analysis of iterative and recursive algorithms.

UNIT 3
Algorithmic Strategies with examples and problem solving: Brute-force algorithms with examples, Greedy algorithms with examples, Divide-and-conquer algorithms with examples, Recursive backtracking, Dynamic Programming with examples, Branch-and-bound with examples, Heuristics, Reduction: transform-and-conquer with examples.

UNIT 4
Non-Linear Data Structures and Sorting Algorithms: Hash tables, including strategies for avoiding and resolving collisions, Binary search trees, Common operations on binary search trees such as select min, max, insert, delete, iterate over tree, Graphs and graph algorithms, Representations of graphs, Depth- and breadth-first traversals, Heaps, Graphs and graph algorithms, Shortest-path algorithms (Dijkstra and Floyd), Minimum spanning tree (Prim and Kruskal)

UNIT5

Problem Clauses: P, NP, NP- Hard and NP-complete, deterministic and non-deterministic polynomial time algorithm approximation and algorithm for some NP complete problems. Introduction to parallel algorithms, Genetic algorithms, intelligent algorithms.

Laboratory work:

Implementation of Arrays, Recursion, Stacks, Queues, Lists, Binary trees, Sorting techniques, Searching techniques. Implementation of all the algorithmic techniques.

Text Books: 1. Cormen H. T., Leiserson E. C., Rivest L. R., and Stein C., Introduction to Algorithms, MIT Press (2009) 3rd ed. 2. Goldberg E. D., Genetic Algorithms, Pearson education 1989 (2009) 1st ed.

Reference Books: 1. Sedgewick R. and Wayne K., Algorithms, Addison-Wesley Professional (2011), 4th ed.

Mobile Computing

BCA-503

L	T	P	Cr
4	0	0	4

Course Outcomes:
At the end of this course, Students will demonstrate the ability to:

1. Learn mobile computing fundamentals and communication technologies.
2. Explore cellular systems, mobile telecommunication protocols, and security.
3. Study wireless LANs, satellite networks, and IEEE standards.
4. Analyze mobile IP, routing protocols, and mobile transport layers.
5. Develop mobile applications while addressing constraints and security issues.

UNIT 1: Introduction
Introduction to Mobile Computing – Applications of Mobile Computing- Generations of Mobile Communication Technologies- Multiplexing – Spread spectrum -MAC Protocols – SDMA- TDMA- FDMA- CDMA

UNIT 2: Mobile Telecommunication System
Introduction to Cellular Systems - Cellular systems- Frequency Management and Channel Assignment- types of handoff andtheir characteristics, dropped call rates & their evaluation, GSM – Services & Architecture – Protocols – Connection Establishment – Frequency Allocation – Routing – Mobility Management – Security – GPRS- UMTS – Architecture – Handover - Security

UNIT 3: Telecommunication Networks &WirlessLan
Telecommunication systems – GSM – GPRS - Satellite Networks ,Wireless LAN – IEEE802.11 - Architecture – services – MAC – Physical layer – IEEE 802.11a -802.11b standards–HIPERLAN – Blue Tooth.

UNIT 4: Mobile Network Layer & Transport Layer
Mobile IP – DHCP – AdHoc– Proactive protocol-DSDV, Reactive Routing Protocols – DSR, AODV , Hybrid routing –ZRP, Multicast Routing- ODMRP, Vehicular Ad Hoc networks (VANET) –MANET Vs VANET – Security, Traditional TCP, Mobile TCP

UNIT5: Mobile Platforms and Applications
Mobile Device Operating Systems – Special Constraints & Requirements – Commercial Mobile Operating Systems, Mobile Payment System – Security Issues, WAP Model- Mobile Location based services -WAP Gateway –WAP protocols – WAP useragent profile- caching model-wireless bearers for WAP - WML – WML Scripts

TEXT BOOKS:

1. Jochen Schiller, "Mobile Communications", Second Edition, Pearson Education, 2003.
2. William Stallings, "Wireless Communications and Networks", Pearson Education, 2002.

REFERENCE BOOKS:

1. KavehPahlavan, PrasanthKrishnamoorthy, "Principles of Wireless Networks", PHI/PearsonEducation, 2003.
2. UweHansmann, LotharMerk, Martin S. Nicklons and Thomas Stober, "Principles of MobileComputing", Springer, 2003..
3. Raj Kamal, "Mobile Computing",Oxford University Press, 2007
4. Asoke K. Talukdar, "Mobile Computing", Tata McGraw-Hill Education,2010.
5. Mohammad Ilyas , Imad Mahgoub," Mobile Computing Handbook" ,AUERBACH,2004.
6. Vilas S. Bagad , "Mobile Computing Introduction", Technical Publications,2014
7. DR SANJAY Sharma, "Mobile Computing",S.K. Kataria & Sons Publication,2014.
8. Dr. Ashish N.Jani, Dr. N.N. Jani , Neeta Kanabar ," Mobile Computing – Technologiesand Applications", 2010
9. Pattnaik, Prasant Kumar, Mall, Rajib, "Fundamentals Of Mobile Computing", SecondEdition, PHI Learning Pvt. Ltd., 2015.

Big Data and Machine Learning

BCA-504

L	T	P	Cr
4	0	0	4

Course Outcomes:
At the end of this course, Students will demonstrate the ability to:

1. Understand business intelligence concepts and its lifecycle.
2. Learn data analytics techniques such as correlation, regression, and clustering.
3. Implement machine learning methods like supervised, unsupervised, and reinforcement learning.
4. Apply clustering algorithms (e.g., K-Means) and distance measures.
5. Build decision tree models and implement Bayesian learning for classification tasks.

UNIT 1
Introduction to Business Intelligence: Business View of IT Applications, Digital Data, OLTP vs. OLAP, Why, What and How BI? , BI Framework and components, BI Project Life Cycle, Business Intelligence vs. Business Analytics.

UNIT 2
Introduction to Data Analytics: Data and Relations, Data Visualization, Correlation, Regression, Forecasting, Classification, Clustering. Big Data Technology Landscape: Fundamentals of Big Data Types, Big data Technology Components, Big Data Architecture, Big Data Warehouses, Functional vs. Procedural Programming Models for Big Data.

UNIT 3
Basic concepts, Designing a learning system, Issues in machine learning. Types of machine learning: Learning associations, Supervised learning, Unsupervised learning, Reinforcement learning, Model Evaluation Parameters, Feature Selection and Extraction. Linear Regression, Multi Regression, Gradient Descent, SVM.

UNIT 4
Clustering: K-Means, k-Medoids, Agglomerative versus Divisive Hierarchical Clustering Distance Measures in Algorithmic Methods, Mean-shift Clustering.

UNIT5
Decision Tree Learning: Decision tree representation, appropriate problems for decision tree learning, Univariate Trees (Classification and Regression), Bayesian Learning: Bayes theorem and concept learning, Bayes optimal classifier, Naive Bayes Classifier.

Text Books: . Mitchell T.M., Machine Learning, McGraw Hill (1997) 2nd ed. 2. Alpaydin E., Introduction to Machine Learning, MIT Press (2010) 2nd ed.

Reference Books: Bishop C., Pattern Recognition and Machine Learning, Springer-Verlag (2006) 2nd ed. 4. Michie D., Spiegelhalter D. J., Taylor C. C., Machine Learning, Neural and Statistical Classification. Overseas Press (2009) 1st ed.

Software Engineering Lab

BCA-551

L	T	P	Cr
0	0	4	2

Course Outcomes:
At the end of this course, Students will demonstrate the ability to:

1. Understand the software development life cycle (SDLC) and apply it to real-world projects.
2. Develop skills in requirement gathering, system design, and coding for software applications.
3. Implement software testing methods to ensure functionality, performance, and reliability.
4. Apply version control tools and collaborate effectively on team-based software development projects.
5. Evaluate and improve software design and architecture based on user feedback and performance analysis.

1. To prepare problem statement for any project.
2. Create a problem statement for an online learning platform.
3. Develop an understandingandSoftware Requirements Specification(SRS).
4. To draw a sample Entity Relationship Diagram for library management system.
5. To prepareDataFlow Diagram Online shopping management system.
6. To prepare the student / university management system Use Case Diagram.
7. To draw a sample activity diagram for enterprise architectural modeling.
8. To draw a sample Class diagram for seminar.
9. To draw a Sequence Diagram for Online Shopping Checkout Process
10. To draw a Component Diagram for Library Management System.
11. To draw a Deployment Diagram for University Management System.
12. Develop a testing strategy for an online banking application.
13. Create a presentation that explains each phase of the SDLC with examples.

Algorithms and Data Structures with C++ Lab

BCA-552

L	T	P	Cr
0	0	4	2

Course Outcomes:

At the end of this course, Students will demonstrate the ability to:

1. Understand the implementation and application of fundamental algorithms using C++.
2. Develop skills in working with data structures like arrays, stacks, queues, and linked lists.
3. Apply sorting and searching algorithms to solve practical problems efficiently.
4. Implement advanced data structures like trees, graphs, and hash tables in C++.
5. Analyze algorithmic complexity and optimize code for better performance in real-world applications.

1. **Introduction to C++**
   - Review of C++ syntax and fundamentals
   - Basic data types and control structures
2. **Arrays and Strings**
   - Dynamic and static arrays
   - String manipulation functions
3. **Linked Lists**
   - Singly and doubly linked lists
   - Basic operations: insert, delete, traverse
4. **Stacks and Queues**
   - Stack implementation and applications
   - Queue implementation and applications
5. **Trees**
   - Binary trees and traversal techniques
   - Binary search trees: operations and applications
6. **Heaps**
   - Heap data structure and heap sort
   - Priority queues
7. **Hashing**
   - Hash tables: creation and collision handling
   - Practical applications of hashing
8. **Graphs**
   - Graph representations (adjacency list/matrix)
   - Traversal algorithms: BFS and DFS

-

9. **Sorting Algorithms**
    - Overview of sorting algorithms: quicksort, mergesort, bubblesort
    - Analysis of time and space complexity
10. **Searching Algorithms**
    - Linear search vs. binary search
    - Searching techniques on various data structures
11. **Algorithm Analysis**
    - Big O notation and complexity analysis
    - Practical examples and case studies
12. **Final Project**
    - Implementation of a complex data structure or algorithm
    - Presentation and demonstration of project

Research Project-I

BCA-553

L	T	P	Cr
0	0	4	2

Course Outcomes:

At the end of this course, Students will demonstrate the ability to:

1. Develop skills in conducting independent research on a chosen topic or problem.
2. Apply research methodologies to gather, analyze, and synthesize relevant data and information.
3. Enhance problem-solving abilities by formulating hypotheses and testing them through experiments or analysis.
4. Communicate research findings effectively through written reports and presentations.
5. Foster critical thinking and innovation by exploring new ideas and potential solutions in the project domain.

Introduction to Research Methodologies: Overview of qualitative, quantitative, and mixed methods.

Research Topic Selection: Strategies for identifying and refining research questions.

Literature Review: Conducting thorough searches and summarizing relevant literature.

Research Methodology Design: Choosing appropriate research methods and approaches.

Data Collection Techniques: Exploring surveys, interviews, experiments, and observations.

Data Analysis: Introduction to statistical and qualitative analysis techniques.

Research Proposal Development: Structuring and writing an effective research proposal.

Ethical Considerations in Research: Understanding ethical issues and obtaining necessary approvals.

Project Review and Feedback: Presenting progress and receiving constructive feedback.

Final Project Submission: Preparing and submitting the completed research project.

Data Communication and Computer Network

BCA-601

L	T	P	Cr
4	0	0	4

Course Outcomes:
At the end of this course, Students will demonstrate the ability to:

1. Understand Internet organization, ISP, and network performance criteria.
2. Learn about LAN topologies, wireless LANs, and network protocols (e.g., Ethernet, IEEE 802.11).
3. Implement error and flow control techniques in reliable data delivery.
4. Explore routing, forwarding, and multicast routing algorithms.
5. Develop network applications using DNS, HTTP, and email protocols.

UNIT 1
Introduction: Organization of the Internet, ISP, Network criteria, Categories of networks, Network performance and Transmission Impairments. Network Devices, OSI Model, TCP/IP Protocol Suite, Layering principles, Line Encoding, Switching technique and Multiplexing.

UNIT 2
Local Area Networks: LAN topologies: Bus topology, Ring topology, Token passing rings, FDDI, Star topologies, Asynchronous transfer mode, Ethernet, IEEE standards 802.3, 802.5. Wireless LANs: IEEE 802.11 and Bluetooth, introduction to Virtual circuit switching including frame relay, X.25, and ATM.

UNIT 3
Reliable Data Delivery: Error control (retransmission techniques, timers), Flow control (Acknowledgements, sliding window), Multiple Access, Performance issues (pipelining). Routing and Forwarding: Routing versus forwarding, Static and dynamic routing, Unicast and Multicast Routing. Distance-Vector, Link-State, Shortest path computation.

UNIT 4
Process-to-Process Delivery: UDP, TCP and SCTP, Multiplexing with TCP and UDP, Principles of congestion control, Approaches to Congestion control, Quality of service, Flow characteristics, Techniques to improve QoS.

UNIT5
Network Applications: Naming and address schemes (DNS, IP addresses, Uniform Resource Identifiers, etc.), Distributed applications (client/server, peer-to-peer, cloud, etc.), HTTP as an application layer protocol, Electronic mail, File transfer, Remote login.

Laboratory work: To design conceptual networks using E-Draw, Visual Studio etc. and to implement topologies BUS, RING, STAR, Mesh and configuring Router using Packet tracer or GNS3 platform

Text Books: 1. Forouzan A. B., Data communication and Networking, McGraw Hill (2012) 5thed. 2. Tanenbaum S. A. and Wetherall J. D., Computer Networks, Prentice Hall (2013) 5thed.

Reference Books: Kurose J. and Ross K., Computer Networking: A Top Down Approach, Perason (2017) 7thed. 2. Stallings W., Computer Networking with Internet Protocols and Technology, Pearson (2004)

Artificial Intelligence

BCA-602

L	T	P	Cr
4	0	0	4

Course Outcomes:
At the end of this course, Students will demonstrate the ability to:

1. Grasp foundations, problems, and approaches of AI and intelligent agents.
2. Learn knowledge representation methods and reasoning techniques.
3. Study planning as search and reasoning with uncertain knowledge (Bayesian networks).
4. Understand decision-making, machine learning methods, and Q-learning.
5. Build expert systems and implement AI algorithms (e.g., search, heuristic search).

UNIT 1
Overview:foundations, scope, problems, and approaches of AI. Intelligent agents: reactive, deliberative, goal-driven, utility-driven, and learning agents Problem-solving through Search: forward and backward, state-space, blind, heuristic, problem reduction, A, A*, AO*.

UNIT 2
Knowledge Representation and Reasoning:ontologies, foundations of knowledge representation and reasoning, representing and reasoning about objects, relations, events, actions, time, and space; predicate logic, situation calculus, description logics, reasoning with defaults, reasoning about knowledge, sample applications.

UNIT 3
Planning: planning as search, partial order planning, construction and use of planning graphs Representing and Reasoning with Uncertain Knowledge: probability, connection to logic, independence, Bayes rule, Bayesian networks, probabilistic inference, sample applications

UNIT 4
Decision-Making: decision theory, sequential decision problems
Machine Learning and Knowledge Acquisition: learning from memorization, Learning nearest neighbour, naive Bayes, and decision tree classifiers, Q-learning for learning action policies, applications.

UNIT5
Expert Systems: Architecture of an expert system, existing expert systems like MYCIN, RI, Expert system shells.

Laboratory work:
Programming in C/C++/Java/LISP/PROLOG: Programs for Search algorithms- Depth first, Breadth first, Hill climbing, Best first, A* algorithm, Implementation of games: 8-puzzle, Tic-Tac-Toe, tower of Hanoi and water jug problem using heuristic search, Designing expert system using logic in PROLOG, Implementing an intelligent agent.

Text Books: 1. Rich E., Knight K. and Nair B. S., Artificial Intelligence, Tata McGraw Hills (2009) 3rded. 2. Luger F. G., Artificial Intelligence: Structures and Strategies for Complex Problem Solving, Pearson Education Asia (2009) 6thed.

Reference Books: 1. Patterson W. D., Introduction to Artificial Intelligence and Expert Systems, Pearson (2015) 1st ed. 2. Russel S., Norvig P., Artificial Intelligence: A Modern Approach, Prentice Hall (2014) 3rd ed.

Cyber Security and Cyber Law

BCA-603

L	T	P	Cr
4	0	0	4

Course Outcomes:
At the end of this course, Students will demonstrate the ability to:

1. Understand information security, cyber security, and cybercrime types.
2. Study information policies, digital divide, and convergence.
3. Explore IT Act, security protocols, and fairness in information exchanges.
4. Learn about trusted third parties and information security infrastructure.
5. Understand international cyber laws and data privacy rules.

Unit-I
Information Security, Cyber Security, Information Assurance, Cyber Crime- Meaning, Types,Need, Function

Unit-II
Information Policy- Meaning, Types, Need, Function, Case Studies, Need, Convergence,Information Divide, Digital Divide, Information Literacy, Network Literacy, Digital Humanities& Sociology, Information and IT Policy as a Discipline and Degrees worldwide

Unit-III
Information Technology Act, Information Security Protocols, Non-repudiation services, relatedprotocols, Fairness in Information Exchanges Protocols

Unit-IV
Trusted Third Party, its use as Adjudicator, message authenticator, Information Securitystandards, Information Security Infrastructure.

Unit-V
International Information Act & IT Act, Right to Information Act-2005 with Process, Features and Functions, IT Act 2000-Role, Features, Summary, Changes, Data Privacy Rules, Real life Example of IT Act uses, Emerging Cyber Act in India

Text/References:

1. Kahin, B., & Nesson, C. (1996). Borders in cyberspace: Information policy and the global information infrastructure. MIT Press.
2. Kamisar, Y. (1980). Police interrogation and confessions: Essays in law and policy (p. 1)Ann Arbor, MI: University of Michigan Press.
3. Holtshouse, D. K. (2013). Information technology for knowledge management. U. M.Borghoff, & R. Pareschi (Eds.). Springer Science & Business Media.

Software Project Management

BCA-604

L	T	P	Cr
4	0	0	4

Course Outcomes:

At the end of this course, Students will demonstrate the ability to:

1. Learn project management basics, including cost, time, and quality objectives.
2. Explore planning methods and Agile software principles for project management.
3. Study project quality management techniques like Six Sigma and ISO standards.
4. Understand risk management processes and tools for assessing project risks.
5. Implement software configuration management and version control practices.

UNIT 1

Introduction to Project Management: The characteristics of software projects, Objectives of project management: time, cost and quality, Basics of Project Management, Stakeholders, Stages of Project, The Feasibility Study, Cost-benefit Analysis, Planning, Project Execution, Project and Product Life Cycles, Project Management Knowledge areas, Project Management Tools & Techniques, Project success factors, role of project manager

UNIT 2

Project Management and Planning: System view of project management, Understanding organizations, stakeholder's management, project phases and project's life cycles. Introduction to Agile software, why planning is necessary, Iterative steps for planning, Project Plan documentation methods, Software Requirement Specification.

UNIT 3

Project Quality Management: Quality Planning, quality Assurance, Quality control, Tool &techniques for quality control, Pareto Analysis, Six Sigma, CMM, ISO Standards, Juran Methodology.

UNIT 4

Project risk management: Risk Management planning, common sources of risk, risk identification, risk register, qualitative risk analysis, using probability impact matrixes, expert judgement, qualitative risk analysis, decision trees & expected monetary value, simulation, sensitivity analysis, risk response planning, risk monitoring & control.

UNIT5

Software Configuration Management: Why versions exist, why retain versions, SCI, Releases vs. version. Change Control and Management

Laboratory work:
Laboratory work: Using Function Point calculation tools for estimation, comparing with COCOMO estimates, Implementation of various exercises using PERT, CPM methods, Preparing schedule, resource allocation etc. using MS Project or Fissure. sim or VENSIM can also be used, Preparing an RMMM Plan for a case study, Preparing Project Plan for a Software Project for Lab Project or case study. Exploring about PMBOK (Project Management Body of Knowledge) and SWEBOK(Software Engineering Body of Knowledge) from related website, Implementation of software project management concepts using related tools and technologies.

Text Books: 1. Hughes B. and Cotterell M. and Mall R., Software Project Management, Tata McGraw Hill (2011) 5th Ed. 2. Pressman R., A practitioner's Guide to Software Engineering, Tata McGraw Hill (2014) 7th Ed.

Reference Books: 1. Stellman A., Greene J., Applied Software Project Management, O'Reilly Media, Inc. (2008). 2. Futrell T. R., Shafer F. D. and Shafer I. L., Quality Software Project Management, Prentice Hall (2002).

Computer Network

BCA-651

L	T	P	Cr
0	0	4	2

Course Outcomes:
At the end of this course, Students will demonstrate the ability to:

1. Understand the fundamental concepts of computer networks, including protocols, IP addressing, and routing.
2. Develop skills in configuring and managing network devices like routers, switches, and hubs.
3. Implement and analyse various network protocols such as TCP/IP, HTTP, and DNS.
4. Conduct experiments on data transmission, error detection, and network security.
5. Troubleshoot and optimize network performance through hands-on lab exercises and simulations.

1. Programs using TCP Sockets (like date and time server & client, echo server & client, etc.)

2. Programs using UDP Sockets (like simple DNS)

3. Programs using raw sockets (like packet capturing and filtering)

4. Programs using RPC

5. Simulation of sliding window protocols

Seminar and Group Discussion

BCA-656

L	T	P	Cr
0	0	4	2

Course Outcomes:

At the end of this course, Students will demonstrate the ability to:

1. Enhance research and analytical skills by selecting and exploring relevant topics.
2. Develop effective communication skills through structured presentations and group discussions.
3. Foster teamwork and collaboration by engaging in productive group discussions.
4. Improve critical thinking by evaluating diverse viewpoints and providing constructive feedback.
5. Build confidence in public speaking and presenting ideas clearly to an audience.

□**Introduction to Seminar Presentations:** Overview of effective presentation techniques and styles.

□**Topic Selection:** Guidance on choosing relevant and engaging topics for seminars.

□**Research Skills:** Techniques for researching and organizing information for presentations.

□**Presentation Skills:** Training on voice modulation, body language, and visual aids.

□**Group Discussion Dynamics:** Understanding roles in discussions, including facilitators, note-takers, and speakers.

□**Critical thinking:** Techniques for analyzing arguments and providing constructive feedback.

□**Peer Evaluation:** Learning how to give and receive feedback on presentation skills and content.

□**Technology in Presentations:** Utilizing tools such as PowerPoint, Prezi, and video aids effectively.

□**Special Topics:** Guest lectures or workshops on specific communication skills (e.g., negotiation, conflict resolution).

□**Final Group Discussion:** A culminating group discussion where students will apply skills learned throughout the course.

Research Project-II

BCA-658

L	T	P	Cr
0	0	4	2

Course Outcomes:

At the end of this course, Students will demonstrate the ability to:

1. Conduct in-depth research on a specialized topic, building upon prior knowledge and findings.
2. Apply advanced research methodologies and techniques to collect, analyze, and interpret data.
3. Develop problem-solving skills by addressing complex challenges and proposing innovative solutions.
4. Communicate research outcomes through detailed reports, presentations, and publications.
5. Collaborate effectively with peers and mentors for feedback, improvement, and knowledge sharing.

Project Implementation: Execution of the research plan, including data collection and analysis.

Data Analysis Techniques: Application of statistical tools and software for data interpretation.

Research Documentation: Structuring and writing a detailed research report.

Presentation Preparation: Techniques for effectively communicating research findings.

Peer Review Process: Engaging in constructive feedback sessions with peers on research presentations and reports.

Ethical Considerations: Addressing ethical issues encountered during the research process.

Final Presentation: Preparing and delivering a presentation summarizing the research project and findings.

Shobhit University

EDUCATION EMPOWERS

Shobhit University, Gangoh

(Established by UP Shobhit University Act No. 3, 2012)

School of School of Engineering and Technology

Ordinances, Regulations & Syllabus

For

Master of (MCA), Two Year Programme

Semester System

(w.e.f. session 2013-14)

Approved and adopted in the year 2021 (17th Meeting, Board of Studies)

Programme Educational Objectives (PEOs)

PEO 1 To provide a strong foundation in computer science and software engineering, enabling students to develop, design, and implement advanced IT solutions for complex challenges.

PEO 2 To enhance critical thinking and problem-solving abilities, allowing graduates to analyze, design, and optimize algorithms and systems for real-world applications in diverse domains.

PEO 3 To develop leadership skills, effective communication, and teamwork capabilities, preparing students to manage projects and lead multidisciplinary teams in delivering innovative IT solutions.

PEO 4 To foster research skills and encourage innovation, enabling students to explore emerging technologies and contribute to advancements in software development and computer science.

PEO 5 To promote ethical behavior, professional integrity, and continuous learning, ensuring graduates stay adaptable and contribute positively to the evolving IT industry throughout their careers.

PEO 6 To nurture leadership qualities, communication skills, and teamwork, preparing students to manage projects and collaborate effectively within multidisciplinary teams, ensuring success in software development and IT management.

PEO 7 To instill a sense of ethical responsibility, professionalism, and integrity, ensuring that graduates understand the societal impact of technology and contribute positively to the global IT community.

PEO 8 To promote lifelong learning and adaptability, preparing graduates to continually update their skills, stay current with emerging technologies, and remain competitive in an ever-evolving IT landscape.

Programme Specific Objectives (PSO's)

PSO 1 To develop proficiency in designing, implementing, and testing software applications using modern programming languages, frameworks, and tools to address complex computational problems.

PSO 2 To equip students with advanced knowledge of computer networks, protocols, and cybersecurity, enabling them to design secure, scalable, and efficient networked systems.

PSO 3 To provide expertise in database management, data structures, and data analysis, empowering students to design efficient data-driven applications for real-world business and scientific solutions.

PSO 4 To explore emerging technologies such as Artificial Intelligence, Machine Learning, Cloud Computing, and Big Data, preparing students to innovate and apply these technologies in various domains.

Programme Outcome (PO's)

PO 1 Fundamental Engineering Knowledge- Utilize a strong foundation in mathematics, science, and engineering principles to analyze and solve complex engineering problems effectively.

PO 2 Critical Problem Solving- Identify, model, and solve challenging engineering problems by applying analytical methods, scientific principles, and engineering techniques to arrive at optimal solutions.

PO 3 Solution Design and Development - Design innovative and effective solutions for complex engineering challenges, considering factors such as safety, public health, and cultural, environmental, and societal implications.

PO 4 Investigative Research - Apply scientific methods, including experimental design, data collection, analysis, and synthesis, to conduct investigations and draw valid, research-based conclusions for complex engineering problems.

PO 5 Advanced Tool Application- Select and apply modern engineering and IT tools, including software for modeling, simulation, and prediction, to solve complex engineering problems while understanding the limitations and scope of these tools.

PO 6 Ethical and Societal Awareness- Evaluate and address societal, ethical, health, legal, and cultural issues related to engineering practice, ensuring that solutions contribute positively to both society and the profession.

PO 7 Sustainable Engineering Practice- Assess the environmental and societal impact of engineering solutions and implement sustainable practices to support long-term ecological balance and development.

PO 8 Professional and Ethical Responsibility- Commit to and practice ethical behavior in all engineering activities, adhering to professional standards and societal expectations to promote integrity in the engineering profession.

PO 9 Collaborative and Independent Work - Function both independently and collaboratively, contributing as an effective team member or leader in multidisciplinary environments, adapting to diverse roles and responsibilities.

PO 10 Effective Communication- Develop strong communication skills, enabling the clear and effective presentation of technical information through reports, documentation, and presentations to both technical and non-technical audiences.

PO 11 Project and Financial Management - Apply engineering and management principles to plan, manage, and lead projects efficiently, considering factors such as time, cost, and resources in both individual and team-based environments.

PO 12 Commitment to Lifelong Learning - Recognize the importance of continuous professional development and engage in lifelong learning, staying updated with the latest technologies, research, and trends in the engineering field.

Scheme of Teaching

TEACHING SCHEME OF MCA 1st YEAR (1st SEMESTER)

Code	Course Title	Cr.	L	T	P
MCA-101	Java	4	3	1	0
MCA-102	Advanced Database Management System	4	3	1	0
MCA-103	Advanced Design and analysis of Algorithm	4	3	1	0
MCA-104	Network Fundamentals	4	3	1	0
MCA-133 MCA-133 A MCA-133 B MCA-133 C MCA-133 D	Optimization Techniques Elements of Statistics Combinatorial Optimization Multi-objective Optimization Biostatistics	4	3	1	0
MCA-151	Lab JAVA	2	0	0	4
MCA-152	Lab Advanced Database Management System	2	0	0	4
MCA-153	Lab Design and analysis of Algorithm	2	0	0	4
	Total	24	15	5	4

PROFESSIONAL ELECTIVE-I

1. MCA-131 Mobile Computing
2. MCA-132 Theory of Computation
3. MCA-133 Optimization techniques
4. MCA-134 Data Warehousing and Data Mining

Shobhit University

EDUCATION EMPOWERS

Shobhit University, Gangoh

(Established by UP Shobhit University Act No. 3, 2012)

School of School of Engineering and Technology

Ordinances, Regulations & Syllabus

For

Bachelor of Engineering, Four Year Programme

Semester System

(w.e.f. session 2020-21)

Approved and adopted in the year 2021 (17th Meeting, Board of Studies)

Programme Educational Objectives (PEOs)

PEO 1 Graduates will acquire a strong foundation in engineering principles, enabling them to design, develop, and implement innovative solutions to complex engineering problems across various industries.

PEO 2 Graduates will develop the ability to apply critical thinking, problem-solving skills, and engineering techniques to analyze, evaluate, and resolve real-world challenges in their chosen engineering discipline.

PEO 3 Graduates will gain hands-on experience in using modern engineering tools, software, and technologies, enabling them to effectively design, model, and optimize engineering systems and processes.

PEO 4 Graduates will demonstrate the ability to work collaboratively in multidisciplinary teams, manage engineering projects, and communicate technical information effectively to both technical and non-technical stakeholders.

PEO 5 Graduates will adhere to professional and ethical standards, ensuring their engineering solutions are socially responsible, environmentally sustainable, and aligned with industry best practices and regulatory requirements.

PEO 6 Graduates will develop leadership and management skills, preparing them to take on roles of responsibility in both technical and managerial aspects of engineering projects.

PEO 7 Graduates will engage in lifelong learning and stay current with emerging technologies, ensuring continuous professional growth and adaptability to the evolving engineering landscape.

PEO 8 Graduates will contribute to the betterment of society by creating innovative solutions that address societal challenges, promote sustainable development, and enhance the quality of life globally.

Programme Specific Objectives (PSO's)

PSO 1 Software Design and Development- Equip students with the necessary skills to design, develop, and deploy software systems and applications, applying software engineering principles, algorithms, and best practices to solve complex problems efficiently

PSO 2 System Design and Networking- Develop students' ability to design, implement, and analyze computer systems, networks, and databases, with a focus on optimization, scalability, and security in distributed computing environments.

PSO 3 Emerging Technologies and Innovation- Encourage students to explore and apply emerging technologies such as Artificial Intelligence, Machine Learning, Cloud Computing, and Internet of Things (IoT), preparing them to innovate and adapt to technological advancements.

PSO 4 Professionalism and Ethical Responsibility- Instill in students the importance of professionalism, ethical conduct, and societal responsibility in their work, ensuring they consider the broader impact of technology on society, privacy, and security.

Programme Outcome (PO's)

PO 1 Engineering knowledge - Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO 2 Problem analysis - Identify, formulate, research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

PO 3 Design/Development of Solutions - Design/Development of Solutions- Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

PO 4 Conduct Investigations of Complex Problems - Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

PO 5 Modern Tool Usage - Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.

PO 6 The Engineer and Society- Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

PO 7 Environment and Sustainability- Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PO 8 Ethics- Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO 9 Individual and Team Work- Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO 10 Communication- Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PO 11 Project Management and Finance- Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

PO 12 Life-Long Learning- Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Scheme of Teaching

TEACHING SCHEME OF B.TECH. 1ST YEAR (1ST SEMESTER)

W.E.F. Academic Session 2021-22

(COMMON FOR ALL BRANCHES)

CODE	SUBJECT	CREDIT	L	T	P
CMAN-101	Mathematics-I				
CMAN-101 A	Mathematics				
CMAN-101 B	Basic Mathematics	4	3	1	0
CMAN-101 C	Applied Mathematics				
CMAN-101 D	Advanced Applied Mathematics				
CMEN-101	Engineering Mechanics				
CMEN-101 A	Structural Analysis				
CMEN-101 B	Rigid Body Mechanics	4	3	1	0
CMEN-101 C	Fluid Mechanics				
CMEN-101 D	Free-Body Diagrams Mechanics				
CECN-101	Fundamentals Of Electronics				
CECN-101 A	Analog Electronics				
CECN-101 B	Digital Electronics	4	3	1	0
CECN-101 C	Electronics Measurement and Testing				
CECN-101 D	Electromagnetics				
CESN-101	Engineering Chemistry and Environmental Science				
CESN-101 A	Chemical Thermodynamics				
CESN-101 B	Chemical Kinetics	4	3	1	0
CESN-101 C	Environmental Chemistry				
CESN-101 D	Natural Resource Management				
CPCN-101	Presentation and Communication Skills				
CPCN-101 A	English Communication				
CPCN-101 B	English /				
CPCN-101 C	Technical Communication	3	3	0	0
CPCN-101 D	Human Values, Deaddiction and Traffic Rules				
CMEN-151	Engineering Workshop Practice	1	0	0	2
CMEN-153	Engineering Graphics Lab	1	0	0	2
CPCN-151	Communication Lab				
CPCN-151 A	English Communication Lab				
CPCN-151 B	English Lab	1	0	0	2
CPCN-151 C	Technical Communication Lab				
CPCN-151 D	Human Values, Deaddiction And Traffic Rules (Lab)				
TOTAL		22	15	4	6

SHOBHIT UNIVERSITY, GANGOH (SAHARANPUR)

TEACHING SCHEME

W.E.F. Academic Session 2021-22

B. TECH. (COMPUTER SCIENCE & ENGINEERING)

III semester

Code	Course Title	Cr.	L	T	P
CCSN-201	Data Structure Using 'C'	4	3	1	0
CCSN-203	Database Management System	4	3	1	0
CCSN-205	Operating Systems (Unix Programming)	4	3	1	0
CCSN-207	Java Programming	4	3	1	0
CCSN-XXX	Professional Elective-I	4	3	1	0
CBSN-201	Value Education, Human Rights and Legislative Procedures	2	2	0	0
CBSN-201 A	Humanities And Science				
CBSN-201 B	Public Policy				
CBSN-201 C	Leaders For Global Operations				
CCSN-251	Data Structure Using 'C' Lab	1	0	0	2
CCSN-253	Database Management System Lab	1	0	0	2
CCSN-255	Java Programming Lab	1	0	0	2
	Total	25	17	5	6

PROFESSIONAL ELECTIVE-I

1. CCSN 209 Discrete Mathematics
   CCSN 209 A Mathematics
   CCSN 209 B Basic Mathematics
   CCSN 209 C Mathematics-I
   CCSN 209 D Advanced Applied Mathematics
1. CCSN 211 PERL Programming
2. CCSN 213 Introduction To Soft Computing (Neural Networks, Fuzzy Logic and Genetic Algorithm)
3. CCSN 215 MATLAB Programming For Engineers

SHOBHIT UNIVERSITY, GANGOH (SAHARANPUR)

TEACHING SCHEME

W.E.F. Academic Session 2021-22

B. TECH. (COMPUTER SCIENCE & ENGINEERING)

V semester

Code	Course Title	Cr.	L	T	P
CCSN-301	Software Engineering	4	3	1	0
CCSN-303	Compiler Design	4	3	1	0
CCSN-305	Object Oriented Analysis and Design	4	3	1	0
CCSN-XXX	Professional Elective-Iii	4	3	1	0
CUCS-XXX	Open Elective-I	4	3	1	0
CBSN-301	Energy Studies	2	2	0	0
CBSN-301 A	Supply Chain Management				
CBSN-301 B	Transportation				
CBSN-301 C	Environment and Sustainability				
CCSN-351	Software Engineering Lab	1	0	0	2
CCSN-353	Compiler Design Lab	1	0	0	2
CCSN-355	Object Oriented Analysis and Design Lab	1	0	0	2
	Total	25	17	5	6

PROFESSIONAL ELECTIVE-III

1. CCSN 307 Cryptography & Information Security
2. CCSN 309 Internet Web Programming
3. CCSN 311 Graph Theory

OPEN ELECTIVE-I

1. CUCS 341 Computer Vision
2. CUCS 343 Robotics and Automation
3. CUCS 345 Cloud Computing
4. CUCS 347 Human Computer Interface

SHOBHIT UNIVERSITY, GANGOH (SAHARANPUR)

TEACHING SCHEME

W.E.F. Academic Session 2021-22

B. TECH. (COMPUTER SCIENCE & ENGINEERING)

VII Semester

Code	Course Title	Cr.	L	T	P
CCSN-401	Artificial Intelligence	4	3	1	0
CCSN-403	Distributed Computing Systems	4	3	1	0
CCSN-405	Advanced Computer System Architecture	4	3	1	0
CCSN-XXX	Professional Elective-V	4	3	1	0
CUCS-XXX	Open Elective-V	4	3	1	0
CBSN-401	Law For Engineers	2	2	0	0
CBSN-401 A	Intellectual Property Rights				
CBSN-401 B	Employment Law				
CBSN-401 C	Dispute Resolution And Litigation				
CBSN-401 D	Environmental Law				
CCSN-451	Artificial Intelligence Lab	1	0	0	2
CCSN-453	Distributed Computing Systems Lab	1	0	0	2
CCSN-481	Seminar & Group Discussion	1	0	0	2
	Total	25	17	5	6

PROFESSIONAL ELECTIVE-V

1. CCSN 407 Digital Image Processing
2. CCSN 409 Multimedia Computing
3. CCSN 411 Pattern Recognition
4. CCSN 413 C# Programming

OPEN ELECTIVE-III

1. CUCS 441 Client-Server Computing
2. CUCS 443 Neural Network
3. CUCS 445 Engineering System Modeling And Simulation
4. CUCS 447 Computer Based Numerical & Statistical Techniques

SYLLABUS

Mathematics-I

CMAN-101

L	T	P	Cr
3	1	0	4

COURSE OBJECTIVES:

The objectives of this course are to

1. Develop a strong foundation in matrix algebra, including matrix operations, eigenvalues, eigenvectors, and matrix diagonalization.
2. Understand and solve higher-order ordinary differential equations using various methods, including Euler-Cauchy and variation of parameters.
3. Learn numerical methods for solving ordinary differential equations, such as Picard's method and Euler methods.
4. Explore functions of several variables, including limits, differentiability, Jacobians, and Taylor's theorem.
5. Study series solutions of second-order linear differential equations and properties of Bessel functions and Legendre polynomials.

Course Outcomes:

At the end of this course, students will demonstrate the ability to:

1. Apply matrix algebra techniques to solve linear equations, calculate eigenvalues and eigenvectors, and understand matrix diagonalization.
2. Solve linear and simultaneous differential equations using various analytical methods like Euler-Cauchy and variation of parameters.
3. Implement numerical methods to solve ordinary differential equations and analyze the convergence of infinite series.
4. Evaluate functions of several variables, apply the chain rule, and find extrema using Taylor's theorem and Jacobians.
5. Solve second-order differential equations using series methods and understand the properties of Bessel functions and Legendre polynomials.

Unit-I

Matrix Algebra: Rank of a matrix, Inverse of a matrix by elementary operations; Solution of linear simultaneous equations and their numerical solutions by Gauss elimination , Eigenvalues and Eigenvectors of matrices by Cayley-Hamilton theorem; Diagonalisation of matrices; Orthogonal, Hermetian, Skew-Hermetian, Normal and Unitary matrices and their elementary properties.

Unit-II

Ordinary Differential Equations: Linear differential equation of nth order with constant coefficients, Simultaneous Linear differential equations, Euler-Cauchy equations, Solution of second order differential equations by change of dependent and independent variables; Method of variation of parameters for second order differential equations.

Unit-III

Numerical Solution of ODE: Picard's method, Taylor's series, Euler method & Modified Euler method. Definition of Sequence and series with example, Convergence of infinite series; Comparison test, Ratio test, Root test, Logarithmic test, De Morgan's test, Cauchy integral test.

Unit-IV

Functions of Several Variables: Limit cotinuity and differentiability of functions of two variables; Euler's theorem, Tangent plane and normal, Change of variables, Chain rule; Jacobians, Taylor's Theorem for two variables; Extrema of functions of two or more variables.

Unit-V

Solution in Series: Solution in series of second order linear differential equations with polynomial coefficients; Bessel and Legendre equations and their series solutions; Properties of Bessel functions and Legendre polynomials.

Reference Books :

1. Kreyszig, E. *Advanced Engineering Mathematics*. 8th Edition. Wiley Eastern, 2004.
2. Grewal, B.S. *Engineering Mathematics*. 39th Edition. Khanna Publishers, 2005.

Mathematics

CMAN-101 A

L	T	P	Cr
3	1	0	4

Course Outcomes:
At the end of this course, students will demonstrate the ability to:
1. Apply basic mathematical principles to real-world problems.
2. Develop problem-solving techniques using algebra and calculus.
3. Utilize theorems and formulas to solve mathematical problems.
4. Analyze data with statistical and probabilistic methods.
5. Use mathematical software for complex problem-solving and visualization.

Unit 1: Calculus
Functions, Limits, and Continuity: Definitions, limit laws, and continuity.
Differentiation: Differentiation of functions, product and quotient rules, chain rule, higher-order derivatives.
Applications of Differentiation: Tangents and normals, maxima and minima, optimization problems, curve sketching.
Integration: Definite and indefinite integrals, techniques of integration (substitution, integration by parts), improper integrals.
Applications of Integration: Area under curves, volumes of solids of revolution.

Unit 2: Linear Algebra

Matrices and Determinants: Basic operations, types of matrices, determinants, properties.
System of Linear Equations: Gaussian elimination, inverse of a matrix, rank of a matrix, consistency of linear systems.
Eigenvalues and Eigenvectors: Definitions, properties, diagonalization, Cayley-Hamilton theorem, applications to systems of differential equations.
Vector Spaces: Subspaces, linear independence, basis, and dimension.

Unit 3: Ordinary Differential Equations

First-order Differential Equations: Separable equations, exact equations, integrating factors, applications (growth models, electrical circuits).
Second and Higher-order Differential Equations: Solutions of linear differential equations, homogeneous and non-homogeneous equations, method of undetermined coefficients, variation of parameters.
Applications: Mechanical vibrations, electrical networks, and other physical applications.

Unit 4: Vector Calculus

Vector Functions: Differentiation and integration of vector functions, gradient, divergence, and curl.
Line, Surface, and Volume Integrals: Green's theorem, Stokes' theorem, and Gauss's divergence theorem.
Applications: Fluid flow, electromagnetism, and potential fields.

Unit 5: Probability and Statistics

Probability Theory: Basics of probability, conditional probability, independent events, Bayes' theorem.
Random Variables: Discrete and continuous random variables, probability density function (PDF), cumulative distribution function (CDF), and expectation.
Probability Distributions: Binomial, Poisson, and Normal distributions, applications to engineering problems.
Statistics: Measures of central tendency (mean, median, mode), measures of dispersion (variance, standard deviation), hypothesis testing, confidence intervals.

Recommended Textbooks:

1. Advanced Engineering Mathematics by Erwin Kreyszig, 11th Edition, Wiley, 2020.
2. Higher Engineering Mathematics by B.S. Grewal, 44th Edition, Khanna Publishers, 2022.
3. Linear Algebra and Its Applications by David C. Lay, 6th Edition, Pearson, 2021.
4. Introduction to Probability and Statistics for Engineers and Scientists by Sheldon M. Ross, 6th Edition, Academic Press, 2020.
5. Differential Equations and Boundary Value Problems: Computing and Modeling by C.H. Edwards and David E. Penney, 6th Edition, Pearson, 2018

Basic Mathematics

CMAN-101 B

L	T	P	Cr
3	1	0	4

Course Outcomes:
At the end of this course, students will demonstrate the ability to:

1. Understand fundamental mathematical operations and principles.
2. Solve basic algebraic equations and expressions.
3. Perform arithmetic calculations with accuracy.
4. Interpret and solve simple geometric problems.
5. Apply basic mathematical concepts to everyday situations.

Unit 1: Algebra

Polynomials: Degree, factorization, roots of polynomials, quadratic equations, and their applications.
Arithmetic and Geometric Progressions: Definitions, nth term, sum of series, applications in engineering.
Binomial Theorem: Expansion, general term, and applications.
Logarithms: Properties of logarithms, solving logarithmic equations, applications.

Unit 2: Trigonometry

Trigonometric Functions: Definitions, identities, and equations.
Inverse Trigonometric Functions: Domains, ranges, and basic properties.
Trigonometric Equations: General solutions, applications to physical problems.
Applications of Trigonometry: Heights and distances, simple harmonic motion, and waves.

Unit 3: Coordinate Geometry

Straight Lines: Equation of a line in different forms, slope, angle between two lines, distance formula, applications.
Circles: Standard equation, tangents and normals, intersection of a circle with a line.
Conic Sections: Parabola, ellipse, and hyperbola - standard equations and simple properties.
Applications in Engineering: Modelling of trajectories and orbits, structural designs.

Unit 4: Calculus

Limits and Continuity: Concept of a limit, properties of limits, continuity of a function.
Differentiation: Basic rules, derivatives of standard functions, product rule, quotient rule, chain rule.
Applications of Differentiation: Rate of change, maxima and minima, curve sketching.
Integration: Basic rules of integration, integration of standard functions, definite and indefinite integrals.

Applications of Integration: Area under curves, volumes of revolution, and simple applications in physics.

Unit 5: Probability and Statistics

Probability Basics: Definitions, sample space, events, conditional probability, independence, and Bayes' theorem.
Random Variables: Discrete and continuous, probability mass function (PMF), probability density function (PDF), cumulative distribution function (CDF).
Descriptive Statistics: Measures of central tendency (mean, median, mode), measures of dispersion (variance, standard deviation).
Basic Probability Distributions: Binomial, Poisson, and normal distributions.
Introduction to Hypothesis Testing: Null and alternative hypotheses, significance levels, z-tests and t-tests.

Recommended Textbooks:

1. Basic Engineering Mathematics by John Bird, 8th Edition, Routledge, 2021.
2. Engineering Mathematics by K.A. Stroud and Dexter Booth, 8th Edition, Palgrave Macmillan, 2020.
3. College Algebra and Trigonometry by Margaret Lial, John Hornsby, David Schneider, 7th Edition, Pearson, 2021.
4. Introduction to Probability and Statistics for Engineers and Scientists by Sheldon M. Ross, 6th Edition, Academic Press, 2020.
5. Calculus: Early Transcendentals by James Stewart, 9th Edition, Cengage Learning, 2020.

Applied Mathematics

CMAN-101 C

L	T	P	Cr
3	1	0	4

Course Outcomes:
At the end of this course, students will demonstrate the ability to:

1. Apply mathematical methods to solve real-world engineering problems.
2. Use differential equations to model and analyze dynamic systems.
3. Implement optimization techniques for resource allocation and decision-making.
4. Apply numerical methods to solve complex mathematical problems.
5. Utilize statistical tools to analyze and interpret data in applied contexts.

Unit 1: Advanced Calculus

Partial Differentiation: Functions of several variables, total derivatives, chain rule, Jacobians.
Taylor's Theorem for Multivariable Functions: Expansion of functions in two variables.
Maxima and Minima of Functions of Several Variables: Lagrange multipliers method and applications.
Multiple Integrals: Double and triple integrals, applications to area, volume, and center of mass.
Applications of Calculus: Engineering problems involving optimization, mass distribution, and fluid mechanics.

Unit 2: Ordinary and Partial Differential Equations

First-Order Differential Equations: Separable, exact, and linear equations, applications in mechanics and electrical circuits.
Higher-Order Differential Equations: Solutions of linear differential equations with constant coefficients, method of undetermined coefficients, and variation of parameters.
Partial Differential Equations (PDEs): Classification, method of separation of variables, wave equation, heat equation, and Laplace equation.
Applications: Mechanical vibrations, heat conduction, and fluid flow analysis.

Unit 3: Numerical Methods

Roots of Equations: Bisection method, Newton-Raphson method, and secant method.
Numerical Integration: Trapezoidal rule, Simpson's rule, and Gaussian quadrature.
Numerical Solutions to ODEs: Euler's method, Runge-Kutta methods (2nd and 4th order).
Finite Difference Methods for PDEs: Forward and backward difference methods, Crank-Nicolson method.
Applications: Numerical simulations in engineering problems such as heat transfer and structural analysis.

Unit 4: Complex Variables and Complex Analysis

Complex Numbers and Functions: Basic properties of complex numbers, polar form, complex functions, and their derivatives.
Analytic Functions: Cauchy-Riemann equations, harmonic functions, conformal mapping.
Complex Integration: Cauchy's theorem, Cauchy's integral formula, Taylor and Laurent series, residue theorem, and its applications.
Applications in Engineering: Fluid dynamics, electromagnetic fields, and signal processing.

Unit 5: Fourier Series and Laplace Transforms

Fourier Series: Periodic functions, Fourier series expansions, half-range expansions, and applications in engineering (signal processing, vibrations).
Laplace Transforms: Definition and properties, inverse Laplace transforms, solving ordinary differential equations using Laplace transforms.
Applications of Fourier Series and Laplace Transforms: Solution of heat, wave, and Laplace equations, control systems, and circuit analysis.

Recommended Textbooks:

1. Advanced Engineering Mathematics by Erwin Kreyszig, 11th Edition, Wiley, 2020.
2. Applied Mathematics for Engineers and Physicists by L.A. Pipes and L.R. Harvill, 4th Edition, Dover Publications, 2014.
3. Numerical Methods for Engineers by Steven C. Chapra and Raymond P. Canale, 8th Edition, McGraw-Hill, 2020.
4. Complex Variables and Applications by James Ward Brown and Ruel V. Churchill, 9th Edition, McGraw-Hill, 2021.
5. Fourier Analysis and Its Applications by Gerald B. Folland, 2nd Edition, American Mathematical Society, 2020.

Advanced Applied Mathematics

CMAN-101 D

L	T	P	Cr
3	1	0	4

Course Outcomes:
At the end of this course, students will demonstrate the ability to:

1. Solve complex partial differential equations in physical and engineering problems.
2. Apply advanced numerical methods for simulations and approximations.
3. Model and analyze systems using advanced optimization techniques.
4. Use advanced statistical methods for data analysis and prediction.
5. Implement mathematical theories in the analysis of complex real-world scenarios.

Unit 1: Optimization Techniques

Linear Programming: Formulation, graphical method, simplex method, duality, sensitivity analysis.
Non-Linear Programming: Introduction to non-linear optimization, Lagrange multipliers, Kuhn-Tucker conditions.
Dynamic Programming: Bellman's principle of optimality, recursive equations, applications to inventory control, resource allocation.
Applications: Optimization problems in engineering, project management, and operations research.

Unit 2: Advanced Numerical Methods

Interpolation and Extrapolation: Newton's forward and backward interpolation, Lagrange interpolation, spline interpolation.
Numerical Solutions to Nonlinear Systems: Fixed-point iteration, Newton's method for systems of equations.
Numerical Methods for ODEs and PDEs: Higher-order Runge-Kutta methods, finite element method (FEM), finite volume method (FVM).
Error Analysis and Stability: Concepts of error, stability, and convergence in numerical methods.
Applications: Numerical simulation of fluid dynamics, structural analysis, and heat transfer.

Unit 3: Integral Transforms

Fourier Transform: Fourier integrals, Fourier cosine and sine transforms, properties and applications to PDEs.
Laplace Transform: Review of Laplace transforms, inverse Laplace transforms, convolution theorem, application to ODEs and PDEs.

Z-Transform: Introduction, properties, inverse Z-transform, application in discrete-time systems and digital signal processing.
Applications: Signal processing, control systems, electrical circuits, and mechanical vibrations.

Unit 4: Special Functions

Gamma and Beta Functions: Definitions, properties, and applications in engineering problems.
Bessel Functions: Bessel's equation, Bessel functions of the first and second kinds, applications in vibration and heat conduction problems.
Legendre Polynomials: Legendre's equation, generating functions, orthogonality, applications in potential theory and electrostatics.
Applications: Solutions to boundary value problems in cylindrical and spherical coordinates.

Unit 5: Integral Equations and Calculus of Variations

Integral Equations: Volterra and Fredholm integral equations, kernel functions, methods of solving integral equations, applications.
Green's Function: Application of Green's function to solve boundary value problems.
Calculus of Variations: Euler-Lagrange equation, isoperimetric problems, Hamilton's principle, applications to mechanics and engineering.
Applications: Structural mechanics, fluid dynamics, and electrostatics.

Recommended Textbooks:

1. Advanced Engineering Mathematics by Erwin Kreyszig, 11th Edition, Wiley, 2020.
2. Numerical Methods for Engineers by Steven C. Chapra and Raymond P. Canale, 8th Edition, McGraw-Hill, 2020.
3. Applied Mathematical Methods by J. David Logan, 4th Edition, Wiley, 2018.
4. Introduction to Optimization by Pablo Pedregal, 3rd Edition, Springer, 2021.
5. Special Functions for Scientists and Engineers by W.W. Bell, 2nd Edition, Dover Publications, 2014.

Engineering Mechanics

CMEN 101

L	T	P	Cr
3	1	0	4

Course Outcomes:

At the end of this course, students will demonstrate the ability to:

1. Understanding of basic concepts in two-dimensional force systems and their application in analyzing concurrent and non-concurrent forces.
2. Ability to determine shear force and bending moment diagrams for statically determinate beams and analyze simple trusses using joint and section methods.
3. Knowledge of stress and strain, including the effects of normal and shear stresses, strain energy, and bending in beams and torsion in circular sections.
4. Proficiency in calculating centroids, moments of inertia for plane areas, and using theorems for composite bodies and mass moment of inertia.
5. Understanding of key thermodynamic principles such as laws of thermodynamics, entropy, and the Carnot cycle, along with their applications in energy analysis.

UNIT-I

Two Dimensional Force Systems: Basic concepts, Laws of motion, Principle of Transmissibility of forces, Resultant of a force system, Simplest Resultant of Two dimensional concurrent and Non-concurrent Force systems, Lami's Theorem, Distributed force system, Free body diagrams, Types of supports- Support reactions for beams with different types of loading- Concentrated, uniformly distributed and uniformly varying loading.

UNIT-II

Beam: Introduction, Shear force and Bending Moment, Shear force and Bending Moment Diagrams for StaticallyDeterminateBeams
Trusses: Introduction, Simple Truss and Solution of Simple truss, Method f Joints and Method of
Sections.

UNIT-III

Simple stress and strain: Normal and shear stresses. One Dimensional Loading; members of varying cross section, bars in series. Tensile Test diagram for ductile and brittle materials, Elastic constants, Strain energy. Bending of Beams: theory of pure bending, neutral surface and neutral axis, stresses in beams of different cross sections. Theory of Torsion, Torque and twist, Shear stress due to torsion circular sections.

UNIT-IV

Centroid and Moment of Inertia: Centroid of plane, curve, area and composite bodies, Moment of inertia of plane area, Parallel Axes Theorem, Perpendicular axes theorems, Mass Moment of Inertia

Unit-V

Engineering Thermodynamics: Thermodynamic system, Surrounding and the Universe, Control volume phase, Macroscopic & microscopic point of view, Thermodynamic equilibrium, Thermodynamic properties, State path process, Cyclic process, Laws of thermodynamics, Carnot cycle, Clausius inequality, Enthalpy and entropy, Principle of entropy increase.

References:

1. "Engineering Mechanics: Statics" , J.L Meriam , Wiley
2. "Engineering Mechanics: Dynamics" , J.L Meriam , Wiley
3. "Engineering Mechanics " , F L Singer
4. "Engineering Mechanics : Statics and Dynamics", R. C. Hibbler, Pearson
5. "Engineering Mechanics " , Thimoshenko& Young , 4ed, Tata McGraw Hill
6. "Engineering Mechanics: Statics and Dynamics", A. Nelason, McGraw-Hill
7. "Engineering Mechanics : Statics and Dynamics", Shames and Rao, Pearson
8. "Engineering Mechanics : Statics and Dynamics", S. Rajasekaran and G. Sankarasubramanian, Vikas
9. "Engineering Mechanics", V. Jayakumar and M. Kumar, PHI
10. "Engineering Mechanics", D. P. Sharma, PHI
11. "Engineering Mechanics", M. V. Sheshagiri Rao, and D. Rama Durgaiah, University Press.
12. "Engineering Mechanics" , K L Kumar and V. Kumar, McGraw Hill
13. "Engineering Mechanics" , Bhattacharya , Oxford Press
14. "Engineering Mechanics " , Dr Sadhu Singh , Umesh Publications
15. "Engineering Mechanics " , Bhavikatti , New Age

Structural Analysis

CMEN-101 A

L	T	P	Cr
3	1	0	4

Course Outcomes:
At the end of this course, students will demonstrate the ability to:

1. Analyze forces and moments in static structures.
2. Apply principles of equilibrium to solve structural problems.
3. Calculate deformations and displacements in structures.
4. Evaluate the stability and strength of structures under various loads.
5. Use advanced methods for analyzing complex structural systems.

UNIT I

Fundamentals of Statically Determinate Structures
Types of statically determinate & indeterminate structures, static and kinematic indeterminacy, stability of structures, principle of superposition, Maxwell's reciprocal theorems. Framed structure : Computation of internal forces in statically determinate framed structures such as plane truss, plane frame, grids.

UNIT II

Strain energy & Displacement of Statically Determinate structures
Strain Energy : Resilience, strain energy due to axial loads & flexure, proof resilience, modulus of resilience, impact loads, and sudden loads Displacement : Differential equation of elastic curve, relation between moment, slope and deflection, Displacement of beam by Macaulay's method

UNIT III

Direct and Bending stresses + Column & Struts
Direct and Bending stresses Members subjected to eccentric loads, middle third rule, kernel of Section, stress distribution. Applications of Direct & Bending stresses.Columns and Struts ,Buckling of columns, different end conditions, effective length, Least radius of gyration Applications: Euler's and Rankine's formulae,

UNIT IV

Statically Indeterminate beam
Types of statically indeterminate beams, Consistent Deformation Method, Basic principles for fixed beam, basics of moment distribution Method.Propped Cantilever beam : Analysis of propped cantilever beams. Fixed beam : Computation of fixed-end actions for various types of loads And secondary effects using basic principles, beams of varying moment of Inertia. Continuous beams

UNIT V

Computer Applications in Structural Engg. (for Laboratory Only)
Use of professional software such as STAAD-Pro, SAP, ETABS etc. for Determining response of frames structure of the topics related to this course

Reference Books:

1. Junarkar S.B. & Shah H.J.; Mechanics of Structures Vol-I; Charter publishing house, Anand
2. Wang. C.K., Intermediate Structural analysis. Tata McGraw Hill book Company.Delhi

Rigid Body Mechanics

CMEN-101 B

L	T	P	Cr
3	1	0	4

Course Outcomes:
At the end of this course, students will demonstrate the ability to:

1. Apply the principles of force and motion to rigid body systems.
2. Analyze the equilibrium of rigid bodies under applied forces and moments.
3. Solve problems involving the kinematics and kinetics of rigid bodies.
4. Use the concepts of angular velocity and acceleration in rigid body motion.
5. Apply energy methods to analyze work and power in rigid body systems.

UNIT I

Introduction to Rigid Body Mechanics
Definition and importance of rigid body mechanics. Basic concepts (position, displacement, velocity, acceleration). Reference frames (inertial, non-inertial). Rigid body idealization and modeling

UNIT II

Kinematics of Rigid Bodies
Translation, rotation, and general motion. Angular displacement, velocity, and acceleration. Euler's angles and rotation matrices. Relative motion and velocity analysis

UNIT III

Kinetics of Rigid Bodies
Newton-Euler equations. Angular momentum and moment of inertia. Work-energy principle and conservation of energy. Impulse-momentum principle

UNIT IV

Planar Motion of Rigid Bodies
. Planar kinematics and kinetics. Equations of motion (translation, rotation). Force and moment analysis. Application to linkages, gears, and cams

UNIT V

Three-Dimensional Motion of Rigid Bodies
3D kinematics and kinetics.Euler's equations and angular velocity. Gyroscopic motion and precession. Application to rotating shafts and machinery.Vibrations and Oscillations

Textbook Recommendations:
1. Hibbeler, R. C.Engineering Mechanics: Dynamics. 14th ed.
2. Bedford, A., & Fowler, W. . Engineering Mechanics: Statics & Dynamics. 6th ed. McGraw-Hill.

Fluid Mechanics

CMEN -101C

L	T	P	Cr
3	1	0	4

Course Outcomes:
At the end of this course, students will demonstrate the ability to:

1. Understand the properties and behavior of fluids at rest and in motion.
2. Apply principles of fluid statics and dynamics to solve engineering problems.
3. Analyze fluid flow using Bernoulli's equation and conservation laws.
4. Study the effects of viscosity and turbulence on fluid flow.
5. Use dimensional analysis to solve and scale fluid mechanics problems.

UNIT I
INTRODUCTION
Units & Dimensions. Properties of fluids - Specific gravity, specific weight, viscosity, compressibility, vapour pressure and gas laws capillarity and surface tension concepts of system, energy equation, momentum equation

UNIT II
FLOW THROUG CIRCULAR CONDUITS
Laminar flow though circular conduits and circular annuli. Boundary layer concepts. Boundary layer thickness. Hydraulic and energy gradient. Darcy Weisbach equation. Friction factor and Moody diagram. Commercial pipes. Minor losses. Flow though pipes in series and in parallel.

UNIT III
DIMENSIONAL ANALYSIS
Dimension and units: Buckingham's II theorem Discussion on dimensionless parameters. Models and similitude. Applications of dimensionless parameters.

UNIT IV
ROTO DYNAMIC MACHINES
Homologus units. Specific speed. Elementary cascade theory. Theory of turbo machines. Euler's equation. Hydraulic efficiency. Velocity components at the entry and exit of the rotor.radial flow and axial flow machines. Centrifugal pumps, turbines,

UNIT V
POSITIVE DISPLACEMENT
Recriprocating pumps, Indicator diagrams, Work saved by air vessels. Rotory pumps.

REFERENCES BOOKS
1. S. Fluid Mechanics, Hydraulics and Fluid Machines, DhanpatRai
2. Bansal, R.K., Fluid Mechanics and Hydraulics Machines, Laxmi Publications

Free Body Diagram Mechanics

CMEN-101 D

L	T	P	Cr
3	1	0	4

Course Outcomes:
At the end of this course, students will demonstrate the ability to:

1. Identify and represent forces acting on a body in a free-body diagram.
2. Apply equilibrium conditions to solve for unknown forces and moments.
3. Understand the role of support reactions and external loads in a system.
4. Analyze structures by breaking them down into individual components.
5. Use free-body diagrams to visualize and solve static and dynamic problems.

UNIT I

Introduction to Free Body Diagrams
Definition and importance of free body diagrams Basic concepts (forces, moments, torques) Drawing free body diagrams Identifying support reactions

UNIT II

Equilibrium of Particles and Rigid Bodies
Equilibrium equations (2D, 3D) Force and moment analysis Application to simple machines (levers, pulleys.) Center of gravity and center of mass; Moments and force

UNIT III

Force in Beams and Frames
Beam analysis (simply supported, cantilever). Frame analysis (simple, compound). Force and moment diagrams. Application to structural systems

UNIT IV

Torques and Rotational Equilibrium
Torque and rotational equilibrium. Application to gears, pulleys, and shafts. Rotational kinematic Angular momentum.

UNIT V

Stress and Strain Analysis
Introduction to stress and strain. Axial loading Torsional loading. Bending and shear stress
Textbook Recommendations:
1. Hibbeler, R. C. (2020). Engineering Mechanics: Statics & Dynamics. 14th ed. Pearson.
2. Beer, J. P., & Johnston, E. R. (2020). Mechanics of Materials. 8th ed. McGraw-Hill.

Fundamentals of Electronics

CECN-101

L	T	P	Cr
3	1	0	4

COURSE OBJECTIVES:

The objectives of this course are to

1. Understand the working principles of semiconductor diodes, their characteristics, and practical applications.
2. Learn the construction, operation, and configurations of Bipolar Junction Transistors (BJTs) and Field Effect Transistors (FETs).
3. Explore the basics and practical applications of Operational Amplifiers in analog circuits.
4. Master digital electronics concepts, including Boolean algebra, K-map minimization, and gate simplifications.
5. Gain knowledge of communication systems, focusing on modulation techniques and wireless communication technologies.

Course Outcomes:

At the end of this course, students will demonstrate the ability to:

1. Describe the concept of PN Junction and devices.
2. Explain the concept of BJT, FET and MOFET.
3. Apply the concept of Operational amplifier to design linear and non-linear applications.
4. Perform number systems conversions, binary arithmetic and minimize logic functions.
5. Describe the fundamentals of communication technologies.

UNIT-I

Semiconductor Diode: Depletion layer, V-I characteristics, ideal and practical Diodes, Diode Equivalent Circuits, Zener Diodes breakdown mechanism (Zener and avalanche)

Diode Application: Diode Configuration, Half and Full Wave rectification, Clippers, Clampers, Zener diode as shunt regulator, Voltage-Multiplier Circuits

Special Purpose two terminal Devices: Light-Emitting Diodes, Photo Diodes, Varactor Diodes, Tunnel Diodes.

UNIT-II

Bipolar Junction Transistor: Transistor Construction, Operation, Amplification action. Common Base, Common Emitter, Common Collector Configuration

Field Effect Transistor: Construction and Characteristic of JFETs. Transfer Characteristic. MOSFET (MOS) (Depletion and Enhancement) Type, Transfer Characteristic.

UNIT-III

Operational Amplifiers: Introduction, Op-Amp basic, Practical Op-Amp Circuits (Inverting Amplifier, Non-inverting Amplifier, Unit Follower, Summing Amplifier, Integrator, Differentiator).Differential and Common-Mode Operation, Comparators.

UNIT-IV

Digital Electronics: Number system & representation, Binary arithmetic, Introduction of Basic and Universal Gates, using Boolean algebra simplification of Boolean function. K Map Minimization upto 6 Variables.

UNIT-V

Fundamentals of Communication Engineering: Basics of signal representation and analysis, Electromagnetic spectrum Elements of a Communication System, Need of modulation and typical applications, Fundamentals of amplitude modulation and demodulation techniques.

Introduction to Wireless Communication: Overview of wireless communication, cellular communication, different generations and standards in cellular communication systems, Fundamentals of Satellite & Radar Communication.

Text Books:

1. Robert L. Boylestand / Louis Nashelsky "Electronic Devices and Circuit Theory", Pearson Education.
2. George Kennedy, "Electronic Communication Systems", McGrawPublication
3. David A. Bell, "Electronic Devices and Circuits", Oxford UniversityPress.
4. Jacob Millman, C.C. Halkias, StayabrataJit, "Electronic Devices and Circuits", McGrawHill.
5. A. Anand Kumar, "Fundamental of Digital Circuits," PHI 4th edition, 2018.

Analog Electronics

CECN-101 A

L	T	P	Cr
3	1	0	4

Course Outcomes:
At the end of this course, students will demonstrate the ability to:

1. Analyze and design basic analog circuits using resistors, capacitors, and inductors.
2. Understand the operation of diodes, transistors, and operational amplifiers in analog circuits.
3. Apply filtering techniques in analog signal processing.
4. Design and analyze amplifiers for various applications.
5. Use frequency response analysis to understand circuit behavior in the frequency domain.

Unit-I
Bipolar Junction Transistors: Transistor amplifier, small signal Equivalent circuits (Hybrid-pi model), Graphical Analysis, biasing the BJT for discrete-circuit design, Basic Single Stage BJT amplifier configurations.

Unit-II
MOSFETS: Construction of Enhancement and Depletion mode MOSFET, Drain & Transfer characteristics, Internal capacitances of MOSFET, MOSFET as an amplifier, Biasing in MOS amplifier circuits, Basic configurations of MOS amplifier, Analysis of Source follower.

Unit-III
Frequency Response: BJT internal capacitances and high frequency model, frequency response
of CE amplifier, MOSFET internal capacitances and high frequency model, frequency response of CS amplifier.

Unit-IV
Feed Back: Properties of negative feedback, four basic feedback topologies (series shunt; series-series; shunt-shunt; & shunt-series) determination of Loop gain

Unit-V
Oscillators: Basic principles of sinusoidal oscillator Different oscillator circuits (RC phase shift, Wein-bridge, Collpitts, Hartley, Clap. and Crystal Oscillators.)

Reference Books:

1. A.S. Sedra and K.C. Smith, "Microelectronic circuits", Oxford University Press (India).
2. Boylestad&Nashelsky "Electronic Device and Circuit."
3. Millman, J. and Grabel, A./"Microelectronics"/McGraw Hill.
4. Bell, David A/ "Electronic Devices & Circuits"/Prentice Hall (India) 4th Edition

Digital Electronics

CECN-101 B

L	T	P	Cr
3	1	0	4

Course Outcomes:
At the end of this course, students will demonstrate the ability to:

1. Understand the principles of binary systems and digital logic.
2. Design and analyze combinational and sequential logic circuits.
3. Apply Boolean algebra to simplify digital circuits.
4. Implement digital circuits using gates, flip-flops, and registers.
5. Use counters and shift registers in digital systems for data storage and processing.

Unit-I

Introduction: Types of Digital circuits and their characteristics, Number system: Direct conversion between bases, Negative numbers & BCD and their arithmetic's, Boolean algebra, Logic gates, Minimization of Boolean Functions: K-Map & Tabular method, Error detecting & correcting codes, hamming codes.

Unit-II

Combinational Logic Circuits: Design Procedure, Adders, Subtractors, Code conversion, Multiplexers/ Demultiplexers, Encoder/ decoders, decimal adders & amplitude comparators. Decoder and driver circuits for 7-segment LED displays.

Unit-III

Sequential Logic Circuits: Flip–Flops and their conversions, excitation table, state table & state diagram, state reduction, Shift registers and their applications. Design of synchronous and asynchronous counters.

Unit-IV

Memory and Programmable Logic: RAM, Types of RAM. ROM, Types of ROM. Programmable Logic Device (PLD), Programmable Logic Array(PLA),Programmable Array Logic(PAL).

Unit-V

Asynchronous Sequential Logic: Analysis procedure, circuit with latches, design procedure, reduction of state and flow table, race free state assignment, hazards.

Reference Books :

1. Digital Design by M Moris Mano, 2nd Edn.PHI
2. Introduction to Digital Microelectronic Circuits, by Gopalan, TMH.
3. Switching Circuit & Logic Design by Hill & Peterson, Wiley
4. Digital Circuit & Logic Design, by Holsworth.

Electrical Measurement & Instrumentation

CECN-101 C

L	T	P	Cr
3	1	0	4

Course Outcomes:
At the end of this course, students will demonstrate the ability to:

1. Use various electronic instruments to measure voltage, current, and resistance.
2. Calibrate and test electronic components for proper functionality.
3. Understand the principles of oscilloscopes, multimeters, and signal generators.
4. Perform frequency analysis and signal waveform testing.
5. Analyze and troubleshoot electronic circuits using measurement tools.

UNIT I

Measuring Instruments: Classification , deflecting, control and damping torques , Ammeters and Voltmeters , PMMC, moving iron type instruments , expression for the deflecting torque and control torque , Errors and compensations, extension of range using shunts and series resistance. Electrostatic Voltmeters-electrometer type and attracted disc type Extension of range of E.S. Voltmeters.

Instrument transformers: CT and PT – Ratio and phase angle errors , design considerations Type of P.F. Meters – dynamometer and moving iron type 1-ph and 3-ph meters , Frequency meters , resonance type and Weston type , synchroscopes.

UNIT II

Measurement of Power: Single phase dynamometer wattmeter, LPF and UPF, Double element and three element dynamometer wattmeter, expression for deflecting and control torques , Extension of range of wattmeter using instrument transformers , Measurement of active and reactive powers in balanced and unbalanced systems.

UNIT III

Measurement of Energy: Single phase induction type energy meter , driving and braking torques , errors and compensations , testing by phantom loading using R.S.S. meter. Three phase energy meter, trivector meter, maximum demand meters.

UNIT IV

Potentiometers: Principle and operation of D.C. Crompton's potentiometer, standardization Measurement of unknown resistance, current, voltage.

Resistance Measurements: Method of measuring low, medium and high resistance , sensitivity of Whetstone's bridge , Carey Foster's bridge, Kelvin's double bridge for measuring low resistance, measurement of high resistance , loss of charge method.

UNIT V

A.C. Bridges: Measurement of inductance, Quality Factor - Maxwell's bridge, Hay's bridge, Anderson's bridge, Owen's bridge. Measurement of capacitance and loss angle, Desauty Bridge. Wien's bridge, Schering Bridge.

Magnetic Measurements: Ballistic galvanometer, equation of motion, flux meter, constructional details, comparison with ballistic galvanometer. Determination of B-H Loop methods of reversals six point method , A.C. testing , Iron loss of bar samples, core loss measurements by bridges and potentiometers.

TEXT BOOKS:

1. Electrical Measurements and measuring Instruments – by E.W. Golding and F.C. Widdis, fifth Edition, Wheeler Publishing.
2. Electrical & Electronic Measurement & Instruments by A.K.Sawhney, DhanpathRai& Co.

REFERENCE BOOKS

1. Electrical Measurements by Buckingham and Price, Prentice Hall of India
2. Electrical Measurements: Fundamentals, Concepts, Applications by Reissland, M.U, New Age International (P) Limited, Publishers

Electromagnetics

CECN-101 D

L	T	P	Cr
3	1	0	4

Course Outcomes:
At the end of this course, students will demonstrate the ability to:

1. Understand the principles of electric fields, magnetic fields, and their interactions.
2. Analyze electromagnetic waves and their propagation in different media.
3. Apply Maxwell's equations to solve electromagnetic problems.
4. Study the behavior of waveguides and antennas in communication systems.
5. Use computational methods to model and solve electromagnetic field problems.

Unit-I
Review of Vector analysis, Rectangular, Cylindrical and Spherical coordinates and their transformation. Divergence, gradient and curl in different coordinate systems. Divergence's theorem and Stoke's theorem.

Unit-II
Electric field intensity, Electric Flux density, Energy and potential. Current and conductors, Dielectrics and capacitance, Poisson's and Laplace's equation.

Unit-III
Steady magnetic field, magnetic forces, materials and inductance, Time varying field and Maxwell's equation.

Unit-IV

Uniform plane waves: wave propagation in free space, dielectrics, and conductors. Poynting Vector, Plane wave reflection at normal incidence.

Unit-V
Transmission lines: Line equations, line parameters and line examples. Smith chart, Application of transmission lines.

Reference Books:

1. William H.Hayt, John A.Buck, 'Engineering Electromagnetics', Tata McGraw Hill Publishing Co. Ltd., New Delhi Sixth edition.
2. Jordan E.C. and Balmain K.G. "Electromagnetic wave and radiating systems",PHI, Second edition.
3. Mathew M.O.Sadiku, "Element of Electromagnetics", Oxford Press, 4th Edition.

Engineering Chemistry and Environmental Studies

CESN-101

L	T	P	Cr
3	1	0	4

Course Outcomes

- Understanding of different fuel types, their calorific value, and methods of determining the calorific value of coal, biomass, biogas, and biodiesel.
- Knowledge of polymer types, polymerization processes, and applications of plastics, rubbers, and bio-polymers, including their degradation and vulcanization processes.
- Proficiency in water hardness types, associated problems in boilers, and various water softening methods like Permutit, De-ionization, and Lime-soda processes.
- Awareness of environmental pollution types, their impact on air, water, soil, and human health, including greenhouse effects and water contamination issues.
- Familiarity with pollution control and cleanup methods, including air and water pollution prevention, solid waste management, and bioremediation techniques like phytoremediation.

Unit 1: Fuels:

Introduction, Classification of fuels, Calorific value, Methods for determination of Calorific value of fuel, Classification of coal by rank, Analysis of coal, Proximate & Ultimate analysis of coal, Biomass, Biogas, Biodiesel: Definition, Types, Physical Characteristics and Biodiesel Production procedure.

Unit 2 Polymers:

Introduction, Nomenclature of polymers, Functionality, Types of Polymerization, Classification of Polymers, Plastics, Important Thermoplastic and Thermosetting Resins, Synthetic Fibres, Ion-exchange resins, Rubbers (Elastomers), Vulcanization of rubber, De-vulcanization, Synthetic rubbers or elastomers, Application of rubber, Bio-polymers, Degradation of polymers.

Unit 3 Water Technology:

Introduction, Hardness of water: Temporary and Permanent hardness; Equivalents of Calcium Carbonate, units of hardness, Disadvantage of hard water, Boiler troubles, Scale and sludge formation in boilers and their disadvantage, Boiler corrosion, Caustic embrittlement, Priming and foaming, water softening methods: Permutit process, De-ionization process, Lime-soda process.

Unit 4: Environmental pollution and its impact:

Environment and Atmosphere; Kinds of pollution; Air pollution: Greenhouse effect, Acid rains and global warming; Noise pollution; Water and Solid waste pollution: Industrial effluents and wastes, Ground water pollution, Lead pollution, Fluoride pollution; Radiation and chemical toxicology.

Unit 5 Pollution Cleanup:

Prevention and control of air pollution: Source correction, Collection of pollutants, Cooling, Treatment; Prevention and control of water pollution: Stabilization of the ecosystem, Reutilization and Recycling of waste, Removal of Pollutants; Solid waste management: Collection, Disposal, etc.; Bioremediation: Introduction, Phytoremediation.

Reference Books:

•Textbook of Engineering Chemistry, 2024, Wiley Publishers (ISBN: 9789357460972)972

•Jain, M. and Jain, P.C., Engineering Chemistry, 17th edition, DhanpatRai Publishing Company (P) Ltd., New Delhi.

•Engineering Chemistry Second Edition, Publisher: McGraw Hill Education India, ISBN: 9789352605774.

- Kuriacose and Rajaram, Chemistry in Engineering and Technology, TMH, Delhi.
- Sharma, P.D., Ecology and Environment, 11th edition, Rastogi Publications, Meerut.
- Gupta, K.M. Environmental Studies, Umesh Publications, Delhi.
- Gopalan, R.R., Environmental Studies: from crisis to cure, Oxford University Press, New Delhi.

Chemical Thermodynamics

CESN-101 A

L	T	P	Cr
3	1	0	4

Course Outcomes:

At the end of this course, students will demonstrate the ability to:

1. Understand the laws of thermodynamics and their application in chemical processes.
2. Analyze energy changes in chemical reactions using enthalpy, entropy, and Gibbs free energy.
3. Apply the concept of equilibrium to chemical reactions and phase transitions.
4. Calculate the work, heat, and efficiency in thermodynamic cycles.
5. Use thermodynamic principles to predict the spontaneity and direction of chemical reactions.

Unit 1: Basic Concepts of Thermodynamics

Thermodynamic Systems and Processes:Definition of system, surroundings, and boundaries, Types of systems: isolated, closed, and open systems, Thermodynamic processes: isothermal, adiabatic, isobaric, and isochoric processes, State and path functions (internal energy, work, heat)

Zeroth Law of Thermodynamics: Concept of thermal equilibrium, Temperature and its measurement

First Law of Thermodynamics: Concept of internal energy (U) and enthalpy (H), Mathematical form of the first law: $\Delta U = q + w$, Work done in various processes (PV work, electrical work), Specific heat capacities (Cp and Cv) and their relation

Application of the First Law: Internal energy changes in ideal and real gases, Joule-Thomson effect, Joule-Thomson coefficient, inversion temperature

Unit 2: Second Law of Thermodynamics and Entropy

Second Law of Thermodynamics: Limitations of the first law, Concepts of heat engines and refrigerators, Carnot cycle and its efficiency

Entropy (S): Definition of entropy and its physical significance, Entropy changes in reversible and irreversible processes, Entropy of the universe and the second law

Applications of the Second Law: Clausius inequality, Entropy change in mixing of gases, Free expansion of gases and its relation to entropy

Third Law of Thermodynamics: Nernst heat theorem, Absolute entropy and its significance

Unit 3: Thermodynamic Potentials and Equilibrium

Thermodynamic Potentials:Definitions of thermodynamic potentials (Gibbs free energy, Helmholtz free energy, Enthalpy, Internal energy), Maxwell relations and their applications, Gibbs-Helmholtz equation and its significance
Criteria for Spontaneity:Conditions for equilibrium and spontaneity ($\Delta G < 0$ for spontaneous processes), Phase equilibrium and phase rule, Le Chatelier's principle and its applications
Chemical Equilibrium:Law of mass action and equilibrium constant, Temperature dependence of equilibrium constant (Van't Hoff equation), Relation between free energy and equilibrium constant,
Phase Equilibria:Phase diagrams for one-component systems (water and sulfur), Clausius-Clapeyron equation and its applications

Unit 4: Thermodynamics of Solutions

Ideal and Non-Ideal Solutions:Raoult's law and deviations from ideal behavior, Henry's law and its applications, Activity, activity coefficient, and their significance
Thermodynamics of Mixing:Partial molar quantities (partial molar volume, partial molar Gibbs free energy), Gibbs-Duhem equation, Chemical potential and its variation with temperature and pressure
Colligative Properties:Lowering of vapor pressure, elevation of boiling point, depression of freezing point, Osmotic pressure and its applications in determining molecular weight
Applications in Electrolyte Solutions:Thermodynamic properties of electrolytes, Debye-Hückel theory of ion-ion interactions

Recommended Books:

1. "Thermodynamics: An Engineering Approach" by Yunus A. Çengel and Michael A. Boles (2021)
2. "Introduction to Chemical Engineering Thermodynamics" by J.M. Smith, H.C. Van Ness, and M.M. Abbott (2017)
3. "Chemical Thermodynamics: Advanced Applications" by J. Bevan Ott and Juliana Boerio-Goates (2019)
4. "Modern Thermodynamics: From Heat Engines to Dissipative Structures" by DilipKondepudi and Ilya Prigogine (2014)
5. "Molecular Driving Forces: Statistical Thermodynamics in Biology, Chemistry, Physics, and Nanoscience" by Ken A. Dill and Sarina Bromberg (2018)

Chemical Kinetics

CESN-101 B

L	T	P	Cr
3	1	0	4

Course Outcomes:
At the end of this course, students will demonstrate the ability to:

1. Understand the rate laws and factors affecting reaction rates.
2. Analyze reaction mechanisms and determine rate-determining steps.
3. Apply the Arrhenius equation to study temperature dependence of reaction rates.
4. Determine the effect of concentration, temperature, and catalysts on reaction rates.
5. Use integrated rate laws to calculate concentration changes over time in chemical reactions.

Unit 1: Fundamentals of Chemical Kinetics

Basic Concepts:Definition of reaction rate and rate laws, Order and molecularity of a reaction, Rate constant and its units for different orders of reactions, Elementary and complex reactions
Integrated Rate Equations:Zero-order, first-order, second-order reactions, Half-life period for different orders of reactions, Determination of order of reaction using integrated rate laws
Experimental Methods of Studying Kinetics:Methods of determining reaction rates (flow, stopped-flow, relaxation methods), Spectroscopic methods, electrical methods, and pressure measurement

Unit 2: Theories of Reaction Rates

Collision Theory:Basic postulates of collision theory, Effective collisions and activation energy, Dependence of rate on temperature and concentration
Transition State Theory (TST):Concept of activated complex, Energy profiles of reactions, Eyring equation and its applications
Arrhenius Equation:Temperature dependence of reaction rates, Interpretation of Arrhenius parameters (A and Ea), Determination of activation energy
Comparative Study of Collision and Transition State Theories:Merits and limitations of both theories

Unit 3: Reaction Mechanisms

Reaction Mechanisms:Elementary steps and their importance in mechanisms, Steady-state approximation and rate-determining step theory
Unimolecular and Bimolecular Reactions:Lindemann-Hinshelwood mechanism for unimolecular reactions, Chain reactions: H_2-Br_2 reaction and decomposition of acetaldehyde
Catalysis and Reaction Mechanism:Homogeneous and heterogeneous catalysis

Enzyme catalysis: Michaelis-Menten mechanism, Role of catalysts in altering reaction pathways

Unit 4: Complex Reactions and Kinetics in Solutions

Complex Reactions:Parallel, consecutive, and reversible reactions, Analysis of complex reaction mechanisms, Chain reactions and explosion limits (e.g., hydrogen-oxygen reaction)
Reactions in Solutions:Factors influencing reaction rates in solution (solvent effect, ionic strength), Diffusion-controlled and activation-controlled reactions
Kinetics of fast reactions in solutions: relaxation methods, flash photolysis
Kinetics of Polymerization:Free-radical polymerization kinetics, Chain initiation, propagation, and termination

Recommended Books:

1. "Chemical Kinetics and Reaction Dynamics" by Paul L. Houston (2020)
2. "Essentials of Chemical Kinetics" by C. Kalidas and V. Rajaram (2019)
3. "Chemical Kinetics: From Molecular Structure to Chemical Reactivity" by Luis Arnaut, Sebastiao Jose Formosinho, and Hugh Burrows (2018)
4. "Reaction Kinetics: Principles and Applications in Organic and Biological Chemistry" by Keith J. Laidler (2018)
5. "Chemical Reaction Engineering and Kinetics" by Jorge Ancheyta (2021)

Environmental Chemistry

CESN-101 C

L	T	P	Cr
3	1	0	4

Course Outcomes:
At the end of this course, students will demonstrate the ability to:

1. Understand the chemical processes occurring in the environment.
2. Analyze the impact of pollutants on air, water, and soil quality.
3. Study the chemistry of natural cycles, such as carbon, nitrogen, and sulfur cycles.
4. Investigate the sources, behavior, and fate of hazardous chemicals in the environment.
5. Apply chemical principles to develop strategies for pollution control and sustainable practices.

Unit 1: Fundamentals of Environmental Chemistry

Introduction to Environmental Chemistry:Definition, scope, and importance of environmental chemistry, Segments of the environment: atmosphere, hydrosphere, lithosphere, and biosphere, Chemical composition of air, water, and soil
Environmental Cycles:Biogeochemical cycles (carbon, nitrogen, sulfur, phosphorus cycles), Role of microorganisms in biogeochemical cycles
Concepts of Green Chemistry:Principles of green chemistry and sustainability, Environmental impact of chemical processes and industrial activities, green solvents, catalysts, and alternative energy sources

Unit 2: Atmospheric Chemistry

Structure and Composition of Atmosphere:Layers of the atmosphere: troposphere, stratosphere, mesosphere, thermosphere, Composition and chemical reactions in the atmosphere
Air Pollution and Global Warming:Primary and secondary pollutants (SOx, NOx, CO, particulate matter, VOCs), Greenhouse gases and their effects on global warming, Photochemical smog, acid rain, and ozone depletion
Monitoring and Control of Air Pollution:Air quality standards and monitoring techniques (AQI, particulate matter sensors), Control measures: scrubbers, electrostatic precipitators, catalytic converters

Unit 3: Water Chemistry and Pollution

Water Quality Parameters:Physical parameters (temperature, color, turbidity), Chemical parameters (pH, dissolved oxygen, BOD, COD, alkalinity, hardness), Biological parameters (coliform bacteria, microbial contamination)
Water Pollution:Sources of water pollution (domestic, industrial, agricultural), Heavy metals in water (lead, mercury, cadmium, arsenic) and their toxicity, Eutrophication and its effects on aquatic ecosystems
Water Treatment and Purification:Primary, secondary, and tertiary treatment of wastewater

Methods of water purification: filtration, coagulation, flocculation, sedimentation, disinfection (chlorination, UV treatment), Desalination and reverse osmosis techniques

Unit 4: Soil Chemistry and Waste Management

Soil Composition and Chemistry:Composition of soil: minerals, organic matter, water, air, Soil properties: pH, cation exchange capacity, nutrient availability, Soil pollutants: pesticides, heavy metals, industrial wastes
Soil Pollution:Sources of soil contamination: fertilizers, pesticides, industrial discharge, Effects of soil pollution on plant growth and food safety, Remediation techniques: bioremediation, phytoremediation, chemical methods
Solid Waste Management:Types of solid waste: municipal, hazardous, biomedical
Waste management practices: recycling, composting, incineration, landfills, Hazardous waste management and disposal

Recommended Books:

1. "Environmental Chemistry: A Global Perspective" by Gary W. vanLoon and Stephen J. Duffy (2021)
2. "Environmental Chemistry" by Stanley E. Manahan (2022)
3. "Principles of Environmental Chemistry" by James Girard (2020)
4. "Introduction to Environmental Chemistry" by Julian E. Andrews, Peter Brimblecombe, and Tim D. Jickells (2020)
5. "Environmental Chemistry: Fundamentals" by Ronald A. Hites and Jonathan D. Raff (2021)

Natural Resource Management

CESN-101 D

L	T	P	Cr
3	1	0	4

Course Outcomes:

At the end of this course, students will demonstrate the ability to:

1. Understand the principles of sustainable management of natural resources.
2. Analyze the impact of human activities on natural ecosystems and biodiversity.
3. Develop strategies for the conservation and efficient use of water, soil, and energy resources.
4. Apply environmental policies and regulations to manage natural resources effectively.
5. Use modern technologies to monitor and assess natural resource availability and health.

Unit 1: Introduction to Natural Resources

Definition and Classification of Natural Resources: Renewable and non-renewable resources Biotic and abiotic resources, Resource availability, scarcity, and carrying capacity
Global and National Resource Distribution: Geographical distribution of resources (water, forests, minerals), Resource consumption patterns: global vs. local scenarios, Depletion and degradation of natural resources
Principles of Sustainable Resource Management: Sustainability concepts and sustainable development goals (SDGs), The role of science, technology, and innovation in resource management

Unit 2: Water Resource Management

Water Resources:Types of water resources: surface water, groundwater, glaciers, oceans, Hydrological cycle and water balance, Freshwater availability and demand
Water Pollution and Scarcity:Sources and types of water pollution (industrial, agricultural, domestic), Impact of water pollution on ecosystems and human health, Global water scarcity and strategies to combat it
Water Conservation and Management:Rainwater harvesting, groundwater recharge, watershed management, Irrigation management techniques
Policies for sustainable water resource management: National Water Policy, Integrated Water, Resource Management (IWRM)

Unit 3: Forest Resource Management

Importance of Forests:Forest ecosystems and their role in maintaining biodiversity, Forest resources and their economic, ecological, and social significance

Deforestation and Forest Degradation:Causes of deforestation (agriculture, urbanization, logging), Impacts of deforestation on climate, biodiversity, and indigenous communities
Forest Conservation and Sustainable Management:Afforestation, reforestation, and agroforestry, Forest certification programs (FSC) and sustainable logging practices, Community-based Forest management and Joint Forest Management (JFM)

Unit 4: Soil and Mineral Resource Management

Soil Resources:Types of soils, soil formation, and soil profiles, Soil fertility and its importance in agriculture, Soil erosion, desertification, and degradation
Soil Conservation Techniques:Soil conservation methods: contour plowing, terracing, crop rotation, Integrated soil management practices, Policies for sustainable agriculture and soil conservation
Mineral Resources:Types of mineral resources: metallic and non-metallic mineralsGlobal distribution of minerals and mining activities
Environmental impacts of mining: pollution, habitat destruction, land degradation
Sustainable Mining Practices:Techniques for reducing environmental impact of mining (e.g., rehabilitation, reforestation), Waste management in mining (tailings and their treatment), Responsible mining initiatives and policies

Recommended Books:

1. "Sustainable Resource Management: Global Trends, Visions, and Policies" by Stefan Bringezu and AnkeSchandl (2021)
2. "Natural Resource and Environmental Economics" by Roger Perman, Yue Ma, and Michael Common (2020)
3. "Natural Resource Conservation: Management for a Sustainable Future" by Daniel D. Chiras and John P. Reganold (2021)
4. "Natural Resource Management: Principles and Practices" by B.W. Pandey (2020)
5. "Water Resources Management: Principles, Challenges and Solutions" by Neil S. Grigg (2020)

Presentation and communication skills

CPCN-101

L	T	P	Cr
3	0	0	3

Course Outcome:

- Mastery of essential grammar rules, sentence structures, and correct usage of word classes, articles, tenses, and prepositions.
- Expanded vocabulary through synonyms, antonyms, idioms, one-word substitutes, and technical terms, with focus on word formation using prefixes and suffixes.
- Enhanced linguistic skills through active listening, speaking, reading, and writing activities, including phonetics and reading comprehension techniques.
- In-depth understanding of language through literature, with analysis of essays, poems, and plays from authors like Bacon, Lamb, Keats, and Tagore.
- Development of professional speaking skills for job interviews, group discussions, public speaking, and presentations, with emphasis on body language and argumentative skills.

Unit – I

Essential Grammar: Basic Clause/Sentence Patterns, Correct Usage of Different Word-Classes, Articles, Tense, Syntactic Concord, Prepositions, Transformation, Synthesis, Graded Syntactic Structures.

Unit – II

Essential Vocabulary: Basic words, Synonyms, Antonyms, Homophones, One-Word Substitutes, Idioms and Phrases, Word-formation-Suffix and Prefix, Technical Vocabulary.
Linguistic Skills: Listening, Speaking, Reading, and Writing (Activities to be Selected by the Teacher).Strategies for Active Listening, Introduction to Phonetics-Monophthongs, Diphthongs and Consonant sound symbols.Newspaper reading and Precis Writing, SQ3R technique of Reading& Comprehension Passage.

Unit – III

Language Through Literature: Non-Fiction &/or Fiction, Verse, and Play
Bacon's *Essays* (Selection) and/or Lamb's *Tales from Shakespeare* (Selection)
Keats' *The Eve of St Agnes/ Ode To Autumn/Ode to A Nightingale*
Tagore's *Chitra/ Gitanjali(Lyric 1-5)*

Unit – IV

Speaking Professionally: Job Interviews, Group-Discussions, Difference between GD and Debate, Public Speaking, Argumentative Skills, Role-Plays, Presentation Skills, Significance of Body Language

Reference Books :

1. Hornby, A.S. *Guide to Patterns & Usage in English*. 2nded. New Delhi: Oxford University Press, 2002. Print.

2. Swan, Michael. *Practical English Usage*. 3rded. New Delhi: Oxford University Press, 2006. Print.
3. Carter, R. and M. McCarthy. *Cambridge Grammar of English*. New Delhi: Cambridge University Press, 2006.CD-ROM, Print.
4. McCarthy, M. and F. O'Dell. *English Vocabulary in Use*. New Delhi: Cambridge University Press, 2006. Print.
5. Kumar, E. Suresh and P. Sreehari. *A Handbook for English Language Laboratories*. New Delhi: Cambridge University Press, 2007. Print.

English Communication

CPCN-101 A

L	T	P	Cr
3	0	0	3

Course Outcomes:
At the end of this course, students will demonstrate the ability to:

1. Develop effective verbal and written communication skills in various contexts.
2. Enhance listening skills to understand and respond appropriately in conversations.
3. Use appropriate vocabulary, grammar, and sentence structures for clear communication.
4. Improve presentation skills for conveying ideas confidently and clearly.
5. Foster interpersonal communication skills for better collaboration and teamwork.

Units: 1

Introduction: Theory of Communication, Types and modes of Communication Language of Communication: - Verbal and Non-verbal (Spoken and Written) - Personal, Social and Business - Barriers and Strategies - Intra Personal, Inter Personal and Group Communication

Unit 2

Listening Skills- Listening to others, Listening short Lectures and Videos, Types of Listening, How to improve our listening skills?

Unit: 3

Speaking Skills: - Monologue - Dialogue - Group Discussion - Effective Communication/ Mis-Communication - Interview - Public Speech

Unit 4

Reading and Understanding - Close Reading - Comprehension - Summary Paraphrasing - Analysis and Interpretation - Translation(from Indian language to English and vice-versa) Literary/Knowledge Texts Unit 5

Writing Skills - Documenting - Report Writing - Making notes - Letter Writing

English

CPCN-101 B

L	T	P	Cr
3	0	0	3

Course Outcomes:
At the end of this course, students will demonstrate the ability to:

1. Improve reading comprehension and critical analysis of texts.
2. Enhance writing skills for clear and coherent expression of ideas.
3. Develop vocabulary and grammar for effective communication.
4. Practice spoken English for better fluency and pronunciation.
5. Analyze literary works to understand themes, characters, and contexts.

Unit: 1

Basic Essential Grammar: Parts of Speech, Tenses, Sentence Pattern, Correct Usage of different word classes, Syntax Concord, Transformation, Syntheses, Articles, Prepositions

Unit 2

Vocabulary: Synonyms, Antonyms, Homophones, Homonyms, One word substitution, Idiom and Phrases, Word Formation, Words often confused, Technical Vocabulary

Unit: 3

Linguistic Skills-Listening skills, Speaking Skills, Reading Skills, Writing Skills (Activities also done selected by teacher)

Unit 4

Professional Speaking- Group Discussion, Debate, Public Speaking, Job Interview, Role Plays, Presentation Skills

Unit 5

Writing Skills - Documenting - Report Writing - Making notes - Letter Writing, Proposal Writing, Paragraph Writing

Technical Communication

CPCN-101 C

L	T	P	Cr
3	0	0	3

Course Outcomes:
At the end of this course, students will demonstrate the ability to:

1. Develop clear and concise technical writing skills for manuals and reports.
2. Enhance the ability to present technical information to diverse audiences.
3. Use proper documentation techniques for technical processes and systems.
4. Improve oral communication skills for effective presentations and discussions.
5. Master the use of visuals and diagrams to support technical explanations.

Unit: 1

Grammar rules -articles, tenses, auxiliary verbs (primary & modal) prepositions, subject-verb agreement, pronoun-antecedent agreement, discourse markers and sentence linkers
General Reading and Listening comprehension – rearrangement & organization of sentences

Unit 2

Different kinds of written documents: Definitions- descriptions- instructions-recommendations-user manuals – reports – proposals, writing formal Letters, punctuation
Scientific Reading & Listening Comprehension

Unit: 3

Technical paper writing: documentation style – document editing – proof reading – Organizing and formatting, Modifiers, phrasal verbs, tone and style, graphical representation
Reading and listening comprehension of technical documents

Unit 4

Professional Speaking- Group Discussion, Debate, Public Speaking, Job Interview, Role Plays, Presentation Skills

Unit 5

Phonetics- International Phonetic Alphabet, Phonemes, Allophones, Phonetics Transcription, Organ of speech.

Human Values, De-addiction and Traffic Rules

CPCN-101 D

L	T	P	Cr
3	0	0	3

Course Outcomes:

At the end of this course, students will demonstrate the ability to:

1. Understand and apply ethical principles and human values in personal and professional life.
2. Promote awareness and practices to prevent addiction and its harmful effects.
3. Develop a sense of responsibility toward maintaining traffic safety and following traffic rules.
4. Foster respect for others' rights and well-being in society.
5. Encourage active participation in community efforts to enhance road safety and reduce substance abuse.

Unit: 1 Course Introduction - Need, Basic Guidelines, Content and Process for Value Education

- Understanding the need, basic guidelines, content and process for Value Education
- Self-Exploration– content and process; 'Natural Acceptance' and Experiential Validation- as the mechanism for self-exploration
- Continuous Happiness and Prosperity- A look at basic Human Aspirations
- Right understanding, Relationship and Physical Facilities- the basic requirements for fulfillment of aspirations of every human being with their correct priority
- Method to fulfill the above human aspirations: understanding and living in harmony at various levels

Unit 2 Understanding Harmony in the Human Being - Harmony in Myself!

- Understanding human being as a co-existence of the sentient 'I' and the material 'Body' Understanding the needs of Self ('I') and 'Body' - Sukh and Suvidha
- Understanding the Body as an instrument of 'I' (I being the doer, seer and enjoyer)
- Understanding the characteristics and activities of 'I' and harmony in 'I'
- Understanding the harmony of I with the Body: Sanyam and Swasthya; correct appraisal of Physical needs, meaning of Prosperity in detail
- Programs to ensure Sanyam and Swasthya

Unit: 3 Understanding Harmony in the Family and Society- Harmony in Human Relationship

- Understanding harmony in the Family- the basic unit of human interaction
- Understanding values in human-human relationship; meaning of Nyaya and program for its fulfillment to ensure Ubhay-tripti; Trust (Vishwas) and Respect (Samman) as the foundational values of relationship

- Understanding the meaning of Vishwas; Difference between intention and competence 16. Understanding the meaning of Samman, Difference between respect and differentiation; the other salient values in relationship
- Understanding the harmony in the society (society being an extension of family): Samadhan, Samridhi, Abhay, Sah-astitva as comprehensive Human Goals
- Visualizing a universal harmonious order in society- Undivided Society (Akhand Samaj), Universal Order (Sarvabhaum Vyawastha) - from family to world family!

Unit 4 Understanding Harmony in the Nature and Existence - Whole existence as Co-existence

- Understanding the harmony in the Nature
- Interconnectedness and mutual fulfillment among the four orders of nature recyclability and self-regulation in nature
- Understanding Existence as Co-existence (Sah-astitva) of mutually interacting units in all-pervasive space
- Holistic perception of harmony at all levels of existence

Unit 5 Implications of the above Holistic Understanding of Harmony on Professional Ethics

- Natural acceptance of human values
- Definitiveness of Ethical Human Conduct
- Basis for Humanistic Education, Humanistic Constitution and Humanistic Universal Order

Workshop Practice

CMEN-151

L	T	P	Cr
0	0	2	1

Course Outcome (CO)

At the end of this course, the students should be able to:

1. Study and practice on machine tools and their operations
2. Practice on manufacturing of components using workshop trades including fitting, carpentry, foundry and welding
3. Identify and apply suitable tools for machining processes including turning, facing, thread cutting and tapping
4. Welding and soldering operations
5. Apply basic electrical engineering knowledge for house wiring practice

LIST OF EXPERIMENTS

Machine shop:

- Study of machine tools in particular Lathe machine
- Demonstration of different operations on Lathe machine
- Practice of Facing, Plane Turning, step turning, taper turning, knurling and parting.
- Study of Quick return mechanism of Shaper.

Fitting shop:

- Preparation of T-Shape Work piece as per the given specifications.
- Preparation of U-Shape Work piece which contains: Filing, Sawing, Drilling, Grinding.
- Practice marking operations.

Carpentry:

- Study of Carpentry Tools, Equipment and different joints.
- Practice of Cross Half lap joint, Half lap Dovetail joint and Mortise Tenon Joint

Welding:

- Instruction of BI standards and reading of welding drawings.
- Butt Joint

- Lap Joint

Smithy

- Sharpening any arc and edge.
- Preparing small arc and edge,
- Repair of agricultural implements and power plough, use of power hammer etc.

Text Books:

1. Raghuwanshi B.S., Workshop Technology Vol. I & II, DhanpathRai& Sons.
2. Kannaiah P. and Narayana K.L., Workshop Manual, 2nd Edn, Scitech publishers.
3. John K.C., Mechanical Workshop Practice. 2nd Edn. PHI 2010.
4. JeyapoovanT.andPranitha S., Engineering Practices Lab Manual, 3rd Edn. Vikas Pub.2008.

Engineering Graphics Lab

CMEN-153

L	T	P	Cr
0	0	2	1

Course Outcomes:
At the end of this course, students will demonstrate the ability to:

1. Develop skills in creating accurate technical drawings using drafting tools.
2. Understand and apply basic geometric principles in design and construction.
3. Create 2D and 3D representations of engineering objects and structures.
4. Use computer-aided design (CAD) software to produce and modify technical drawings.
5. Interpret and analyze engineering drawings for practical application in projects.

Basic Drawing Operations

- Objective: Familiarize with basic drawing tools.
- Activities:
  - Draw a line using two endpoints.
  - Draw a circle given a center and radius.
  - Draw a rectangle with specified coordinates.

Transformations

- Objective: Apply geometric transformations.
- Activities:
  - Implement translation of shapes (move by dx, dy).
  - Implement rotation of shapes around a point.
  - Implement scaling of shapes (increase/decrease size).

Drawing 2D Shapes

- Objective: Create various 2D shapes.
- Activities:
  - Draw a triangle given three vertices.
  - Draw a polygon by specifying the number of vertices and their coordinates.

Basic CAD Commands

- Objective: Understand basic CAD functionalities.
- Activities:
  - Draw an arc using center, radius, start angle, and end angle.
  - Implement a Bezier curve using control points.

- Parametric Equations for Curves

  - Objective: Use parametric equations to draw curves.
  - Activities:
    - Draw a parametric curve (e.g., a sine wave).
    - Visualize parametric equations in 2D space.

- 3D Projections

  - Objective: Understand 3D object representation.
  - Activities:
    - Create isometric projections of simple shapes.
    - Draw orthographic views (front, top, side) of 3D objects.

- Sectional Views

  - Objective: Learn to create sectional views.
  - Activities:
    - Generate a sectional view of a given solid object.
    - Illustrate the differences between full and half sections.

- Dimensioning Techniques

  - Objective: Apply dimensioning standards.
  - Activities:
    - Add linear and angular dimensions to a drawing.
    - Practice dimensioning for clarity and accuracy.

- Rendering Techniques

  - Objective: Enhance drawings with rendering techniques.
  - Activities:
    - Apply shading to 2D shapes.
    - Use textures and gradients for better visual representation.

- CAD Software Basics

  - Objective: Introduction to CAD software tools.
  - Activities:
    - Create a simple project using CAD software.
    - Familiarize with layers, commands, and saving/exporting drawings.

Communication Lab

CPCN-151

L	T	P	Cr
0	0	2	1

Course Outcomes:
At the end of this course, students will demonstrate the ability to:

1. Improve verbal communication skills through practice in discussions and presentations.
2. Enhance listening skills for better comprehension and response.
3. Develop effective public speaking techniques for clear and confident delivery.
4. Practice writing skills for creating concise and well-structured documents.
5. Foster teamwork and interpersonal communication through group activities and exercises.

The Language Lab focuses on the production and practice of sounds of language and familiarizes the students with the use of English in everyday situations both in formal and informal contexts.

Syllabus: English Language and Communication Skills Lab (ELCS) shall have two parts:

a. Computer Assisted Language Learning (CALL) Lab

b. Interactive Communication Skills (ICS) Lab

Listening Skills

Objectives 1. To enable students develop their listening skills so that they may appreciate its role in the LSRW skills approach to language and improve their pronunciation.

2. To equip students with necessary training in listening so that they can comprehend the speech of people of different backgrounds and regions.

Students should be given practice in listening to the sounds of the language, to be able to recognize them and find the distinction between different sounds, to be able to mark stress and recognize and use the right intonation in sentences.

- Listening for general content
- Listening to fill up information
- Intensive listening
- Listening for specific information

Speaking Skills

Objectives 1. To involve students in speaking activities in various contexts

2. To enable students express themselves fluently and appropriately in social and professional contexts • Oral practice: Just a Minute (JAM) Sessions

• Describing objects/situations/people

• Role play – Individual/Group activities

Exercise – I

CALL Lab:

Understand: Listening Skill- Its importance – Purpose- Process- Types- Barriers of Listening. Practice: Introduction to Phonetics – Speech Sounds – Vowels and Consonants.

ICS Lab:

Understand: Communication at Work Place- Spoken vs. Written language. Practice: Ice-Breaking Activity and JAM Session- Situational Dialogues – Greetings – Taking Leave – Introducing Oneself and Others.

Exercise – II

CALL Lab:

Understand: Structure of Syllables – Word Stress and Rhythm– Weak Forms and Strong Forms in Context.

Practice: Basic Rules of Word Accent - Stress Shift - Weak Forms and Strong Forms in Context.

ICS Lab:

Understand: Features of Good Conversation – Non-verbal Communication. Practice: Situational Dialogues – Role-Play- Expressions in Various Situations –Making Requests and Seeking Permissions - Telephone Etiquette.

Exercise - III

CALL Lab:

Understand: Intonation-Errors in Pronunciation-the Influence of Mother Tongue (MTI).

Practice: Common Indian Variants in Pronunciation – Differences in British and American Pronunciation. **ICS Lab:**

Understand: How to make Formal Presentations. Practice: Formal Presentations.

Exercise – IV

CALL Lab:

Understand: Listening for General Details. Practice: Listening Comprehension Tests.

ICS Lab:

Understand: Public Speaking – Exposure to Structured Talks. Practice: Making a Short Speech – Extempore.

Exercise – V

CALL Lab:

Understand: Listening for Specific Details. Practice: Listening Comprehension Tests.

ICS Lab:

Understand: Interview Skills. Practice: Mock Interviews.

Minimum Requirement of infrastructural facilities for ELCS Lab:

1. Computer Assisted Language Learning (CALL) Lab:

The Computer Assisted Language Learning Lab has to accommodate 40 students with 40 systems, with one Master Console, LAN facility and English language learning software for self- study by students.

System Requirement (Hardware component):

Computer network with LAN facility (minimum 40 systems with multimedia) with the following specifications:

i) Computers with Suitable Configuration
ii) ii) High Fidelity Headphones

2. Interactive Communication Skills (ICS) Lab:

The Interactive Communication Skills Lab:

A Spacious room with movable chairs and audio-visual aids with a Public-Address System, a LCD and a projector etc.

English Communication Lab

CPCN-151 A

L	T	P	Cr
0	0	2	1

Course Outcomes:
At the end of this course, students will demonstrate the ability to:

1. Improve pronunciation and fluency in spoken English through interactive sessions.
2. Develop listening skills for better understanding of various English accents.
3. Enhance vocabulary and grammar for effective written and oral communication.
4. Practice group discussions and debates to build confidence in public speaking.
5. Learn to write clear, concise, and structured texts for different communication contexts.

1. Develop interactive quizzes or flashcards to enhance vocabulary through definitions, synonyms, and antonyms.
2. Create listening exercises using audio clips followed by questions to assess understanding and retention.
3. Implement a program for students to record, analyze, and improve their speeches based on feedback.
4. Design a workshop that allows students to practice and present topics using visual aids and presentation software.
5. Create a platform for conducting group discussions on various topics, focusing on turn-taking and effective communication.
6. Develop a program that provides writing prompts and feedback on grammar, structure, and style.
7. Implement role-playing exercises to simulate real-life situations and improve conversational skills and confidence.
8. Create an application that helps students practice pronunciation through audio playback and comparison.
9. Design a set of reading passages followed by comprehension questions to enhance critical reading skills.
10. Implement a digital journal for students to reflect on their communication experiences and receive peer feedback.

English Lab

CPCN-151 B

L	T	P	Cr
0	0	2	1

Course Outcomes:
At the end of this course, students will demonstrate the ability to:

1. Improve reading comprehension and interpretive skills through various texts.
2. Enhance vocabulary and grammar usage for effective communication.
3. Develop writing skills for essays, reports, and creative content.
4. Practice listening skills through audio materials and discussions.
5. Strengthen speaking skills through role-plays, debates, and presentations.

1) Develop a program that identifies and corrects grammatical errors in written text.
2) Create an application with quizzes and games to help users expand their vocabulary.
3) Implement audio-based comprehension exercises that include questions to test understanding.
4) Design a tool that records speeches and provides feedback on pace, tone, and clarity.
5) Develop a program that presents reading passages followed by comprehension questions.
6) Create an application that allows users to practice pronunciation and receive feedback using audio samples.
7) Implement a tool that provides creative writing prompts to stimulate writing practice.
8) Design a platform for virtual group discussions where participants can practice speaking and listening skills.
9) Develop a program that guides users through creating and delivering effective presentations.
10) Create a platform for students to share their writing and receive constructive feedback from peers.

Technical Communication Lab

CPCN-151 C

L	T	P	Cr
0	0	2	1

Course Outcomes:
At the end of this course, students will demonstrate the ability to:

1. Develop technical writing skills for creating manuals, reports, and documentation.
2. Enhance presentation skills for delivering technical information clearly and confidently.
3. Improve the ability to communicate complex technical concepts to diverse audiences.
4. Practice creating and interpreting technical diagrams and visuals to support communication.
5. Foster collaboration and teamwork through group technical projects and discussions.

- Writing Technical Reports
  - Focus on structure, clarity, and audience.
- Creating User Manuals
  - Emphasize step-by-step instructions and usability.
- Developing Proposals
  - Learn to draft persuasive and structured proposals.
- Designing Presentations
  - Use of visuals and effective delivery techniques.
- Conducting Oral Communication Workshops
  - Improve verbal skills through practice and feedback.
- Practicing Resume and Cover Letter Writing
  - Tailor documents for job applications.
- Engaging in Peer Review Sessions
  - Provide and receive constructive feedback on documents.

- [ ] Utilizing Visual Aids Effectively
  - Incorporate charts, graphs, and images to enhance communication.
- [ ] Exploring Digital Communication Tools
  - Familiarization with software for documentation and collaboration.
- [ ] Analyzing Case Studies in Technical Communication
  - Examine real-world examples to identify best practices.

Human Values, Deaddiction and Traffic Rules

CPCN-151 D

L	T	P	Cr
0	0	2	1

Course Outcomes:
At the end of this course, students will demonstrate the ability to:

1. Understand the importance of human values in personal and professional life.
2. Raise awareness about the dangers of addiction and promote preventive measures.
3. Learn and practice traffic rules for ensuring road safety and discipline.
4. Develop a sense of responsibility and ethical behavior in daily activities.
5. Encourage active participation in community efforts to promote de-addiction and road safety.

1. Workshops on Ethics and Morality
    - Discuss fundamental ethical principles and moral dilemmas.
2. Community Service Projects
    - Engage in activities promoting social responsibility and compassion.
3. Conflict Resolution Training
    - Teach effective communication and mediation skills.
4. Empathy Development Sessions
    - Activities to foster understanding and empathy towards others.
5. Cultural Awareness Programs
    - Explore diversity and promote respect for different cultures.

Addiction Awareness Programs

1. Substance Abuse Education
    - Provide information on the effects of drugs and alcohol.
2. Support Group Facilitation
    - Create safe spaces for sharing experiences and recovery stories.
3. Stress Management Workshops
    - Teach techniques for coping with stress without resorting to substances.
4. Healthy Lifestyle Promotion
    - Encourage activities like exercise and hobbies as alternatives to addictive behaviors.
5. Guest Lectures from Addiction Experts
    - Invite professionals to discuss prevention and treatment strategies.

Traffic Rules Programs

1. Road Safety Workshops
    - Educate on traffic laws and safe driving practices.

2. Mock Traffic Situations
    - Simulate real-life scenarios to practice safe behavior.
3. Pedestrian Safety Campaigns
    - Promote awareness of pedestrian rights and safety tips.
4. Bicycle and Motorcycle Safety Training
    - Teach specific rules and safety measures for non-vehicle commuters.
5. Community Awareness Drives
    - Organize events to highlight the importance of following traffic rules.

Data Structure Using 'C'

CCSN-201

L	T	P	Cr
3	1	0	4

Course Outcomes:

1. Understanding basic data structures like arrays, linked lists, and their operations, including dynamic and array-based implementations, and applications like sparse matrices and polynomial addition.
2. Proficiency in stack and queue operations, including their array and linked implementations, and understanding their applications in recursion, postfix expressions, and simulation.
3. Knowledge of trees, including binary trees, tree traversals, binary search trees, heaps, AVL trees, and m-way search trees, with an emphasis on insertion, deletion, and traversal algorithms.
4. Familiarity with graph representations, graph traversal techniques (DFS, BFS), and algorithms for spanning trees, shortest paths, and minimum cost spanning trees like Prim's and Kruskal's.
5. Ability to perform search operations (sequential, binary) and sorting algorithms (insertion, quicksort, heap sort, etc.), analyze their complexities, and implement hashing techniques with collision resolution strategies.

Unit - I

Introduction: Basic Terminology, Elementary Data Organization, Algorithm, Efficiency of an Algorithm, Time and Space Complexity, Asymptotic notations: Big-Oh, Time-Space trade-off. Abstract Data Types (ADT), Arrays: Definition, Single and Multidimensional Arrays, Representation of Arrays: Row Major Order, and Column Major Order, Application of arrays, Sparse Matrices and their representations.

Linked lists: Array Implementation and Dynamic Implementation of Singly Linked Lists, Doubly Linked List, Circularly Linked List, Operations on a Linked List. Insertion, Deletion, Traversal, Polynomial Representation and Addition, Generalized Linked List.

UNIT - II

Stacks: Abstract Data Type, Primitive Stack operations: Push & Pop, Array and Linked Implementation of Stack in C, Application of stack: Prefix and Postfix Expressions, Evaluation of postfix expression, Recursion, Tower of Hanoi Problem, Simulating Recursion, Principles of recursion, Tail recursion, Removal of recursion Queues, Operations on Queue: Create, Add,

Delete, Full and Empty, Circular queues, Array and linked implementation of queues in C, Dequeue and Priority Queue.

UNIT – III

Trees: Basic terminology, Binary Trees, Binary Tree Representation: Array Representation and Dynamic Representation, Complete Binary Tree, Algebraic Expressions, Extended Binary Trees, Array and Linked Representation of Binary trees, Tree Traversal algorithms: Inorder, Preorder and Postorder, Threaded Binary trees, Traversing Threaded Binary trees, Huffman algorithm.

Search Trees: Binary Search Trees (BST), Insertion and Deletion in BST, HEAP (Max and min heap), Heap Implementation, Insertion and Deletion Operations, AVL trees, Introduction to m-way Search Trees, B Trees & B+ Trees.

UNIT – IV

Graphs: Terminology, Sequential and linked Representations of Graphs: Adjacency Matrices, Adjacency List, Adjacency Multi list, Graph Traversal: Depth First Search and Breadth First Search, Connected Component, Spanning Trees, Minimum Cost Spanning Trees: Prims and Kruskal algorithm. Transitive Closure and Shortest Path algorithm: Warshal Algorithm and Dijikstra Algorithm.

UNIT - V

Searching: Sequential search, Binary Search, Comparison and Analysis Internal Sorting: Insertion Sort, Selection, Bubble Sort, Quick Sort, Two Way Merge Sort, Heap Sort, Radix Sort, Practical consideration for Internal Sorting.

Complexity of Search Algorithm

Hashing Hash Function, Collision Resolution Strategies.

Storage Management: Garbage Collection and Compaction.

Text Books:

1. Horowitz and Sahani, "Fundamentals of data Structures", Galgotia Publication Pvt. Ltd., New Delhi.

2. R. Kruse etal, "Data Structures and Program Design in C", Pearson Education Asia, Delhi-2002

3. A. M. Tenenbaum, "Data Structures using C & C++", Prentice-Hall of India Pvt. Ltd., New Delhi.

4. K Loudon, "Mastering Algorithms with C", Shroff Publisher & Distributors Pvt. Ltd.

5. Bruno R Preiss, "Data Structures and Algorithms with Object Oriented Design Pattern in C++", Jhon Wiley & Sons, Inc.

6. Adam Drozdek, "Data Structures and Algorithms in C++", Thomson Asia Pvt. Ltd.(Singapore)

Database Management System

CCSN-203

L	T	P	Cr
3	1	0	4

Course Outcomes:

1. Understanding of database management systems, data models, ER diagrams, and the process of transforming ER diagrams into relational tables.
2. Proficiency in the relational data model, SQL commands, and operations such as queries, joins, subqueries, and aggregate functions.
3. Knowledge of database design, normalization techniques, functional dependencies, and normal forms including BCNF for efficient database structuring.
4. Familiarity with transaction processing concepts, including serializability, conflict resolution, recovery methods, and deadlock handling in databases.
5. Understanding of concurrency control, recovery systems, file organization, and indexing techniques such as B+ trees and dynamic hashing for efficient data storage and retrieval.

Unit- I Introduction:
An overview of database management system, database system Vs file system, Database system concepts and architecture, data models schema and instances, data independence and database language and interfaces, Data definitions language, DML, Overall Database Structure. Data Modeling using the Entity Relationship Model: ER model concepts, notation for ER diagram, mapping constraints, keys, Concepts of Super Key, candidate key, primary key, Generalization, aggregation, reduction of an ER diagrams to tables, extended ER model, relationships of higher degree.

Unit- II Relational data Model and Language:
Relational data model concepts, CODD's Rules, integrity and constraints, entity integrity, referential integrity, Keys constraints, Domain constraints, relational algebra, relational calculus, tuple and domain calculus. **Introduction on SQL:** Characteristics of SQL, advantage of SQL. SQl data type and literals. Types of SQL commands. SQL operators and their procedure. Tables, views and indexes. Queries and sub queries. Aggregate functions. Insert, update and delete operations, Joins, Unions, Intersection, Minus, Cursors, Triggers, Procedures in SQL/PL SQL

Unit- III Data Base Design & Normalization:
Functional dependencies, normal forms, first, second, third normal forms, BCNF, inclusion dependences, loss less join decompositions, normalization using FD, MVD, and JDs, alternative approaches to database design.

Unit- IV Transaction Processing Concepts:
Transaction system, Testing of serializability, Serializability of schedules, conflict & view serializable schedule, recoverability, Recovery from transaction failures, log based recovery, checkpoints, deadlock handling.

Unit- V Concurrency Control Techniques:

Concurrency control and recovery system: Concurrency control, lock based protocols, time-stamp based protocols, validation based protocols, multiple granularity. Recovery system - failure classification, storage structure, recovery and atomicity, log-based recovery, shadow paging, buffer management, failure with loss of non-volatile storage, advanced recovery techniques, remote backup systems.Data Storage and Indexes - file organizations, primary, secondary index structures, various index structures - hash-based, dynamic hashing techniques, multi-level indexes, B+ trees.

Text Books

1) Date C J, "An Introduction To Database System", Addision Wesley
2) Korth, Silbertz, Sudarshan, "Database Concepts", McGraw Hill
3) Elmasri, Navathe, "Fundamentals Of Database Systems", Addision Wesley
4) Leon & Leon, "Database Management System", Vikas Publishing House.
5) Bipin C. Desai, "An introduction to Database Systems", Galgotia Publication
6) Majumdar & Bhattacharya, "Database Management System", TMH
7) Ramakrishnan, Gehrke, "Database Management System", McGraw Hill
8) Kroenke, "Database Processing: Fundamentals, Design and Implementation", Pearson Education.
9) Maheshwari Jain, "DBMS: Complete Practical Approach", Firewall Media, New Delhi

JAVA Programming

CCSN-207

L	T	P	Cr
3	1	0	4

COURSE OBJECTIVES:

The objectives of this course are to:

1. Understand Object Oriented Programming concepts and basic characteristics of Java.
2. Know the principles of packages, inheritance and interfaces.
3. Define exceptions and use I/O streams.
4. Develop a java application with threads and generics classes
5. Design and build simple Graphical User Interfaces.

COURSE OUTCOMES: On successful completion of the course, the student will be able to:

1. Write Java programs with properly designed constants, variables, objects, methods and reusability functionality
2. Learn how and where to implement interface and exception-handling concepts.
3. Write multi-threaded programming concepts for concurrency control based applications.
4. Construct GUI based JAVA enterprise applications
5. Develop web applications using JDBC, RMI and Servlet methodologies.

Unit – I

Introduction to Java: Overview of Java, Keywords, constants, variables and Data Types, Operators and Expressions, Decision Making, Branching and Looping, Jump statements: break, continue, return.

Introducing classes, objects and methods, constructors, class inheritance. Inheritance types, super keyword, preventing inheritance: final classes and methods.

Arrays and String: Creating an array, one and two dimensional arrays, string array and methods.

Packages and interfaces: Extending Interfaces, CLASSPATH, Access protection. Interfaces-defining an interface, implementing interfaces.

Unit – II

Exception handling - Fundamentals of exception handling, Exception types, Uncaught exceptions, using try and catch, multiple catch clauses, nested try statements, throw, throws and finally, built- in exceptions, creating own exception sub classes.

Multithreading- Differences between thread-based multitasking and process-based multitasking, Java thread model, creating threads, thread priorities, synchronizing threads, inter thread communication.

Unit – III

Input/Output Programming: Basics, Streams, Byte and Character Stream, predefined streams, Reading and writing from console and files.

The Collection Framework: collection interfaces, collection classes(ArrayList, LinkedList, Hash set), Accessing a Collection via an Iterator, Vector, More utility class

Unit – IV

Working with windows, Graphics and Text, using AWT controls, Button, Label, TextField Understanding Layout Managers, Flow Layout, Border Layout, Grid Layout, Card Layout, Grid Bag Layout and Menus.

GUI Programming with Swing – Introduction, limitations of AWT, components, containers.

Event Handling: Event Classes, Listener Interfaces, Handling mouse and keyboard events, Adapter classes, Inner classes, Anonymous Inner classes. A Simple AWT Application

Unit – V

Applets – Applets and HTML, Security Issues, Applets and Applications, passing parameters to applets. Creating a Swing Applet, Painting in Swing, A Paint example, Exploring Swing Controls- JLabel and Image Icon, JText Field, **Beans:** Introduction to Java Beans and Servlets.

Database Connectivity JDBC architecture, establishing connectivity and working with connection interface, connecting to a database, working with statements, creating and executing SQL statements, working with Result Set

Reference Books:

1. Patrick Naughton and Herbertz Schildt, "*Java-2 the Complete Reference*", TMH, 7th Edition, 2006.
2. E. Balaguruswamy, "*Programming with Java:* A Primer", TMH, First Reprint, 2007.
3. Horstmann, "*Computing Concepts with Java 2 Essentials*", John Wiley and sons inc, Third Edition, 2003.
4. Kathy Sierra, "*Head First Java*", O'Rielly, Second Edition, February 2005.
5. Programming in Java, S. Malhotra and S. Choudhary, Oxford Universities Press.

Operating Systems (Unix Programming)

CCSN-205

L	T	P	Cr
3	1	0	4

Course Outcomes:

On successful completion of the course, the student will be able to:

1. Understanding of operating system objectives, evolution, services, and system calls, along with user-interface interactions.
2. Knowledge of process management, CPU scheduling algorithms, process synchronization issues, and solutions like semaphores and classic synchronization problems.
3. Proficiency in memory management concepts, virtual memory, page replacement algorithms, and handling issues like thrashing and segmentation.
4. Familiarity with I/O systems, mass storage structures, disk scheduling algorithms, and the kernel I/O subsystem's role in transforming requests into hardware operations.
5. Understanding of deadlock characterization, prevention, avoidance, and detection techniques, as well as system protection methods and access control mechanisms.

UNIT - I: Introduction to Operating System:

Operating Systems Objectives and functions, Evolution of Operating Systems - Simple Batch, Multi programmed, time shared, Personal Computer, Parallel, Distributed Systems, Real-Time Systems, Operating System services, user OS Interface, System Calls, Types of System Calls, System Programs.

UNIT - II: Process and CPU Scheduling :-

Process concepts - The Process, Process State, Process Control Block, Threads, Process Scheduling - Scheduling Queues, Preemptive Scheduling, Scheduling Criteria, Scheduling algorithms, Multiple-Processor Scheduling, Real-Time Scheduling, Thread scheduling - Process Synchronization, The Critical section Problem, Reader's Writer's Problem, Dining Philosopher Problem, Semaphores, and Classic Problems of Synchronization.

UNIT - III: Memory Management and Virtual Memory :

Logical & physical Address Space, Swapping, Contiguous Allocation, Paging, Structure of Page Table, Segmentation, Segmentation with Paging, Virtual Memory, Demand Paging, Performance of Demanding Paging, Page Replacement Algorithms, Allocation of Frames, Thrashing.

UNIT - IV: I/O System :-

I/O SYSTEM: Mass storage structure - overview of mass storage structure, disk structure, disk attachment, disk scheduling algorithms, swap space management, stable storage implementation, tertiary storage structure.

I/O: Hardware, application I/O interface, kernel I/O subsystem, transforming I/O requests to hardware operations, streams, performance.

UNIT - V: Deadlocks -:

System Model, Deadlock Characterization, Methods for Handling Deadlocks, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection and Recovery from Deadlock. Banker's Algorithm

Protection - System Protection, Goals of Protection, Principles of Protection, Domain of Protection, Access Matrix, Implementation of Access Matrix, Access Control, Revocation of Access Rights.

TEXT BOOKS:

1. Operating System Principles, Abraham Silberchatz, Peter B. Galvin, Greg Gagne 8th Edition, Wiley Student Edition.
2. Operating systems - Internals and Design Principles, W. Stallings, 6th Edition, Pearson.

REFERENCES BOOKS:

1. Modern Operating Systems, Andrew S Tanenbaum 3rd Edition PHI.
2. Operating Systems A concept - based Approach, 2nd Edition, D. M. Dhamdhere, TMH.
3. Principles of Operating Systems, B. L. Stuart, Cengage learning, India Edition.
4. Operating Systems, A. S. Godbole, 2nd Edition, TMH
5. An Introduction to Operating Systems, P.C.P. Bhatt, PHI.
6. Operating Systems, S, Haldar and A. A. Arvind, Pearson Education.
7. Operating Systems, R. Elmasri, A. G. Carrick and D. Levine, Mc Graw Hill.
8. Operating Systems in depth, T. W. Doeppner, Wiley.

Discrete Mathematics

CCSN-209

L	T	P	Cr
3	1	0	4

Course Outcomes:

On successful completion of the course, the student will be able to:

1. Understanding of set theory, relations, and functions, along with theorem proving techniques like induction and the pigeonhole principle.
2. Proficiency in propositional logic, truth tables, logical implications, and quantifiers, alongside fundamental concepts in probability and random variables.
3. Knowledge of posets, Hasse diagrams, lattices, Boolean algebra, and applications of permutations, combinations, and recurrence relations.
4. Familiarity with algebraic structures, including groups, rings, fields, divisibility, congruences, and their properties and operations.
5. Ability to analyze graphs and combinatorics concepts, including graph representations, tree properties, and algorithms like Euler and Hamiltonian paths.

Unit-I: Set Theory, Relations, and Functions (10 topics)

Sets: definition, countable/uncountable, Venn diagrams, power set, Relations: definition, types, composition, equivalence relation, partial ordering, Functions: definition, types, one-to-one, onto, inverse, composition, Theorem Proving Techniques: mathematical induction, pigeonhole principle, proof by contradiction.

Unit-II: Propositional Logic (10 topics)

Propositions, logic operators, First-order predicate logic, Truth tables, tautologies, arguments, Contradictions, logical implications, equivalence, Predicates, universal/existential quantifiers. 1. Probability: definitions, axioms, properties, Random Variables: definitions, types,Probability Distributions: Bernoulli, Binomial, Conditional Probability and Independence,

Unit-III: Posets, Hasse Diagrams, and Lattices (12 topics)

Permutations and Combinations, Recurrence Relations, Generating Functions,Ordered sets, Hasse diagrams, Isomorphic ordered sets, well-ordered sets, Lattices: properties, bounded, complemented, Boolean Algebra: basic definitions, sum/product forms, Logic gates, Karnaugh maps.

Unit-IV: Algebraic Structures (10 topics)

Number Theory: divisibility, primality, Congruences: definitions, properties,Groups: definition, properties, types (Semi Group, Monoid, Abelian), Subgroup, cyclic groups, cosets, factor group,

Permutation groups, Normal subgroup, Homomorphism and isomorphism of groups, Rings and fields.

Unit-V: Graphs and Combinatorics (10 topics)

Recurrence Relations, generating functions, Graphs: simple, multi, terminology, Representation, Bipartite, Regular, Planar, connected, Euler graphs, Hamiltonian path/circuits, Adjacency/Incidence Matrices, Graph coloring, Tree: definition, rooted, properties, binary search.

Reference Books:

1. Seymour Lipschutz& M.L. Lipson, Discrete Mathematics, Tata McGraw Hill, 2nd Edition, 1999.

2. Trembley, J.P & R. Manhor, Discrete Mathematical Structure with Application to Computer Science, McGraw Hill, 1997.

3. Kennth H. Rosen, Discrete Mathematical and its applications, McGraw Hill, 4th Edition, 2002.

4. JL Morr, AKandal and TP Baker, Discrete Mathematics for Computer Scientists and Mathematics, PHI, 1999.

5. Deo, Narsingh, Graph Theory With application to Engineering and Computer Science, PHI, 2007

Mathmatics

CCSN-209 A

L	T	P	Cr
3	1	0	4

Course Outcomes:
At the end of this course, students will demonstrate the ability to:

1. Develop problem-solving skills using mathematical concepts and techniques.
2. Apply mathematical methods to solve real-world engineering and scientific problems.
3. Understand and work with algebra, calculus, probability, and statistics.
4. Enhance logical thinking and analytical skills through mathematical reasoning.
5. Use mathematical tools for modeling and analyzing complex systems and data.

UNIT-I

Introduction, Elementary row and column transformations, Rank of matrix, Linear dependence, Consistency of linear system of equations, characteristic equation, CaleyHamilton Theorem, Eigen values and eigen vectors, Diagonalisation, Complex and unitary matrices

UNIT-II

nth derivative, Leibnitz theorem, Partial differentiation, Euler's theorem, Curve tracing, Change of variables, Expansion of function of several variables..

UNIT-III

Jacobian, Approximation of errors, Extrema of functions of several variables, Lagrange's method of multipliers (Simple applications)

UNIT-IV

Double and triple integrals, Change of order of the Integration, Change of variables, Beta and Gamma functions, Application to area and volume, Dirichlet's integral and its applications.

UNIT-V

Point functions, Gradient, divergence and curl of a vector and their physical interpretations, Line, Surface and Volume integrals, Green's, Stoke's and Gauss divergence theorems.

References:

1. Shanti Narayan A Text Book of Martices, S. Chand & Co.
2. Thomas/Finny Calculus and Analytical Geometry, Narosa House.
3. B.S. Grewal . Higher Engineering Mathematics, Publishers,
4. Piskunov, M. . Differential and Integral Calculus, Peace Pub.
5. Jaggi and Mathur : Advanced Engineering Mathematics, Khanna
6. C. Prasad . Mathematics for Engineers, Prasad

Basics Mathmatics

CCSN-209 B

L	T	P	Cr
3	1	0	4

Course Outcomes:
At the end of this course, students will demonstrate the ability to:

1. Understand fundamental mathematical concepts such as arithmetic, algebra, and geometry.
2. Develop problem-solving skills through basic equations and functions.
3. Apply mathematical principles to solve real-world problems in various fields.
4. Enhance understanding of fractions, percentages, ratios, and proportions.
5. Learn basic statistics and probability to interpret and analyze data.

UNIT-I

Numbers, HCF & LCM, Decimal Fractions, Simplification, Square and Cube roots, Average, Problems on numbers, Problems on Ages, Surds and Indices, Percentage, Profit and Loss

UNIT-II
Ratio and Proportion, Partnership, Chain rule, Time and work, Pipes and cisterns, Time and distance, Problems on trains, Boats and streams.

UNIT-III
Number system and basic Arithmetic, Algebra, Trigonometry, Geometry and Cartesian, Geometry, Calculus- Differential and Integral, Matrix Algebra, Probability and Statistics.

UNIT-IV
Double and triple integrals, Change of order of the Integration, Change of variables, Beta and Gamma functions, Application to area and volume, Dirichlet's integral and its applications.

UNIT-V
Point functions, Gradient, divergence and Time and work, Pipes and cisterns, Time and distance, Problems on trains, Boats and streams, Simple and Compound interest, Miscellaneous curl of a vector and their physical interpretations, Line, Surface and Volume integrals, Green's, Stoke's and Gauss divergence theorems.

References:

1. Shanti Narayan A Text Book of Martices, S. Chand & Co.
2. Thomas/Finny Calculus and Analytical Geometry, Narosa House.
3. B.S. Grewal . Higher Engineering Mathematics, Publishers,
4. Piskunov, M. . Differential and Integral Calculus, Peace Pub.

Mathematics-I

CCSN 209 C

L	T	P	Cr
3	1	0	4

Course Outcomes:
At the end of this course, students will demonstrate the ability to:

1. Understand the fundamental concepts of calculus, including limits, derivatives, and integrals.
2. Apply differentiation and integration techniques to solve problems in physics and engineering.
3. Analyze functions and their behavior using graphical and algebraic methods.
4. Solve problems involving sequences, series, and their convergence.
5. Learn methods to solve ordinary differential equations and apply them to real-world scenarios.

Unit – 1

Differential Calculus -1: determination of nth order derivatives of Standard functions - Problems. Leibnitz's theorem (without proof) - problems. Polar Curves - angle between the radius vector and tangent, angle between two curves, Pedal equation of polar curves. Derivative of arc length - Cartesian, Parametric and Polar forms (without proof) - problems. Curvature and Radius of Curvature – Cartesian, Parametric, Polar and Pedal forms (without proof) –problems

Unit -2

Differential Calculus -2 Taylor's and Maclaurin's theorems for function of one variable(statement only)- problems. Evaluation of Indeterminate forms. Partial derivatives – Definition and simple problems, Euler's theorem(without proof) – problems, total derivatives, partial differentiation of composite functions-problems. Definition and evaluation of Jacobians

Unit – 3

Vector Calculus: Derivative of vector valued functions, Velocity, Acceleration and related problems, Scalar and Vector point functions. Definition of Gradient, Divergence and Curl-problems. Solenoidal and Irrotational vector fields. Vector identities - div(ϕA), curl (ϕA), curl(grad ϕ), div(curl A).

Unit - 4

Differential Equations ; Solution of first order and first degree differential equations – Exact, reducible to exact and Bernoulli's differential equations .Orthogonal trajectories in Cartesian and polar form. Simple problems on Newton's law of cooling.

Unit - 5

Linear Algebra Rank of a matrix by elementary transformations, solution of system of linear equations - Gauss-elimination method, Gauss –Jordan method and Gauss-Seidel method Eigen values and Eigen vectors, Rayleigh's power method to find the largest Eigen value and the corresponding Eigen vector. Linear transformation, diagonalisation of a square matrix . Reduction of Quadratic form to Canonical form.

Advance Applied Mathematics

CCSN 209 D

L	T	P	Cr
3	1	0	4

Course Outcomes:
At the end of this course, students will demonstrate the ability to:

1. Apply advanced techniques in calculus and linear algebra to solve complex mathematical problems.
2. Use partial differential equations to model and analyze physical phenomena.
3. Study vector calculus and its application in fields like electromagnetism and fluid dynamics.
4. Explore advanced numerical methods for solving large-scale engineering and scientific problems.
5. Develop mathematical models to analyze and optimize systems in various disciplines like economics and biology.

Unit – I

Complex Analysis: Analytic function, Cauchy-Riemann equations, Complex integration: Line integral in the complex plane, Cauchy's integral theorem, Cauchy's integral formula, Derivatives of analytic functions, Taylor's series, Maclaurin's series, Laurent's series, Singularities and zeros.

Unit – II

Complex Analysis: Residue integration method, evaluation of real integrals Numerical Methods: Errors of numerical results, error propagation,., Lagrange Interpolation, Newton divided difference interpolation, Newton's forward and backward interpolation, Spline interpolation.

Unit - III

Numerical Methods: Numerical integration: The trapezoidal rule, The Simpson's rules, Gauss Integration formulas. Solution of ordinary differential equation: Euler's method, Improvement of Euler's method, Runge-Kutta methods, multistep methods, Methods for system and higher order ordinary differential equations.

Unit - IV

Probability Theory and Its Applications: Probability, Random variables, Probability distributions, Mean and variance; Features of Probability Distribution: Binomial, Poisson, Uniform and Normal distribution, Distribution of several random variables.

Unit – V

Statistical Techniques and Its Applications: Scope of Statistics, Random sampling, Sampling Distribution, Correlation analysis, Regression Analysis, Fitting Straight Lines, Estimation of Parameters, Statistical Hypothesis.

Value Education, Human Rights and Legislative Procedure

CBSN-201

L	T	P	Cr
2	0	0	2

Course Outcomes:

1. Understanding of human values, value education, and their role in personal development, including self-analysis and sensitization towards gender equality and respect for others.
2. Knowledge of national and global values, including democracy, equality, justice, professionalism, and religious and aesthetic values, promoting national integration and international understanding.
3. Awareness of environmental conservation, ecological balance, and the interdependence of all living and non-living beings.
4. Familiarity with therapeutic measures such as physical exercise, meditation, yoga, and methods to control desires, anger, and worries for mental and physical well-being.
5. Understanding of human rights from both Indian and international perspectives, including rights for women and children, and the role of institutions in protecting and enforcing these rights.

UNIT – I : Concept of Human Values, Value Education Towards Personal Development Aim of education and value education; Evolution of value oriented education; Concept of Human values; types of values; Components of value education.

Personal Development: Self-analysis and introspection; sensitization towards gender equality, physically challenged, intellectually challenged. Respect to - age, experience, maturity, family members, neighbors, co-workers.

UNIT – II : Value Education Towards National and Global Development National and International Values: Constitutional or national values - Democracy, socialism, secularism, equality, justice, liberty, freedom and fraternity. Social Values - Pity and probity, self-control, universal brotherhood. Professional Values - Knowledge thirst, sincerity in profession, regularity, punctuality and faith. Religious Values - Tolerance, wisdom, character. Aesthetic values - Love and appreciation of literature and fine arts and respect for the same. National Integration and international understanding.

UNIT – III : Environment and Ecological balance – interdependence of all beings – living and non-living. The binding of man and nature – Environment conservation and enrichment.

UNIT - IV : Therapeutic Measures Control of the mind through a. Simplified physical exercise b. Meditation – Objectives, types, effect on body, mind and soul c. Yoga – Objectives, Types, Asanas d. Activities: (i) Moralization of Desires (ii) Neutralization of Anger (iii)Eradication of Worries (iv)Benefits of Blessings

UNIT; V : Human Rights 1. Concept of Human Rights – Indian and International Perspectives a. Evolution of Human Rights b. Definitions under Indian and International documents

2. Broad classification of Human Rights and Relevant Constitutional Provisions. a. Right to Life, Liberty and Dignity b. Right to Equality c. Right against Exploitation d. Cultural and Educational Rights e. Economic Rights f. Political Rights g. Social Rights

3. Human Rights of Women and Children a. Social Practice and Constitutional Safeguards (i) Female Foeticide and Infanticide (ii) Physical assault and harassment (iii) Domestic violence (iv) Conditions of Working Women

4. Institutions for Implementation a. Human Rights Commission b. Judiciary

5. Violations and Redressel a. Violation by State b. Violation by Individuals c. Nuclear Weapons and terrorism d. Safeguards.

Humanities and Science

CBSN 201 A

L	T	P	Cr
2	0	0	2

Course Outcomes:

At the end of this course, students will demonstrate the ability to:

1. Understand the fundamental concepts of humanities and their relation to science and technology.
2. Develop critical thinking and analytical skills through the study of literature, history, and social sciences.
3. Explore the ethical implications of scientific advancements and technological innovations.
4. Enhance communication skills by integrating scientific and humanistic perspectives.
5. Apply interdisciplinary knowledge to address real-world issues and promote societal development.

Unit I

Atomic and molecular structure Schrodinger equation. Particle in a box solutions and their applications for simple sample. Molecular orbitals of diatomic molecules . Energy level diagrams of diatomic. Pi-molecular orbitals of butadiene and benzene and aromaticity. Crystal field theory and the energy level diagrams for transition metal ions and their magnetic properties. Band structure of solids and the role of doping on band structures.

Unit II

Spectroscopic techniques and applications Principles of spectroscopy and selection rules. Electronic spectroscopy. Fluorescence and its applications inmedicine. Vibrational and rotational spectroscopy of diatomic molecules. Applications. Nuclear magneticresonance and magnetic resonance imaging, surface characterisation techniques. Diffraction and scattering

Unit III

Intermolecular forces and potential energy surfaces Ionic, dipolar and van Der Waals interactions. Equations of state of real gases and critical phenomena.

Unit IV

Use of free energy in chemical equilibriaFirst and second laws of thermodynamics and thermodynamic functions: energy, entropy and free energy. Estimations of entropy and free energies. Free energy and emf. Cell potentials, the Nernst equation and applications. Acid base,

oxidation reduction and solubility equilibria. Water chemistry. Corrosion. Use of free energy considerations in metallurgy through Ellingham diagrams.

Unit V

Periodic properties Effective nuclear charge, penetration of orbitals, variations of s, p, d and f orbital energies of atoms in the periodic table, electronic configurations, atomic and ionic sizes, ionization energies, electron affinity and electronegativity, polarizability, oxidation states, coordination numbers and geometries, hard soft acids and bases, molecular geometries

Public Policy

CBSN 201 B

L	T	P	Cr
2	0	0	2

Course Outcomes:
At the end of this course, students will demonstrate the ability to:

1. Understand the principles and processes of public policy formulation and implementation.
2. Analyze the role of government, institutions, and stakeholders in shaping public policy.
3. Examine the impact of policies on society, economy, and environment.
4. Develop skills in evaluating and assessing policy effectiveness and outcomes.
5. Explore the ethical and legal considerations involved in public policy decisions.

Unit-I

Introduction of Public Policy: Definition, Nature, Scope and Importance of Public Policy, Evolution of Public Policy and Policy Sciences, Public Policy and Public Administration. Approaches to Public Policy Analysis: The Process Approach, The Logical Positivist Approach, The Phenomenological Approach, The Participatory Approach and Normative Approach

Unit-II

Theories and Process of Public Policy Making: Theories and Models of Policy Making, Perspectives of Policy Making Process, Institutions of Policy Making.

Unit-III

Policy Implementation and Evaluation: Concept of Policy Implementation, Techniques of Policy Implementation, Concept of Policy Evaluation, Constraints of Public Policy Evaluation

Unit-IV

Introduction of Governance: Definitions, Issues and Controversies, Reinventing Government, Reforming Institutions: The State, Market and Public domain. State and Governance: Origin and types of State, Democratic State and Democratic Administration, Neo-Liberalism and Rolling Back State and Governance as Government.

Unit-V

Citizen and Techniques of Governance: Rule of Law and Human Rights, Accountability, Participation, Representation. Techniques of Governance: Openness and Transparency, Citizen

Charter, Social Audit. Emerging Trends in Public and Private Governance: An Overview, Market, Civil Society, Information and Communication Technology

Leaders for Global Operations

CBSN 201 C

L	T	P	Cr
2	0	0	2

Course Outcomes:
At the end of this course, students will demonstrate the ability to:

1. Understand the principles of global operations and the challenges faced by leaders in an international context.
2. Develop strategic thinking and decision-making skills for managing global supply chains and operations.
3. Analyze the impact of cultural, economic, and political factors on global business operations.
4. Foster leadership skills to drive innovation, efficiency, and sustainability in global organizations.
5. Learn to navigate global markets, manage cross-cultural teams, and lead change in a dynamic environment.

UNIT –I

Introduction to Operations Management - Process Planning - Plant Location - Plant Lay out - Introduction to Production Planning.

UNIT –II

Stages of Development of Operations Research- Applications of Operations ResearchLimitations of Operations Research- Introduction to Linear Programming- Graphical Method- Simplex Method - Duality.

UNIT-III

Transportation Problem- Assignment Problem - Inventory Control - Introduction to Inventory Management - Basic Deterministic Models - Purchase Models - Manufacturing Models with and without Shortages.

UNIT-IV

Shortest Path Problem - Minimum Spanning Tree Problem - CPM/PERT - Crashing of a Project Network.

UNIT- V

Game Theory- Two Person Zero-sum Games -Graphical Solution of (2 x n) and (m x 2) Games - LP Approach to Game Theory - Goal programming - Formulations - Introduction to Queuing Theory - Basic Waiting Line Models: (M/M/1):(GD/a/a), (M/M/C):GD/a/a).

PERL Programming

CCSN-211

L	T	P	Cr
2	0	0	2

Course Outcomes:
At the end of this course, students will demonstrate the ability to:

1. To identify basic perl constructs and to outline perl debugging commands.
2. To create and design simple perl programs with the available perl
3. To pre-defined functions.
4. To demonstrate perl subroutines and perl references
5. To Apply Data Structures on perl programs and perl formats.

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UNIT-I (10 Lectures)

Introduction to perl# ! , Basic I/O, Variables variables& Backslash Interpolation, Scalar/list control operators, operator procedure, if unless, loops, loop control.

Debugging perl scripts Debugging commands, Debugger customization, Unattended execution, Debugging support, the perl profiler.

UNIT-II (10 Lectures)

Built in Function Perl functions by category, Perl functions in alphabetical order. Regular expressions Pattern Matching, operators, Meta character and meta symbols. Character classes, quantifiers, Pointers, capturing & clustering, Alternation, staying in control.

UNIT-III (10 Lectures)

Subroutines Syntax, Semantics, parsing references, prototypes, subroutine attributes. Formats Format variables, footers. References Creating References, using hard references, symbolic references, Braces, Brackets and Quotes.

UNIT-IV (10 Lectures)

Data Structure Arrays of Arrays, Hashes of arrays, Arrays of Hashes, Hashes of Hashes, Hashing as function , Elaborate records, Hashes of functions. CGI Programming CGI Basic, Forms, Methods.

UNIT-V (10 Lectures)

Here Docs, More CGI Emailing, Cookies, File uploading, E-mail.

TEXT BOOKS

1. Tom Christiansen, Brian D Foy, Larry Wall, Jon Orwant, *Programming Perl*, O'Reily, 3rd Edition, 2010.

Scott Guelich, *CGI Programming with Perl*, O'Reily, et al., SPD publication , 2nd Edition , 2008.

Introduction to Soft Computing

CCSN-213

L	T	P	Cr
2	0	0	2

Course Outcomes:
At the end of this course, students will demonstrate the ability to:

1. Understanding the concept of soft computing, its characteristics, and its applications compared to hard computing.
2. Knowledge of fuzzy logic, fuzzy sets, operations, decision-making, and the design and applications of fuzzy logic controllers in electrical engineering.
3. Familiarity with neural networks, including supervised and unsupervised learning, perceptrons, backpropagation, and their applications in electrical engineering control problems.
4. Proficiency in optimization techniques like genetic algorithms, evolutionary algorithms, simulated annealing, and ant colony optimization for solving electrical engineering problems.
5. Ability to apply soft computing techniques in practical electrical engineering problems, focusing on control, modeling, and optimization.

UNIT - I INTRODUCTION TO SOFT COMPUTING 9

Concept of computing systems. "Soft" computing versus "Hard" computing, characteristics of Soft computing, Some applications of Soft computing techniques.

UNIT - II FUZZY LOGIC 12

Fuzzy sets, logic operations, and relations; Fuzzy decision-making; fuzzy inference systems; design steps in fuzzy logic controller; application of fuzzy logic controller in Electrical engineering.

UNIT III – NEURAL NETWORKS 12

Basic concepts and major classes of neural networks, supervised and unsupervised learning, Single-layer perceptron, Multi-layer perceptron, Back Propagation Neural network, Recurrent neural networks, support vector machine, Application of neural network modelling / control problems in Electrical engineering

UNIT – IV OPTIMIZATION TECHNIQUES: 12

Genetic algorithms, Evolutionary Algorithm, Simulated Annealing, Ant colony optimization - Applications to Electrical engineering problems.

TEXT BOOKS

1. George J.Klir and Bo Yuan, Fuzzy sets and Fuzzy Logic, Second Edition, PHI, 2006.
2. J.M.Zurada, Introduction to artificial neural systems, Jaico Publishing House, 2006
3. D.E. Goldberg, Genetic algorithms in search, optimization, and machine learning, Addison-Wesley.

REFERENCES

S.N.Sivanandam, and S.N.Deepa, Principles of Soft computing, Second Edition, Wiley India Pvt. Ltd, 2013.

1. N.P.Padhy and S.P.Simon, Soft computing with MATLAB programming, Oxford publishers, 2015.
2. http://nptel.ac.in/courses/106106046/41
3. https://www.coursera.org/learn/neural-networks
4. http://www.iitk.ac.in/kangal/deb.shtml

MATLAB Programming For Engineers

CCSN-215

L	T	P	Cr
2	0	0	2

Course Outcomes:
At the end of this course, students will demonstrate the ability to:

1. Develop proficiency in using MATLAB for solving engineering problems and simulations.
2. Implement algorithms and functions to perform numerical analysis and data visualization.
3. Apply MATLAB for solving linear algebra, calculus, and differential equations in engineering contexts.
4. Use MATLAB to model and simulate real-world systems and analyze their behavior.
5. Develop skills in writing efficient code for engineering applications and problem-solving.

Unit I

Introduction to MATLAB; Basics of MATLAB: windows - input & output - platform dependence - file types - general commands

Unit II

Script Files; Function files: Functions – Sub functions; Global Variables, Loops, Branches and control-flow

Unit III

Tutorials: Basics - Creating and working with arrays - Creating and Printing simple plots - Creating, saving and executing a script - Creating and executing a function file - Working with arrays and matrices - Importing and Exporting data - Files and Directories - Publishing reports

Unit IV

Graphics; Plotting simple graphs; Basic 2D plots: Style Options – Labels, title and legend –

Axis Control, zoom in and zoom out – Using plot editor - Overlay plots – Specialized 2D Plots; Examples: fplot – semilogx – semilogy – loglog – fill – bar – barh – area – pie – hist – stem – stairs – compass – comet – pcolor; subplots

Unit V

3D plots; View: view(2) and view(3) with examples; Mesh and surface plots; Examples:

plot3 – fill3 – surf – surfc -surf1 – meshz – waterfall – pie3 – stem3

REFERENCES

1. Getting started with MATLAB- RudraPratap, Oxford University Press.
2. Mastering MATLAB 7- Duane Hanselma and Bruce Littlefield, Pearson Education.
3. Understanding MATLAB- S N Alam, I K International Publishing House.
4. Programming in MATLAB- Patel and Mittal, Pearson Education India
5. Web resource: www.mathworks.com

Data Structure Using 'C' Lab

CCSN-251

L	T	P	Cr
0	0	2	1

Course Outcomes:
At the end of this course, students will demonstrate the ability to:

1. Understand and implement linear data structures such as arrays, stacks, queues, and linked lists.
2. Apply non-linear data structures like binary search trees and heaps for efficient data management and retrieval.
3. Represent and traverse graphs using adjacency lists and matrices, implementing DFS and BFS.
4. Develop and compare basic sorting algorithms for organizing data effectively.
5. Apply hashing techniques to create efficient lookup structures using collision handling methods.

1. Implement insertion, deletion, and display functions for a singly linked list.
2. Create a program to perform insertions and deletions in a doubly linked list.
3. Use arrays to implement a stack with push, pop, and display operations.
4. Create a queue using arrays, including enqueue, dequeue, and display functions.
5. Implement a circular queue with necessary operations.
6. Implement a stack using a linked list and perform standard operations.
7. Create a BST with functions for insertion, deletion, and traversal (in-order, pre-order, post-order).
8. Use adjacency list and matrix to represent a graph, including a function to add edges.
9. Implement DFS for graph traversal.
10. Create a program to perform BFS on a graph.
11. Implement a simple hash table with collision handling using chaining.
12. Create a max-heap and implement insert and delete operations.
13. Implement basic sorting algorithms (Bubble, Selection, Insertion).
14. Write a program to perform merge sort on an array.
15. Create a dynamic array that can grow and shrink in size, with functions for insertion and deletion.

Database Management System Lab Syllabus

CCSN-253

L	T	P	Cr
0	0	2	1

Course Outcomes:
At the end of this course, students will demonstrate the ability to:

1. Understand and use SQL, SQL*Plus, and perform basic database operations.
2. Design and manage databases using E-R diagrams, normalization, and key constraints.
3. Implement and manage tables, views, indexes, and use aggregate functions for data analysis.
4. Develop and troubleshoot PL/SQL programs with exception handling, triggers, and cursors.
5. Create and manage subprograms, including procedures and functions, for effective database operations.

List of Experiments:

1. Introduction SQL-SQL*Plus
2. Road way travels E-R Diagrams
3. Various Data Types
4. Tables
5. My SQL Installation
6. DDL and DML Commands with Examples
7. Key Constrains-Normalization
8. Aggregate functions
9. Joins
10. Views
11. Index
12. PL/ SQL
13. Exception handling
14. Triggers
15. Cursors
16. Subprograms-procedure PL/ SQL
17. Functions of PL/ SQL

JAVA Programming Lab

CCSN-255

L	T	P	Cr
0	0	2	1

Course Outcomes:

At the end of this course, students will demonstrate the ability to:

1. Develop foundational programming skills by implementing basic operations, such as printing, calculations, and string manipulations.
2. Implement and understand fundamental data structures including arrays, linked lists, stacks, queues, and binary trees.
3. Apply various sorting algorithms (bubble sort, selection sort, and insertion sort) and search techniques (linear and binary search).
4. Work with file handling and HashMap for storing and managing data efficiently.
5. Gain proficiency in recursion, iterative solutions, and algorithm design for solving mathematical and data structure problems.

1) A simple program that prints "Hello, World!" to the console.
2) Implement a basic calculator that performs addition, subtraction, multiplication, and division.
3) Write a program to calculate the factorial of a number using both iterative and recursive methods.
4) Create a program to check if a given string is a palindrome.
5) Generate and display the Fibonacci series up to a specified number of terms.
6) Implement bubble sort, selection sort, and insertion sort algorithms for an array of integers.
7) Write a program to perform linear search on an array.
8) Implement binary search on a sorted array.
9) Create a program that performs various string operations (substring, concatenation, length, etc.).
10) Implement a singly linked list with methods for insertion, deletion, and traversal.
11) Create a stack using arrays with push, pop, and display operations.
12) Implement a queue using linked lists with enqueue, dequeue, and display operations.
13) Create a binary tree and implement in-order, pre-order, and post-order traversal methods.
14) Demonstrate the use of HashMap for storing and retrieving key-value pairs.
15) Write a program to read from a file and display its contents on the console.

Software Engineering

CCSN-301

L	T	P	Cr
3	1	0	4

Course Outcomes:
At the end of this course, students will demonstrate the ability to:

1. Identify appropriate software design model based on requirement analysis.
2. Formulate Software Requirements Specification (SRS) reports for the real world application. 3. Translate a specification into a design and identify the components to build the architecture. 4. Plan a software engineering process to account for quality issues and non-functional requirements.
3. Translate a specification into a design and identify the components to build the architecture.
4. Plan a software engineering process to account for quality issues and non-functional requirements.
5. Estimate the work to be done, resources required and the schedule for a software project plan.

UNIT – I- Introduction to Software Engineering:Introduction, software applications, importance of software evolution of software, Software Components, Software Characteristics, Software Crisis & myths, Software Engineering paradigms, Software Engineering Processes, Similarity and Differences from Conventional Engineering Processes, Software Quality Attributes. Software Development Life Cycle (SDLC) Models: Water Fall Model, Prototype Model,RAD model, Spiral Model, Evolutionary Development Models, Iterative Enhancement Models.

UNIT - II

Software Requirement Specifications (SRS): Requirement Engineering Process: Elicitation, Analysis, Documentation, Review and Management of User Needs, Feasibility Study, Information Modelling, Data Flow Diagrams, Entity Relationship Diagrams, Decision Tables, SRS Document, IEEE Standards for SRS. Software Quality Assurance (SQA):Verification and Validation, SQA Plans, Software Quality Frameworks, ISO 9000 Models, SEI-CMM Model.

UNIT - III

Software Design: Basic Concept of Software Design, Architectural Design, Low Level Design: Modularization, Design Structure Charts, Pseudo Codes, Flow Charts, Coupling and Cohesion Measures, Design Strategies: Function Oriented Design, Object Oriented Design, Top-Down and Bottom-Up Design. Software Measurement and Metrics: Various Size Oriented Measures: Halestead's Software Science, Function Point (FP) Based Measures, Cyclomatic Complexity Measures: Control Flow Graphs.

UNIT - IV

software testing strategies: Testing Objectives, Unit Testing, Integration Testing, Acceptance Testing, Regression Testing, Top-Down and Bottom-Up Testing Strategies: Structural Testing (white box), Functional Testing (black box testing), validation testing, system testing, debugging, Alpha and Beta Testing of Products.

UNIT - V

Software Reliability and Software Project Management: fault avoidance and tolerance, exception handling, defensive programming. Software Maintenance: maintenance characteristics, maintainability, maintenance tasks, maintenance side effects. CASE: introduction, levels of case, architecture, case building blocks, objectives, case repository, characteristics of case tools, categories,Estimation of Various Parameters such as Cost, Efforts, Schedule/Duration, Constructive Cost Models (COCOMO), Resource Allocation Models, Software Risk Analysis and Management.

References:

1.RS Pressman, Software Engineering: A Practitioners Approach, McGraw Hill.
2.PankajJalote, Software Engineering, Wiley
3.Rajib Mall, Fundamentals of Software Engineering, PHI Publication.
4.KK Aggarwal and Yogesh Singh, Software Engineering, New Age International Publishers.
5.Ghezzi, M. Jarayeri, D. Manodrioli, Fundamentals of Software Engineering, PHI Publication.
6.IanSommerville, Software Engineering, Addison Wesley.
7.Kassem Saleh, "Software Engineering", Cengage Learning.
8.Pfleeger, Software Engineering, Macmillan Publication

Compiler Design

CCSN 303

L	T	P	Cr
3	1	0	4

Course Outcomes

1. Understand compiler phases, lexical analysis, and the application of finite state machines and regular expressions.
2. Learn parsing techniques, including shift-reduce, operator precedence, and LR parsers, along with the construction of parsing tables.
3. Study syntax-directed translation, intermediate code generation, and translation of different language constructs like assignments and expressions.
4. Explore symbol table management, runtime administration, and error detection/recovery in lexical, syntactic, and semantic phases.
5. Gain knowledge of code generation, optimization techniques, and machine-independent optimizations like loop and global data-flow analysis.

Unit - I

Introduction to Compiler: Phases and passes, Bootstrapping, Finite state machines and regular expressions and their applications to lexical analysis, Optimization of DFA-Based Pattern Matchers

Implementation of lexical analyzers, lexical-analyzer generator, LEX compiler, Formal grammars

and their application to syntax analysis, BNF notation, ambiguity, YACC. The syntactic specification of programming languages: Context free grammars, derivation and parse trees, capabilities of CFG.

Unit – II

Basic Parsing Techniques: Parsers, Shift reduce parsing, operator precedence parsing, top down parsing, predictive parsers Automatic Construction of efficient Parsers: LR parsers, the canonical

Collection of LR(0) items, constructing SLR parsing tables, constructing Canonical LR parsing tables, Constructing LALR parsing tables, using ambiguous grammars, an automatic parser generator, implementation of LR parsing tables.

Unit - III

Syntax-directed Translation: Syntax-directed Translation schemes, Implementation of Syntax-directed Translators, Intermediate code, postfix notation, Parse trees & syntax trees, three address

code, quadruple & triples, translation of assignment statements, Boolean expressions, statements

that alter the flow of control, postfix translation, translation with a top down parser. More about translation: Array references in arithmetic expressions, procedures call, declarations and case statements.

Unit - IV

Symbol Tables: Data structure for symbols tables, representing scope information. Run-Time

Administration: Implementation of simple stack allocation scheme, storage allocation in block structured language. Error Detection & Recovery: Lexical Phase errors, syntactic phase errors semantic errors.
Intermediate Code Generation Different Intermediate Forms - Abstract Syntax tree, Polish Notation, 3 address code, Implementation of 3 address code-Quadruple, Triples and Indirect triples

Unit - V

Code Generation: Design Issues, the Target Language. Addresses in the Target Code, Basic Blocks and Flow Graphs, Optimization of Basic Blocks, Code Generator. Code optimization: Machine-Independent Optimizations, Loop optimization, DAG representation of basic blocks, value numbers and algebraic laws, Global Data-Flow analysis.

Reference Books:

1. Alfred V. Aho, Jeffrey D. Ullman, "*Principles of Compiler Design*", Narosa Publication, 2002
2. A.V. Aho, R. Sethi and J.D Ullman, "*Compiler: principle, Techniques and Tools*", Addision Wesley, 2nd Edition, 2006.
3. H.C. Holub, "*Compiler Design in C*", Prentice Hall Inc, Second Edition, Digitized Edition, 2010.
4. O.G. Kakde, "*Compiler Design*", Laxmi Publication, Seventh Edition, 2007

Object Oriented Analysis and Design

CCSN-305

L	T	P	Cr
3	1	0	4

Course Outcomes:
At the end of this course, students will demonstrate the ability to:

1. Understand object modeling concepts such as classes, inheritance, and aggregation, along with metadata.
2. Learn dynamic modeling, including events, states, and nested state diagrams for advanced dynamic system representation.
3. Explore functional modeling through data flow diagrams and understand OMT methodologies with practical case studies.
4. Gain proficiency in Java programming, including syntax, methods, classes, multithreading, and Java AWT for GUI development.
5. Develop software using Java technologies like Java Beans, Swing, Servlets, JSP, and JDBC, with real-world application examples.

Unit – I
Object Modeling: Objects and classes, links and association, generalization and inheritance, aggregation, abstract class and abstract function, inheritance and multiple inheritance, Meta data.

Unit – II
Dynamic Modeling: Events and states, operations, nested state diagrams, advanced dynamic modeling concepts, sample dynamic model.

Unit – III
Functional Modeling: Data flow diagram, specifying operations, a sample functional model. OMT (object modeling techniques) methodologies, examples and case studies to demonstrate methodologies, comparisons of methodologies, SA/SD, JSD.

Unit – IV
Java Programming: Introduction, Operator, Data types, Variables, Methods & Classes, Static methods, Static block, Interfaces, final method and classes, Multithread Programming, Thread life cycle, I/O, Java Applet. Java Library: String Handling, Input/Output exploring Java.io, Networking, Applets classes, Event Handling, Introduction to AWT, Working with window, Graphics, AWT Controls, Layout Manager and Menus, Images, AWT Basics, Event Handling, AWT Button, AWT Label, AWT TextField, AWT TextArea, AWT Checkbox.

Unit – V

Software Development using Java: Java Beans, Java Swing, java Servlets, Servlets Basic Concepts, JSP, Features of JSP, creating simple JSP page, Application of java, Dynamic Billboard Applet, Image Menu: An image based menu, Lavatron Applets, Scrabblets, JDBC, Brief functioning of upper layer E-mail and their applications.

Text Books:

1. James Rumbaughetal, "Object Oriented Modeling and Design", PHI
2. Herbert Schieldt, "The Complete Reference: Java", TMH.
3. E. Balagurusamy, "Programming in JAVA", TMH.

References:

1. Booch Grady, "Object Oriented Analysis & Design with application 3/e", Pearson Education, New Delhi.
2. BjarneStroustrup, "C++ Programming Language", Addison Wesley
3. E. Balagurusamy, "Object Oriented Programming with C++", TMH

Energy Studies

CBSN-301

L	T	P	Cr
2	0	0	2

Course Outcomes:

At the end of this course, students will demonstrate the ability to

1 Understand various energy sources in India, including fossil fuels, nuclear, and renewable energies, and their conservation methods.
2 Learn about the energy conversion processes for solar, nuclear, geothermal, tidal, and wind energies.
3 Explore the global energy scenario, including energy demand, depletion, and international policies of key organizations like G-8 and OPEC.
4 Analyze the Indian energy scenario, examining commercial and noncommercial energy use and sector-wise consumption patterns.
5 Study energy policy issues at global, national, and state levels, focusing on the Energy Conservation Act 2001 and the Electricity Act 2003.

UNIT 1: Energy Sources - Fossil fuels, Nuclear fuels, hydel, solar, wind and bio fuels in India, Energy conservation, Nuclear energy through fission and fusion processes.

UNIT 2: Energy Conversion- Energy conversion from source to utility, Solar, Nuclear, Geothermal, Tide and Wind Energies.

UNIT 3: Global Energy Scenario- Role of energy in economic development and social transformation, Overall energy demand, availability and consumption, Depletion of energy resources and its impact on economy, Non proliferation of nuclear energy. International energy policies of G-8, G-20, OPEC and European Union countries.

UNIT 4: Indian Energy Scenario- Commercial and noncommercial forms of energy, Utilization pattern in the past, present and also future prediction, Sector wise energy consumption.

UNIT 5: Energy Policy: Energy policy issues at global level, national level and state level, Energy conservation act 2001, Electricity act 2003, Energy pricing and its impact on global variations.

Course Outcomes:

At the end of this course, students will demonstrate the ability to

1. Understanding Energy Sources

2. Energy Conversion Processes
3. Global Energy Dynamics
4. Indian Energy Landscape
5. Energy Policy and Regulation
6. Sustainability and Conservation
7. Research and Communication Skills
8. Critical Thinking and Problem Solving

Text Books:

1. Jose Goldenberg, Thomas Johanson, and Reddy, A.K.N., Energy for Sustainable World, WileyEastern, 2005.

2. Charles E. Brown, World Energy Resources, Springer Publication, New York, 2002.

3. Culp, A.W., Principles of Energy Conversion, McGraw Hill New York, 2004. 80

Reference Books:

1. Bukhootsow, B., Energy Policy and Planning, Prentice Hall of India, New Delhi, 2003.

2. TEDDY Year Book, The Energy Research Institute (TERI), 2011

Supply Chain Management

CBSN-301A

L	T	P	Cr
2	0	0	2

Course Outcomes:
At the end of this course, students will demonstrate the ability to:

1. Understand the key components and processes involved in supply chain management.
2. Analyze the impact of logistics, inventory, and distribution on business efficiency.
3. Apply optimization techniques to improve supply chain performance.
4. Develop strategies for managing risks and uncertainties in supply chains.
5. Explore the role of technology and software tools in modern supply chain management.

UNIT 1

Introduction

Introduction, Generic Types of supply chain, Various Definitions and Implications, Major Drivers of Supply chain.

Strategic Decisions- in Supply Chain Management

Introduction, Business Strategy, Core Competencies in Supply Chain, Strategic SC Decisions, Customer Reletationship Management Strategy, Supplier Relationship Management Strategy

Source of Management in Supply Chain

Introduction, Elements of Strategic Sourcing, A Collaborative Perspective, Development of Partnership.

UNIT 2

Inventory Management in Supply Chain

Introduction, Types of Inventory, Supply/ Demand Uncertainties, Inventory costs, Selective Inventory Control, Vendor Manage Inventory system, Inventory Performance Measure

Logistics In Supply Chain Management

Introduction, Strategy, Transportation Selection, Trade-off, Models for Transportation and Distribution, Third Party Logistics,, Overview of Indian Infrastructure for Transportation

UNIT 3

Information Technology in Supply Chain

Introduction, Types of IT Solutions like Electronic Data Inter change (EDI), Intranet/ Extranet, Data Mining/ Data Warehousing and Data Marts, E-Commerce, E- Procurement, Bar Coding Technology.

Information System in Supply Chain

Introduction, Computer Based Information Systems, Computer Models and Perceptions about ERP, ERP & SCM

Application of Mathematical Modeling in Supply Chain
Introduction, Modeling, Consideration in Modeling SCM System, Structuring the Logistic chain, Concept of Modeling.

UNIT 4
Reverse Supply Chain
Introduction, Reverse Supply Chain v/s Forward Supply Chain, Types of Reverse Flows, Issues in Management of Reverse Supply Chain, Reverse Supply Chain for Food items, Reverse

Logistic and Environment Impact.
Integration & Collaborative Supply Chain
Introduction, Evolution of collaborative SCM, Efficient Customer response, Collaboration at various levels, Imperatives for Successful Integrative Supply Chains.

UNIT 5
Agile Supply Chain
Introduction, Source of Variability, Characteristics of Agile Supply Chain, Achieving Agility in Supply Chain.
Cases of Supply Chain
Cases of Supply Chain like, News Paper Supply Chain, Book Publishing, Mumbai Dabbawala, Disaster management, Organic Food, Fast Food.

Text Books & Reference Books:
1 Supply Chain Management Theories & Practices, R. P. Mohanty, S. G. Deshmukh, Dreamtech Press, 19-A, Anari Road, Daryaganj, New Delhi

2 Supply Chain Management Strategy, Planning & Operation by Sunil Chopra, Peter Meindl

3 Total Supply Chain Management by Ron Basu, J. Nevan Wright

4 Supply Chain Management, Chopra, Pearson

5 Logistics Engineering and Management, Blanchard, pearson

Transportation

CBSN-301B

L	T	P	Cr
2	0	0	2

Course Outcomes:
At the end of this course, students will demonstrate the ability to:

1. Understand the principles of transportation systems and their impact on logistics.
2. Analyze the various modes of transportation and their cost-effectiveness.
3. Study transportation planning and optimization techniques for efficiency.
4. Develop an understanding of traffic management and safety regulations.
5. Apply mathematical models to solve transportation-related problems, such as route optimization.

UNIT 1

Introduction to Transportation Engineering, Classification of roads, Typical cross sections of roads in urban and rural area, Requirements and factors controlling alignment of roads Introduction to geometric design of highways, Design controls and criteria, Design of highway cross section elements, Design of horizontal alignment - Stopping sight distance, Overtaking sight distance, super elevation, transition curve, length and shift of transition curve, extra widening. Vertical alignment (introduction only)

UNIT 2

Introduction to highway materials, Desirable properties and testing of road aggregates, bituminous materials and sub grade soil. Introduction of flexible and rigid pavements, Factors influencing the design of flexible pavements, Design of flexible pavements by CBR method and IRC 37: 2018. Construction of bituminous pavements

UNIT 3

Introduction to traffic engineering, Traffic characteristics, Capacity and Level of Service, Design Speed, Traffic surveys, Types of road intersections, Traffic control devices (introduction only), Design of isolated signals by Webster's method.

UNIT 4

Railway Engineering - Component parts of a railway track - functions, concept of Gauges, coning of wheels, cant deficiency, compensation of gradients Tunnel Engineering: Tunnel – sections, tunnel surveying - alignment, transferring centre grade into tunnel. Harbours – classification, features, requirements. Break waters - necessity and functions, classification. Docks – Functions and types - dry docks, wet docks (Introduction only)

UNIT 5

Introduction to Airport Engineering, Components of airport, selection of site for airport. Runway orientation, basic runway length and corrections required, Taxiways and aprons

Text Books

1. Khanna, S.K. and Justo C.E.G., Highway Engineering, Nem Chand & Bros., 20152. Kadiyali, L. R. and N.B Lal, Principles and Practices of Highway Engineering, KhannaPublishers, 20133. Khanna, S. K. and Arora. M. G., Airport Planning and Design, Nemchand& Bros4. Mundrey J. S, Railway Track Engineering, Tata McGraw Hill, 2009

Environment and Sustainability

CBSN-301 C

L	T	P	Cr
2	0	0	2

Course Outcomes:
At the end of this course, students will demonstrate the ability to:

1. Study the environmental impact of human activities and industrial practices.
2. Develop sustainable practices for resource utilization and waste management.
3. Analyze the relationship between environmental conservation and economic development.
4. Understand the role of policies and regulations in promoting sustainability.
5. Explore renewable energy solutions and their potential for sustainable development.

UNIT 1

Ecosystem: Structure of ecosystem, Biotic & Abiotic components, Aquatic (Lentic and Lotic) and terrestrial ecosystem.Global warming - Causes, effects, ,GreenHouse Effect, Ozone depletion.

UNIT 2

Air Pollution: Air pollution, Natural and manmade sources of air pollution, Effects of air pollution. Air Pollutants and Types.Control of air pollutants by Cyclone separator and Electrostatic Precipitator, Air (prevention and control of pollution) act 1981.

Noise Pollution: Noise pollution: sources of pollution, measurement of pollution level, Effects and Control of Noise pollution, Noise pollution (Regulation and Control) Rules, 2000.

UNIT 3

Water and Soil Pollution: Water pollution and Sources of water pollution, Types of water pollutants, Characteristics of water pollutants, control measures of water pollution.. Definition and list unit operations in water and WasteWater Treatment process,Water (prevention and control of pollution) act 1974, Water conservation – Importance of Rain Water Harvesting. Soil pollution, Causes, Effects and Preventive measures of Soil Pollution due to Excessive use of Fertilizers, Pesticides and Insecticides.

UNIT 4

Renewable sources of Energy: Solar Energy: Basics of Solar energy. Definition and advantages of advanced solar collectors. Solar water heater and Solar stills and their uses. Biomass: Overview of biomass as energy source. Thermal characteristics of biomass as fuel. Wind energy: Current status and future prospects of wind energy. Wind energy in India. Need

of new Energy sources, Different type's new energy sources.Environmental benefits of New Energy Sources-Hydrogen energy, Ocean energy resources, Tidal energy conversion.

UNIT 5

Solid Waste Management and Environmental: Solid waste generation, Sources and characteristics of Municipal solid waste, Solid Waste Management rules 2016- 3R in SWM. E-Waste generation,Sources and characteristics, E waste management rules 2016 Plastic Waste generation,Sources and characteristics, Recycled plastic rules 2016 Importance of Environment (protection) act 1986 Occupational health and safety measures.

References:

(a) Suggested Learning Resources: Books:

1. S.C. Sharma & M.P. Poonia, Environmental Studies,Khanna Publishing House,NewDelhi

2. C.N. R. Rao, Understanding Chemistry, Universities Press (India) Pvt. Ltd., 2011.

3. Arceivala, Soli Asolekar, Shyam, Waste Water Treatment for Pollution Control and

4. Reuse, Mc-Graw Hill Education India Pvt. Ltd., New York, 2007, ISBN:978-07-062099.

5. Nazaroff, William, Cohen, Lisa, Environmental Engineering Science, Willy, New York, 2000, ISBN 10: 0471144940.

Software Engineering Lab

CCSN-351

L	T	P	Cr
0	0	2	1

Course Outcomes:
At the end of this course, students will demonstrate the ability to:

1. Apply software development life cycle (SDLC) methodologies to build real-world applications.
2. Develop skills in coding, debugging, and testing software systems.
3. Use version control systems like Git to manage code and collaborate on software projects.
4. Implement and test software solutions using different programming languages and frameworks.
5. Analyze software requirements, design, and architecture for scalability and maintainability.

List of Experiments:

1. To prepare problem statement for any project.
2. Create a problem statement for an online learning platform.
3. Develop an understanding and Software Requirements Specification (SRS).
4. To draw a sample Entity Relationship Diagram for library management system.
5. To prepare Data Flow Diagram Online shopping management system.
6. To prepare the student / university management system Use Case Diagram
7. To draw a sample activity diagram for enterprise architectural modeling.
8. To draw a sample Class diagram for seminar.
9. To draw a Sequence Diagram for Online Shopping Checkout Process
10. To draw a Component Diagram for Library Management System.
11. To draw a Deployment Diagram for University Management System.
12. Develop a testing strategy for an online banking application.
13. Create a presentation that explains each phase of the SDLC with examples.

Compiler Design Lab

CCSN-353

L	T	P	Cr
0	0	2	1

Course Outcomes:
At the end of this course, students will demonstrate the ability to:

1. Understand the key components and stages involved in compiler construction.
2. Design lexical analyzers, parsers, and code generators for programming languages.
3. Implement syntax and semantic analysis techniques for efficient compiler development.
4. Explore optimization techniques for generating efficient machine code.
5. Test and debug compilers for handling various programming language constructs.

1. Create a lexer using Lex/Flex to tokenize input source code and print tokens with types.
2. Build a recursive descent parser or use Yacc/Bison to parse a grammar and display parse trees for valid inputs.
3. Implement a semantic checker that traverses the parse tree to identify type mismatches and undeclared variables.
4. Develop a module that converts the parse tree to intermediate representation (e.g., three-address code).
5. Apply optimization techniques like constant folding and dead code elimination to the intermediate code.
6. Create a generator that translates intermediate code into assembly language for a specified target architecture.
7. Implement error detection and reporting for lexical, syntax, and semantic errors with meaningful messages.
8. Use ANTLR or LLVM to construct a complete compiler from grammar definitions to code generation.
9. Measure compilation time and memory usage, and evaluate the efficiency of the generated code.
10. Develop a mini compiler for a simple language combining all components: lexer, parser, semantic analyzer, optimizer, and code generator.

Object Oriented Analysis and Design Lab

CCSN-355

L	T	P	Cr
0	0	2	1

Course Outcomes:
At the end of this course, students will demonstrate the ability to:

1. Apply object-oriented design principles to model and analyze complex systems.
2. Use UML diagrams to represent system components, interactions, and workflows.
3. Develop skills in class design, inheritance, polymorphism, and encapsulation.
4. Implement object-oriented concepts using programming languages like Java or C++.
5. Test and validate the functionality of object-oriented systems through practical exercises.

1. Design a class diagram for a simple system (e.g., library management) using UML notation.
2. Implement a program to create objects of defined classes and initialize their attributes.
3. Write a program demonstrating method overloading in one class and method overriding in a subclass.
4. Develop a class that uses private and public access modifiers to encapsulate data and provide getter/setter methods.
5. Create a base class and derive multiple subclasses, demonstrating the use of inherited properties and methods.
6. Implement a program that uses both compile-time (method overloading) and runtime (method overriding) polymorphism.
7. Design an interface and an abstract class, then implement classes that adhere to these definitions.
8. Write a program to illustrate the differences between composition and aggregation through class relationships.
9. Implement a design pattern (e.g., Singleton, Factory) in a sample application to demonstrate its utility.
10. Create use case and sequence diagrams for a given scenario to illustrate interactions and functionality.

Cryptography and Information Security

CCSN-307

L	T	P	Cr
3	1	0	4

Course Outcomes:
At the end of this course, students will demonstrate the ability to:

1. Understand the principles, approaches, and types of security, including cryptography concepts like encryption, decryption, and symmetric/asymmetric key cryptography.
2. Learn about symmetric key ciphers (DES, AES, RC5) and asymmetric key ciphers (RSA, Diffie-Hellman), along with their operations and use cases.
3. Gain knowledge of cryptographic hash functions, digital signatures, and key management techniques, including Kerberos and X.509 services.
4. Explore transport-level security protocols like SSL/TLS, HTTPS, and SSH, and understand wireless network security considerations and mobile device security.
5. Study email and IP security protocols like PGP, S/MIME, and IPsec, along with real-world cryptography case studies such as secure elections and cross-site scripting.

Unit - I
Security Concepts: Introduction, The need for security, Security approaches, Principles of security, Types of Security attacks, Security services, Security Mechanisms, A model for Network Security .
Cryptography Concepts and Techniques: Introduction, plain text and cipher text, substitution techniques, transposition techniques, encryption and decryption, symmetric and asymmetric key cryptography, stenography, key range and key size, possible types of attacks.

Unit - II
Symmetric key Ciphers: Block Cipher principles, DES, AES, Blowfish, RC5, IDEA, Block cipher operation, Stream ciphers.
Asymmetric key Ciphers: Principles of public key cryptosystems, RSA algorithm, Diffie-Hellman Key Exchange and Knapsack Algorithm.

Unit - III
Cryptographic Hash Functions: Message Authentication, Secure hash algorithm(SHA-512)
Message Authentication Codes: Authentication requirements.
Digital signatures Key Management and Distribution: Symmetric Key Distribution Using Symmetric & Asymmetric Encryption, Distribution of Public Keys, Kerberos, X.509 Authentication Service, Public – Key Infrastructure.

Unit - IV
Transport-level Security: Web security considerations, Secure Socket Layer and Transport Layer Security, HTTPS, Secure Shell (SSH)
Wireless Network Security: Wireless Security, Mobile Device Security, IEEE 802.11 Wireless LAN, IEEE 802.11i Wireless LAN Security

Unit - V

E-Mail Security: Pretty Good Privacy, S/MIME

IP Security: IP Security overview, IP Security architecture, Authentication Header, Encapsulating security payload, Combining security associations, Internet Key Exchange.

Case Studies on Cryptography and security: Secure Multiparty Calculation, Virtual Elections, Single sign On, Secure Inter-branch Payment Transactions, Cross site Scripting Vulnerability.

Reference Books:

1. William Stallings," *Cryptography and Network Security: Principles and Practice"*, Pearson Education, 5th edition, First impression 2011.
2. Forouzan A. Behrouz, "*Cryptography and Network Security* ", Tata McGraw Hill , 2nd Edition, 2008

Internet Web Programming

CCSN 309

L	T	P	Cr
3	1	0	4

Course Outcomes:
At the end of this course, students will demonstrate the ability to:

1. Understand web development fundamentals, including client-server architecture and the basics of HTTP.
2. Gain proficiency in HTML and CSS for structuring and styling web pages, and learn responsive design principles.
3. Learn JavaScript basics, including variables, functions, and DOM manipulation for interactive web pages.
4. Master advanced JavaScript concepts like asynchronous programming, AJAX, and dynamic content updates.
5. Get introduced to front-end frameworks like React, Angular, or Vue.js for building interactive, component-based web applications.

Unit 1: Introduction to Web Development

This unit introduces the fundamentals of web development, including an overview of the web's architecture. Students will learn about the roles of clients and servers, the basics of HTTP, and the difference between static and dynamic web pages.

Unit 2: HTML and CSS

In this unit, students will explore HTML for structuring web content and CSS for styling it. They will learn to create semantic HTML documents, apply CSS styles, and understand the box model, layout techniques, and responsive design principles.

Unit 3: JavaScript Basics

This unit focuses on JavaScript as the programming language of the web. Students will learn about variables, data types, functions, control structures, and the Document Object Model (DOM). They will practice manipulating HTML elements and responding to user events.

Unit 4: Advanced JavaScript and AJAX

Building on the basics, this unit covers more advanced JavaScript concepts, including asynchronous programming, callbacks, and promises. Students will learn about AJAX for making asynchronous requests to servers, enabling dynamic content updates without reloading the page.

Unit 5: Introduction to Front-End Frameworks

In this unit, students will be introduced to popular front-end frameworks such as React, Angular, or Vue.js. They will learn about component-based architecture, state management, and how to create interactive user interfaces.

Graph Theory

CCSN 311

L	T	P	Cr
3	1	0	4

Course Outcomes:
At the end of this course, students will demonstrate the ability to:

1. Understand graph properties, types, and Turan's theorem.
2. Learn about paths, circuits, Euler and Hamiltonian graphs, and various theorems related to graph connectivity.
3. Study trees, spanning trees, shortest path algorithms, and minimal spanning trees like Prim and Kruskal's algorithms.
4. Explore cut sets, planar graphs, dual graphs, and planarity detection.
5. Master graph coloring, chromatic numbers, and directed graphs with algorithms like Warshall's and Bellman-Ford.

UNIT 1

Introduction: Graphs, Sub-graphs, Regular graph, Adjacency and incidence matrices, Finite and infinite graph, Incidence and degree, Isolated vertex, Pendent vertex and null graph, Turan's theorem.

UNIT 2

Paths and Circuits: Isomorphism, Walk, Cycle, Paths and circuits, Simple and proper circuit, Connected and disconnected graph, Euler graphs, Operations on graphs, Hamiltonian paths and circuits, Bipartite graph, Berge theorem, Hall's theorem, Edge connectivity, Blocks, Menger's theorem.

Trees and Fundamental Circuits: Trees, Properties of tree, Pendant vertices in a tree, Distance and centers in a tree, Spanning tree, Cayley's Formula, Minimal spanning tree, Prim and Kruskal's algorithm, Matrix Tree theorem, Dijkstra's Shortest Path Algorithm, Floyd-Warshall algorithm, Huffman's Coding Algorithm, Depth-first and breath first algorithm.

UNIT 3

Cuts sets and cut-vertices: Cut sets, Properties of cutset, all cut sets in a graph, 1-isomorphism, 2isomorphism.

Planar graph and dual graphs: Planar graphs, Homoeomorphic graph, Kuratowski's Two Graphs, Different representation of a planar graph, Tutte's f-factor theorem, Detection of planarity, Geometric dual, Combinatorial dual.

UNIT 4

Coloring, Covering and Partitioning: Chromatic number, Chromatic Partitioning, Chromatic Polynomial, Covering, Four colour conjecture, Five-colour theorem, Dirac Theorem, Brooks theorem, Vizing theorem.

UNIT 5

Directed Graphs: Directed graph, Diagraph and binary relations, Directed Paths, Euler diagraphs, Acyclic digraphs, Topological sorting, Warshall's algorithm, Bellman-Ford algorithm, Ramsey theorems.

Recommended Books:

1. DeoNarsingh, Graph Theory with applications to Engineering and Computer Science, PrenticeHall of India (2007).
2. Parmenter Michael M., Goodaire Edgar G., Discrete Mathematics with Graph Theory, Prentice-Hall of India (2007).
3. Rosen, Kenneth H. Discrete Mathematics and its Applications, Tata Mcgraw-Hill (2003).

Bondy, J.A. Murty U.S.R., Graph theory and Applications, North Holland Publications (1995).

Computer Vision

CUCS 341

L	T	P	Cr
3	1	0	4

Course Outcomes:
At the end of this course, students will demonstrate the ability to:

1. Understand image formation, representation, and transformations in computer vision.
2. Apply image processing techniques such as histogram equalization, convolution, and Fourier transformation for filtering and noise removal.
3. Learn feature detection methods like edge, corner, and line detection, along with advanced descriptors like SIFT and HOG.
4. Explore camera calibration, motion representation, and techniques like optical flow for analyzing motion.
5. Master motion tracking with filters like the Kalman filter and object recognition through appearance-based methods and shape representation.

UNIT 1
Overview of computer vision and its applications: Image Formation and Representation: Imaging geometry, radiometry, digitization, cameras and Projections, rigid and affine transformation

UNIT 2

Image Processing: Pixel transforms, color transforms, histogram processing, histogram equalization, filtering, convolution, Fourier transformation and its applications in sharpening, blurring and noise removal

UNIT 3

Feature detection: edge detection, corner detection, line and curve detection, active contours, SIFT and HOG descriptors, shape context descriptors, Morphological operations

Segmentation: Active contours, split & merge, watershed, region splitting, region merging, graph-based segmentation, mean shift and model finding, Normalized cut

UNIT 4

Camera calibration: camera models; intrinsic and extrinsic parameters; radial lens distortion; direct parameter calibration; camera parameters from projection matrices; orthographic, weak perspective, affine, and perspective camera models.

Motion representation: the motion field of rigid objects; motion parallax; optical flow, the image brightness constancy equation, affine flow; differential techniques; feature-based techniques; regularization and robust estimation

UNIT 5

Motion tracking: statistical filtering; iterated estimation; observability and linear systems; the Kalman filter

Object recognition and shape representation: alignment, appearance-based methods, invariants, image eigenspaces

Books:

1. Computer Vision: Algorithms and Applications, R. Szeliski, Springer, 2011.
2. Computer Vision: Algorithms and Applications, R. Szeliski, Springer, 2011.
3. Introductory techniques for 3D computer vision, E. Trucco and A. Verri, Prentice Hall, 1998.

Robotics and Automation

CUCS 343

L	T	P	Cr
3	1	0	4

Course Outcomes:
At the end of this course, students will demonstrate the ability to:

1. Understand the fundamental concepts, history, and components of robotics and its applications.
2. Learn the principles of robotics kinematics, including forward and inverse kinematics and transformation matrices.
3. Explore robot dynamics through Newton-Euler and Lagrangian methods for dynamic modeling and simulation.
4. Gain knowledge of control systems in robotics, including PID, adaptive, and robust control strategies.
5. Understand the role of sensors, sensor fusion, and perception technologies like vision systems and lidar in robotics.

Unit 1: Introduction to Robotics

This unit covers the fundamental concepts of robotics, including an overview of its applications across various industries. Students will explore the historical development of robotics, different types of robots, and the basic components that make up robotic systems.

Unit 2: Robotics Kinematics

In this unit, students will learn about kinematics and its significance in robotics. The focus will be on forward and inverse kinematics, the use of homogeneous transformation matrices, and methods for representing position and orientation in three-dimensional space.

Unit 3: Robot Dynamics

This unit delves into the principles of dynamics as applied to robotic systems. Students will study Newton-Euler and Lagrangian methods for dynamic modeling, gaining insights into the behavior of robotic manipulators through simulation.

Unit 4: Control Systems for Robotics

Students will be introduced to control theory, emphasizing feedback and feedforward control mechanisms. The unit will cover PID control in robotic applications as well as advanced control strategies such as adaptive and robust control.

Unit 5: Sensors and Perception

This unit focuses on the various types of sensors utilized in robotics. Students will learn about sensor fusion techniques, vision systems, image processing, and the role of lidar and other spatial perception technologies in enhancing robotic functionality.

Human Computer Interaction

CUCS 347

L	T	P	Cr
3	1	0	4

Course Outcomes:
At the end of this course, students will demonstrate the ability to:

1. Understand the importance and principles of user interface design, focusing on graphical and web-based interfaces.
2. Learn the design process for screen creation, focusing on human interaction, layout, and content organization.
3. Explore the selection and design of windows, navigation schemes, and interface components such as text, icons, and multimedia.
4. Gain knowledge of HCI in the software process, usability engineering, prototyping, and evaluation techniques.
5. Understand cognitive models, ubiquitous computing, augmented reality, and applications in information visualization and user experience.

UNIT I
Introduction: Importance of user Interface – definition, importance of good design. Benefits of good design. A brief history of Screen design. The graphical user interface – popularity of graphics, the concept of direct manipulation, graphical system, Characteristics, Web user – Interface popularity, characteristics- Principles of user interface.

UNIT II
Design process – Human interaction with computers, importance of human characteristics human consideration, Human interaction speeds, understanding business junctions. Screen Designing: Design goals – Screen planning and purpose, organizing screen elements, ordering of screen data and content – screen navigation and f low – Visually pleasing composition – amount of information – focus and emphasis – presentation information simply and meaningfully – information retrieval on web – statistical graphics – Technological consideration in interface design.

UNIT III
Windows – New and Navigation schemes selection of window, selection of devices based and screen- based controls. Components – text and messages, Icons and increases – Multimedia, colors, uses problems, choosing colors.

UNIT IV
HCI in the software process, The software life cycle Usability engineering Iterative design and prototyping Design Focus: Prototyping in practice Design rationale Design rules Principles to support usability Standards Golden rules and heuristics HCI patterns Evaluation techniques, Goals of evaluation, Evaluation through expert analysis, Evaluation through user participation, Choosing an evaluation method. Universal design, Universal design principles Multi-modal interaction

UNIT V

Cognitive models Goal and task hierarchies Design Focus: GOMS saves money Linguistic models The challenge of display-based systems Physical and device models Cognitive architectures Ubiquitous computing and augmented realities Ubiquitous computing applications research Design Focus: Ambient Wood – augmenting the physical Virtual and augmented reality Design Focus: Shared experience Design Focus: Applications of augmented reality Information and data visualization Design Focus: Getting the size right.

TEXT BOOKS: 1. The essential guide to user interface design, Wilbert O Galitz, Wiley Dream Tech. Units 1, 2, 3 2. Human – Computer Interaction. Alan Dix, Janet Fincay, Gre Goryd, Abowd, Russell Bealg, Pearson Education Units 4,5

REFERENCE BOOKS: 1. Designing the user interface. 3rd Edition Ben Shneidermann, Pearson Education Asia. 2. Interaction Design Prece, Rogers, Sharps. Wiley Dreamtech. 3. User Interface Design, Soren Lauesen , Pearson Education. 4. Human –Computer Interaction, D. R. Olsen, Cengage Learning. 5. Human –Computer Interaction, Smith - Atakan, Cengage Learning.

Cloud Computing

CUCS-345

L	T	P	Cr
3	1	0	4

Course Outcomes:
At the end of this course, students will demonstrate the ability to:

1. Understand the evolution, features, and applications of cloud computing, along with its advantages and limitations.
2. Learn about different cloud models (SaaS, PaaS, IaaS) and their respective characteristics, providers, and services.
3. Gain insights into the advantages and challenges of Platform as a Service (PaaS) and its application frameworks.
4. Understand the architecture, advantages, and challenges of Infrastructure as a Service (IaaS) and cloud-based data storage
5. Understand the evolution, features, and applications of cloud computing, along with its advantages and limitations.

Unit - I

Introduction to Cloud Computing: Evolution and History of Cloud Computing, Why Cloud Computing is Becoming Highly Important, Features of Cloud Computing, Advantages of Cloud Computing, Characteristics of Cloud Computing, Limitations of Cloud Computing. Cloud Computing Applications, Cloud Technologies, Security Risks of Cloud Computing Cloud Service Provider Companies.

Unit - II

Cloud Models and Types: Deployment Models, Service Models. Layers and Types of Cloud, Components of Cloud Computing, Cloud Computing Service Providers, Software as a Service (SaaS): Software as a Service, Evolution of SaaS, Brief Introductory part of Software as a Service, Characteristics of SaaS, Services Provided by SaaS, Advantages/ Disadvantages of SaaS, SaaS Providers and their services.

Unit -III

Platform as a Service (PaaS): Introduction to PaaS, Advantages of PaaS, Disadvantages of PaaS, Evolution of PaaS, PaaS Service Providers- Amazon AWS, Google App Engine, Force.com, PaaS Application Framework, PaaS Operator Verbs, PaaS Developer Verbs, Challenges of PaaS

Unit -IV

Infrastructure as a Service (IaaS): Evolution, IaaS Architecture- Advantages and Disadvantages of Infrastructure as a Service, IaaS Providers, IaaS Architecture, Advantages and Disadvantages of Infrastructure as a Service Data in Cloud: Evolution of Network Storage in Cloud, Data as a Service, Database as a Service, Cloud Based Data Storage, Advantages and Limitations of Cloud Based Storage Solution, Cloud Based Data Storage Service Providers

Unit - V

Virtualization: Introduction to Virtualization and its Technical Evolution, History of Virtualization, Types of Virtual Machines, Advantages of Virtualization, Components of Virtualization, Types of Virtualization, Cloud Hypervisor,

Infrastructure Security Network level security, Host level security, Application level security. Data privacy and security Issues. Access Control and Authentication in cloud computing.

Reference Books:

1. MIChael Miller, "*Cloud Computing: Web based application that change the way you work and collaborate*", Kindle , First Edition, 2011.
2. Barrie Sosinsky, "*Cloud Computing bible*", Wiley publishing INC, First Edition ,2011
3. George Reese, "*Cloud Application architecture*" O'Reilly, First Edition, 2009.

Artificial Intelligence

CCSN-401

L	T	P	Cr
3	1	0	4

Course Outcomes:

At the end of this course, students will demonstrate the ability to:

1. Understand the fundamentals of Artificial Intelligence, intelligent agents, and search algorithms.
2. Explore natural language processing, machine translation, and speech recognition techniques.
3. Learn knowledge representation methods, including graphs, frames, and predicate logic.
4. Understand the architecture and working of expert systems and techniques like genetic algorithms and fuzzy logic.
5. Study pattern recognition concepts, including machine perception, object identification, and visual perception.

Unit - I

Introduction: Introduction to Artificial Intelligence, History, Importance of AI, and goal. AI programming techniques; Introduction to Intelligent Agents: Agents and environments. Game Playing: Minimax search, Mini-Max algorithm, Search algorithms: Informed search, Uninformed search, Hill Climbing, Depth first search, Best first search, A*, And or graph.

Unit - II

Processing and understanding Natural Languages: Natural Language processing: Steps in NLP, Applications of Natural Languages, Components of NLP, Understanding Natural Languages: Machine Translation (MT), Automated Reasoning, Question Answering, Speech Recognition: Types of Speech Recognition, Applications of Speech Recognition, , Production Rules: parsing techniques: Rules of parsing, Top down parsing, Bottom up parsing, Transformational grammars, Context free grammar, Transition networks, Fillmore's grammars, Shanks Conceptual Dependency.

Unit - III

Knowledge Representation: Graphs, Frames structures and related structures, Semantic Nets and predicate logic, Scripts, Frames, inheritance, Introduction to PROLOG, Knowledge Based systems, Inference engine, Forward deductions and backward deductions, Scientific Analysis, Medical Diagnosis Financial Analysis

Unit - IV

Expert System – Introduction, Basic concepts, Existing Expert Systems (DENDRAL, MYCIN), Architecture of expert system, how expert systems works, problem areas addressed by expert systems, Features of Expert system, Genetic algorithm, Fuzzy logic, Neural Networks, Intelligent Agents, Meta Knowledge, Expertise Transfer, Self Explaining System, User and expert systems.

Unit - V

Pattern Recognition Introduction to Pattern Recognition, Structured Description, Symbolic Description, Machine perception, Line Finding, Interception, Semantic & Model, Object Identification, visual perception,.

Reference Books :

1. Char Nick, "*Introduction to Artificial Intelligence*", Addision Wesley, 2007.
2. Stuart Russell and Peter Norvig, ``*Artificial Intelligence: A Modern Approach.*", Prentice Hall, Third Edition, 2010.

3. Elaine Rich, Kevin Knight and ShivashankarB.Nair, "*Artificial Intelligence*", Tata McGraw-Hill, Third edition, 2009.

Distributed Computing Systems

CCSN-403

L	T	P	Cr
3	1	0	4

Course Outcomes:

At the end of this course, students will demonstrate the ability to:

1. Understand the key concepts and challenges in distributed systems, including message passing and logical clocks.
2. Learn about synchronization, global states, and distributed debugging techniques.
3. Explore agreement protocols and their applications, such as Byzantine agreement and consensus.
4. Study inter-process communication methods, including RPC and case studies in UNIX and JAVA RMI.
5. Gain knowledge in transactions, concurrency control, distributed deadlocks, and replication in distributed systems.

Unit–I

Characterization of Distributed Systems: Introduction, Examples of distributed Systems, Resource sharing and the Web Challenges. Architectural models, Fundamental Models. Theoretical Foundation for Distributed System: Limitation of Distributed system, absence of global clock, shared memory, Logical clocks, Lamport's& vectors logical clocks. Concepts in Message Passing Systems: causal order, total order, total causal order, Techniques for Message Ordering, Causal ordering of messages, global state, termination detection.

Unit-II

Time and Global States: Introduction, Clocks Events and Process States, Synchronizing Physical Clocks, Logical Time and Logical Clocks, Global States, Distributed Debugging. Coordination and Agreement: Introduction, Distributed Mutual Exclusion, Elections, Multicast Communication, Consensus and Related Problems

Unit–III

Agreement Protocols: Introduction, System models, classification of Agreement Problem, Byzantine agreement problem, Consensus problem, Interactive consistency Problem, Solution to Byzantine Agreement problem, Application of Agreement problem, Atomic Commit in Distributed Database system. Distributed Resource Management: Issues in distributed File Systems, Mechanism for building distributed file systems, Design issues in Distributed Shared Memory, Algorithm for Implementation of Distributed Shared Memory.

Unit–IV

Inter Process Communication: Introduction, The API for the Internet Protocols, External Data Representation and Marshalling, Client-Server Communication, Group Communication, Case Study: IPC in UNIX. Distributed Objects and Remote Invocation: Introduction, Communication between Distributed Objects, Remote Procedure Call, Events and Notifications, Case Study: JAVA RMI.

Unit –V

Transactions and Concurrency Control: Transactions, Nested transactions, Locks, Optimistic Concurrency control, Timestamp ordering, Comparison of methods for concurrency control. Distributed Transactions: Flat and nested distributed transactions, Atomic Commit protocols, Concurrency control in distributed transactions, Distributed deadlocks, Transaction recovery.

Replication: System model and group communication, Fault - tolerant services, highly available services, Transactions with replicated data.

REFERENCES:

1. Singhal&Shivaratri, "Advanced Concept in Operating Systems", McGraw Hill
2. Ramakrishna,Gehrke," Database Management Systems", McGraw Hill
3. Vijay K.Garg Elements of Distributed Compuitng , Wiley
4. Coulouris, Dollimore, Kindberg, "Distributed System: Concepts and Design", Pearson Education

Advanced Computer System Architecture

CCSN-405

L	T	P	Cr
3	1	0	4

Course Outcomes:

At the end of this course, students will demonstrate the ability to:

1. Understand the evolution of computer architecture and key parallel computing concepts, including multiprocessors and multicomputers.
2. Learn performance metrics for parallel systems and the scalability of parallel algorithms, including Amdahl's and Gustafson's laws.
3. Gain knowledge of processor and memory hierarchy, including advanced processor technologies and memory management techniques.
4. Study bus systems, cache memory organization, and shared memory architectures in parallel systems.
5. Explore pipelining concepts, including linear and nonlinear processors, efficiency, throughput, and instruction pipeline design.

Unit - I

Parallel computer model: Evolution of computer architecture, system performance attributes, Multiprocessors and Multicomputer: shared memory multiprocessors and distributed memory multicomputer, Vector supercomputers, Program and network properties: conditions of parallelism: Data and Resource Dependences, Bernstein's Conditions, program partitioning and scheduling, program flow mechanism, System Interconnect Architectures.

Unit – II

Principles of scalable performance: Performance metrics and measures: parallelism profile in programs, harmonic mean performance, efficiency utilization and quality, standard performance measure, Parallel Processing Applications: scalability of parallel algorithms, Speedup performance laws: Amdahl's law for fixed workload, Gustafson's law for scaled problems, Memory bounded speedup model.

Unit – III

Processor and Memory hierarchy: Advanced processor technology: Design Space of Processors,Instruction set Architectures, CISC Scalar Processors, RISC Scalar Processors, superscalar and vector processor: Superscalar Processors, The VLIW Architecture, Vector and Symbolic Processors.Memory hierarchy technology: Hierarchical Memory Technology, Inclusion, Coherence, and Locality, Memory Capacity Planning, virtual memory technology.

Unit – IV

Bus, cache and shared memory: Backplane bus system: bus specification, addressing and timing protocol, arbitration, transaction, and interrupt, cache memory organization: addressing models, direct mapping and associative caches, set-associative and sector cache, shared memory organization: Interleaved memory organization.

Unit – V

Pipelining: Linear pipeline processors: Asynchronous and Synchronous Models, Clocking and Timing Control, Speedup, Efficiency and Throughput. Nonlinearpipeline processors: Reservation and Latency Analysis,Instruction pipeline design.

Reference Books:

1. Kai Hwang, "Advanced Computer Architecture", McGraw-Hill, Revised Edition,2003
2. Hwang and Briggs, "Computer Architecture and Parallel Processing", McGraw Hill, International Edition, 1986.
3. Moreshwar R. Bhujade, "*Parallel Computing*", New Age International(P) Ltd, Publishers, First Edition Reprint, 2004.
4. John L. Hennessy, David A. Patterson, "*Computer Architecture: A Quantitative Approach*", Elsevier Inc., Fifth Edition, 2011
5. Sima, Terence Fountain, PéterKacsuk, "*Advanced Computer Architecture*", Pearson Education, Seventh Impression, 2009.

Digital Image Processing

CCSN-407

L	T	P	Cr
3	1	0	4

Course Outcomes:
At the end of this course, students will demonstrate the ability to:

1. Understand digital image representation, image processing steps, and pixel relationships in various color models.
2. Learn spatial and frequency domain techniques for image enhancement, including gray level transformations and Fourier Transform filtering.
3. Explore noise models, filters, and methods for image restoration, along with segmentation techniques like edge detection and morphological processing.
4. Gain knowledge in image compression methods, including error-free and lossy compression, and common image compression standards.
5. Study image representation and recognition techniques, including boundary representation, shape analysis, and pattern recognition using descriptors.

UNIT I DIGITAL IMAGE FUNDAMENTALS

Digital Image Representation – Fundamental steps in Image Processing)– Elements of Visual Perception – Image Sensing and Acquisition – Image Sampling and Quantization – Relationships between pixels - colour models.

UNIT II IMAGE ENHANCEMENT

Spatial Domain: Gray level transformations – Histogram processing – Basics of SpatialFiltering–Smoothing and Sharpening Spatial Filtering – Frequency Domain: 2D Fourier Transform – Smoothing and Sharpening frequency domain filters

UNIT III IMAGE RESTORATION AND SEGMENTATION

Noise models – Mean Filters – Order Statistics – Adaptive filters – Band reject Filters – Band pass Filters – Notch Filters – Optimum Notch Filtering – Inverse Filtering – Wiener filtering. Segmentation: Edge detection Edge Linking and Boundary detection – Region based segmentation- Morphological processing- erosion and dilation.

UNIT IV IMAGE COMPRESSION AND REPRESENTATION

Compression: Fundamentals – Image Compression models – Error Free Compression – Lossy compression– Image Compression standards

UNIT V IMAGE REPRESENTATION AND RECOGNITION

Boundary representation – Chain Code – Polygonal approximation, signature, boundary segments – Boundary description – Shape number – Fourier Descriptor, moments- Regional Descriptors –Topological feature, Texture - Patterns and Pattern classes - Recognition based on matching.

TEXT BOOKS

1. Rafael C. Gonzales, Richard E. Woods, "Digital Image Processing", Third Edition, Pearson Education, 2010.
2. Anil Jain K. "Fundamentals of Digital Image Processing", PHI Learning Pvt. Ltd., 2011.

REFERENCES

1. Rafael C. Gonzalez, Richard E. Woods, Steven L. Eddins, "Digital Image Processing Using MATLAB", Third Edition Tata McGraw Hill Pvt. Ltd., 2011.
2. Willliam K Pratt, "Digital Image Processing", John Willey, 2002.
3. Malay K. Pakhira, "Digital Image Processing and Pattern Recognition", First Edition, PHI Learning Pvt. Ltd., 2011.

Multimedia Computing

CCSN-409

L	T	P	Cr
3	1	0	4

Course Outcomes:

At the end of this course, students will demonstrate the ability to:

1. Understand the global structure, properties, and challenges of multimedia systems and their components.
2. Learn about sound systems, including speech generation, analysis, and transmission.
3. Explore digital image representation, graphics formats, and the processes of image synthesis, analysis, and transmission.
4. Gain knowledge of video signal representation, animation techniques, and methods for controlling and displaying animation.
5. Study data compression techniques, including coding requirements, entropy coding, and standards like JPEG and MPEG.

Unit 1: Introduction

Global Structure of Multimedia; Multimedia Application; Medium; Multimedia System and Properties; Characteristics of a Multimedia System; Challenges for Multimedia Systems; Components of a Multimedia System

Unit 2: Sound /Audio System

Concepts of Sound System; Music and Speech; Speech Generation; Speech Analysis; Speech Transmission

Unit 3: Images and Graphics

Digital Image Representation; Image and graphics Format; Image Synthesis, analysis and Transmission

Unit 4: Video and Animation

Video Signal Representation; Computer Video Format; Computer-Based animation; Animation Language; Methods of Controlling Animation; Display of Animation; Transmission of Animation

Unit 5: Data Compression

Storage Space; Coding Requirements; Source, Entropy and Hybrid Coding; Lossy Sequential DCT-based Mode; Expanded Lossy DCT-based Mode; JPEG and MPEG

Recommended Books:

1. Multimedia: Computing, Communications and Applications, Ralf Steinmetz and Klara Nahrstedt, Pearson Education Asia
2. Multimedia Communications, Applications, Networks, Protocols and Standards, Fred Halsall, Pearson Education Asia
3. Multimedia Systems, John F. Koegel Buford, Pearson Education Asia

Pattern Recognition

CCSN-411

L	T	P	Cr
3	1	0	4

Course Outcomes:

At the end of this course, students will demonstrate the ability to:

1. Understand the fundamental concepts of probability, random processes, and linear algebra, including Bayes' theorem and decision theory.
2. Learn about Bayes' Decision Theory, classifiers, discriminant functions, and decision surfaces for classification.
3. Study parameter estimation methods such as Maximum-Likelihood, Maximum a Posteriori, and Bayesian estimation.
4. Explore unsupervised learning, clustering algorithms, and Gaussian mixture models for parameter estimation.
5. Gain knowledge of sequential pattern recognition using Hidden Markov Models (HMMs), including discrete and continuous models.

UNIT-1

Basics of Probability, Random Processes and Linear Algebra: Probability: independence of events, conditional and joint probability, Bayes' theorem; Random Processes: Stationary and nonstationary processes, Expectation, Autocorrelation, Cross-Correlation, spectra; Linear Algebra: Inner product, outer product, inverses, eigen values, eigen vectors; Bayes Decision Theory

UNIT-2

Bayes Decision Theory: Minimum-error-rate classification, Classifiers, Discriminant functions, Decision surfaces, Normal density and discriminant functions, discrete features

UNIT-3

Parameter Estimation Methods: Maximum-Likelihood estimation: Gaussian case; Maximum a Posteriori estimation; Bayesian estimation: Gaussian case

UNIT-4

Unsupervised learning and clustering: Criterion functions for clustering; Algorithms for clustering: K-Means, Hierarchical and other methods; Cluster validation; Gaussian mixture models; Expectation-Maximization method for parameter estimation; Maximum entropy estimation

UNIT-5

Sequential Pattern Recognition: Hidden Markov Models (HMMs); Discrete HMMs; Continuous HMMs

Text Books:

R.O.Duda, P.E.Hart and D.G.Stork, Pattern Classification, John Wiley, 2001
S.Theodoridis and K.Koutroumbas, Pattern Recognition, 4th Ed., Academic Press, 2009
C.M.Bishop, Pattern Recognition and Machine Learning, Springer, 2006:

C# Programming

CCSN-413

L	T	P	Cr
3	1	0	4

Course Outcomes:

At the end of this course, students will demonstrate the ability to:

1. Understand the fundamentals of C# and its role in the .NET framework.
2. Gain knowledge of C# syntax, data types, and type safety.
3. Master control structures like if, else, switch, for, while, and do-while in C#.
4. Learn how to define and invoke methods, including overloading and optional parameters.
5. Understand object-oriented programming concepts such as classes, inheritance, and polymorphism in C#.

Unit 1: Introduction to C#

Explore the fundamentals of C# as a programming language. Understand its origins, features, and its role within the .NET framework. Learn about the development environment, including Visual Studio, and how to set up projects.

Unit 2: Basic Syntax and Data Types

Delve into C# syntax, including variables, constants, and data types. Examine how to declare and initialize variables, use built-in data types, and understand the concept of type conversion and type safety.

Unit 3: Control Structures

Study control flow statements in C#, including conditional statements like if, else, and switch, as well as looping constructs such as for, while, and do-while. Analyze how to control program execution and manage decision-making processes.

Unit 4: Methods and Parameters

Learn about the definition and invocation of methods in C#. Explore method parameters, return types, method overloading, and the concept of optional parameters. Understand the importance of methods in structuring code.

Unit 5: Object-Oriented Programming Concepts

Examine the principles of object-oriented programming (OOP) as applied in C#. Discuss classes, objects, inheritance, polymorphism, encapsulation, and abstraction. Analyze how these concepts contribute to code reusability and organization.

Python Programming

CCSN-415

L	T	P	Cr
3	1	0	4

Course Outcomes:
At the end of this course, students will demonstrate the ability to:

1. Understand Python basics, including data types, operators, and control flow.
2. Learn to work with lists, strings, and comprehensions for data manipulation.
3. Master dictionaries, tuples, sets, and their related methods and functions.
4. Gain proficiency in file handling, exception management, and regular expressions in Python.
5. Apply object-oriented programming principles such as classes, inheritance, and polymorphism.

Unit - I

Introduction To Python Programming: Importance of Python, Installing and working with Python in Windows, Using Python as calculator, Comments, How to define main function in Python The concept of data types - Variables, Arithmetic Operators and Expressions String manipulations - Subscript Operator, Indexing, Slicing a string, Converting strings to numbers and vice versa, split function Control flow - if statements, for and while loops, nested loops, range() function, break and continue statements, pass statements, **Functions** Built-In Functions, Commonly Used Modules, Function Definition and Calling the Function, The return Statement and void Function, Scope and Lifetime of Variables, Default Parameters, Keyword Arguments, *args and **kwargs, Command Line Arguments.

Unit - II

Data Structures in Python:Lists - Basic list operations, Replacing, inserting, removing an element; Searching and sorting a list, Methods of list objects, List and nested list Comprehensions
Strings, Creating and Storing Strings, Basic String Operations, Accessing Characters in String by Index Number, String Slicing and Joining, String Methods, Formatting Strings.

Unit- III

Dictionaries, Creating Dictionary, Accessing and Modifying key: value Pairs in Dictionaries, Built-In Functions Used on Dictionaries, Dictionary Methods, The del Statement, **Tuples and Sets,** Creating Tuples, Basic Tuple Operations, Indexing and Slicing in Tuples, Built-In

Functions Used on Tuples, Relation between Tuples and Lists, Relation between Tuples and Dictionaries, Tuple Methods, Using zip() Function, Sets, Set Methods, Traversing of Sets, Frozen set.

Unit - IV

File and Exception Handling in Python - Reading keyboard input, opening and closing file, Read, Write and Append mode, create and Read a text file, Looping over a file object, Writing on a file, with statements, splitting lines in a text file, Renaming and Deleting files. Exception Handling - Exceptions, Why use exceptions, Raising an exception, try and except, try, except and else clause; try and finally **Regular Expressions in Python:** Regular Expressions - re module, Searching a string (match and search), Finding a string (findall), Break string into substrings (split), Replace part of a string (sub)

Unit - V

Object-Oriented Programming, Classes and Objects, Creating Classes in Python, Creating Objects in Python, The Constructor Method, Classes with Multiple Objects, Class Attributes versus Data Attributes, Encapsulation, Inheritance, The Polymorphism.

TEXT BOOK

Gowrishankar S, Veena A, "Introduction to Python Programming", 1st Edition, CRC Press/Taylor & Francis, 2018. ISBN-13: 978-0815394372

REFERENCE BOOKS / WEBLINKS:

Text Books:

• Kenneth A. Lambert, "The Fundamentals of Python: First Programs", Cengage Learning., 2011

Reference Books:

• Laila M. Dawson, "Python Programming for the Absolute Beginner "

• Zed A.Shaw ,"Learn Python the Hard Way "

• Mark Putz, "Learning Python"

• Python Documentation (https://docs.python.org)

Client Server Computing

CUCS-441

L	T	P	Cr
3	1	0	4

Course Outcomes:

At the end of this course, students will demonstrate the ability to:

1. Understand the various client-server architectures, including Two-Tier, Three-Tier, and N-Tier models, and their differences.
2. Comprehend the roles and functionalities of clients and servers in client-server computing.
3. Identify the key building blocks of client-server systems, including hardware, software, and middleware components.
4. Learn about SQL database servers, transaction processing models, and the concepts of stored procedures and triggers.
5. Familiarize with client-server communication protocols and explore recent trends like Intranet, Extranet, and CORBA.

Unit 1

Client Server System Concepts – Introduction – Concepts – Client Server Architecture – Two-Tier Architecture – Three-Tier Architecture – N-Tier Architecture – N-Tier vs 2-Tier Architecture – Case Study of N-Tier Architecture – Client Server Models – Gartner Classification – Middleware – Characteristics and types of Server – File Server – Database Server – Communication Server – Object Server – Groupware Server – Transaction Server – Characteristics and types of Clients – Thin Client – Fat Client.

Unit 2

Components of Client Server Computing – Client – Role of the Client – Client Services – Request for Service – Components of Client Server Computing – Server – Role of the Server – Server Functionality in detail – Components of Client Server Applications – Connectivity – OSI – Communications Interface Technology.

Unit 3

Client Server System Architecture – Client Server Building Blocks – Hardware – Client Hardware – Server Hardware – Client Server Building Blocks – Software – Client Server Systems Development Methodology – Project Management – Architecture Definition – Systems Development Environment – Middleware – Types of Middleware – DCE, MOM, TP – Monitors – ODBC – Design Overview of ODBC – ODBC Architecture – Components – Applications – Driver Managers – Database Drivers – ODBC Data Sources – Network Operating System – Base Services – External Services.

Unit 4

SQL Database Servers – Server Architecture – Multithread Architecture – Hybrid Architecture – Stored Procedures – Triggers – Client Server Transaction Processing – Rules of Client Server

Transaction Processing – Transaction Models – Chained and Nested Transactions – Transaction Management Standards – Data Warehousing – Warehousing Techniques – Data Mining.

Unit 5

Client Server Protocols – RPC – IPC – Recent Trends – Intranet – Extranet – Internet – CORBA.

Text Books

1. Robert Orfali, Dan Harkey and Jerri Edwards: Essential Client/Server Survival Guide, John Wiley &Sons Inc 1996

Reference

1. Alex Berson: Client Server Architecture
2. Patrick Smith, Steve Guengerich: Client Server Computing, Second Edition, Prentice Hall of India Pvt Ltd.

Neural Network

CUCS-443

L	T	P	Cr
3	1	0	4

Course Outcomes:
At the end of this course, students will demonstrate the ability to:

1. Understand the basics of Artificial Neural Networks (ANN) and the comparison between artificial and biological neural networks.
2. Learn the fundamental models of neural networks, including McCulloch-Pitts, Perceptron, and various learning rules such as Hebbian and Delta learning.
3. Explore Adaline and Madeline networks, along with associative memory models like Hetero and Auto Associative Memory Networks.
4. Study feedback networks, including Hopfield networks and their relationship to BAM, as well as feed-forward networks like Back Propagation and Radial Basis Function networks.
5. Gain knowledge on Self-Organizing Feature Maps, including Kohonen maps and methods for determining winners in networks like LVQ, Max Net, and Mexican Hat.

UNIT -I Introduction to Artificial Neural Networks:
Introduction, Artificial Neural Networks, Historical Development of Neural Networks, Biological Neural Networks, Comparison Between them and the Computer, Comparison Between Artificial and Biological Neural Network Basic Building Blocks of Artificial Neural Networks, Artificial Neural Network (ANN) terminologies.

UNIT - II Fundamental Models of Artificial Neural Networks:
Introduction, McCulloch - Pitts Neuron Model, Learning Rules, Habana Learning Rule Perceptron Learning Rule, Delta Learning Rule (Windrow-Hoff Rule or Least Mean Square (LMS) Rule, Competitive Learning Rule, Out Star Learning, Boltzmann Based Learning, Hebb Net. Perceptron Networks: Introduction, Single Layer Perceptron, Brief Introduction to Multilayer Perceptron Networks.

UNIT - III Adaline and Madeline Networks:
Introduction, Adaline, Madeline. Associative Memory Networks: Introduction, Algorithms for Pattern Association, Hetero Associative Memory Neural Networks, Auto Associative Memory Network, Bi- directional Associative Memory.

UNIT – IV Feedback Networks:

Introduction, Discrete Hopfiled Net, Continuous Hopfiled Net, Relation between BAM and Hopfiled Nets. Feed Forward Networks: Introduction, Back Propagation Network (BPN), Radial Basis Function Network (RBFN).

UNIT – V Self Organizing Feature Map :

Introduction, Methods Used for Determining the Winner, Kohonen Self Organizing Feature Maps, Learning Vector Quantization (LVQ),Max Net, Maxican Hat, Hamming Net

Adaptive Resonance Theory : Introduction, ART Fundamentals, ART 1, ART2

TEXT BOOKS:

1. Sivanandam, S Sumathi, S N Deepa; "Introduction to Neural Networks", 2nd ed.,TATA McGraw HILL : 2005.

REFERENCES BOOKS:

1. Simon Haykin, "Neural networks A comprehensive foundations", 2nd ed., Pearson Education, 2004.
2. B Yegnanarayana, "Artificial neural networks", 1st ed., Prentice Hall of India P Ltd, 2005.
3. Li Min Fu, "Neural networks in Computer intelligence", 1st ed., TMH, 2003

Engineering System Modelling and Simulation

CUCS – 445

L	T	P	Cr
3	1	0	4

Course Outcomes:

At the end of this course, students will demonstrate the ability to:

1. Understand the basics of system modeling and its importance in representing real-world systems.
2. Apply mathematical tools like linear algebra, calculus, and differential equations in system modeling.
3. Learn system dynamics concepts, including feedback loops, time delays, and stability analysis.
4. Explore control systems, focusing on open-loop and closed-loop systems, and control strategy design.
5. Gain knowledge of discrete event simulation, including event handling, state variables, and simulation tools.

Unit 1: Introduction to System Modelling

Explore the fundamental concepts of systems and their modeling. Understand the definitions and types of systems, the importance of modeling in engineering, and the relationship between real-world systems and their representations.

Unit 2: Mathematical Foundations

Delve into the mathematical tools used in system modeling, including linear algebra, calculus, and differential equations. Learn how these mathematical concepts are applied to describe dynamic systems and their behavior.

Unit 3: System Dynamics

Study the principles of system dynamics, focusing on feedback loops, time delays, and system stability. Analyze dynamic systems using block diagrams and stock-and-flow diagrams to visualize system interactions.

Unit 4: Control Systems

Examine the fundamentals of control theory as it applies to system modeling. Discuss open-loop and closed-loop systems, stability analysis, and the design of control strategies to achieve desired system behavior.

Unit 5: Discrete Event Simulation

Learn about discrete event simulation techniques and their applications. Understand the components of discrete event systems, including events, state variables, and queues, and explore simulation modeling tools and methodologies.

Computer Based Numerical & Statistical Techniques

CUCS 447

L	T	P	Cr
3	1	0	4

Course Outcomes:
At the end of this course, students will demonstrate the ability to:

1. Understand types of errors and floating-point representation, including error propagation and numerical instability.
2. Solve nonlinear equations and linear systems using various methods like Newton-Raphson, Gauss-elimination, and iterative techniques.
3. Apply interpolation and approximation techniques, including Lagrange's and Newton's formulas, cubic splines, and least squares approximation.
4. Perform numerical differentiation and integration using methods like the Trapezoidal rule, Simpson's rule, and Monte Carlo methods.
5. Solve ordinary differential equations using Euler's method, Runge-Kutta methods, and finite difference schemes.

Unit I: Computer Arithmetic and Errors

Errors, Types of error, Floating-point representation, Significant digits and precision, , Associative and Distributive Laws in Floating Point arithmetic, Error propagation and Numerical Instability.

Unit II: Nonlinear Equations and Linear Systems

Bisection method, Secant method, Regula-Falsi method, Newton-Raphson method for nonlinear systems, Gauss-elimination method with and withoutpartial pivoting, LU decomposition and Cholesky decomposition, Iterative methods for linear systems: Jacobi, Gauss-Jordan and Gauss-Seidel methods.

Unit III: Interpolation and Approximation

Lagrange's interpolation formula, Newton's divided difference formula, Piecewise polynomial interpolation: Linear, Quadratic, and Cubic spline, Least Squares Approximation, Orthogonal polynomials: Legendre and Chebyshev

Unit IV: Numerical Differentiation and Integration

Finite difference operators: forward, backward, and central differences, Richardson extrapolation, Numerical integration: Trapezoidal rule, Simpson's rule, and Romberg

integration, Gaussian quadrature: Gauss-Legendre and Gauss-Hermite, Monte Carlo methods for integration,

Unit V: Ordinary Differential Equations

Euler's method, Modified Euler's methods: Heun and Mid-point methods, Runge-Kutta methods: 2nd and 4th order,Multi-step methods: Adams-Bashforth and Adams-Moulton, Finite difference methods for ODEs: explicit and implicit schemes.

REFERNCE BOOKS:

1. Gupta, R. S. (2009). Elements of numerical analysis. Macmillan India Ltd.
2. Jain, M. K. (1991). Numerical solution of differential equations. John Wiley & Sons.
3. Snedden, I. N. (2006). Elements of partial differential equations. Courier Dover Publications.
4. Gerald, C.F., & Wheatley, P.O. (2004). Applied numerical analysis. Pearson Education India
5. Jain, M. K., Iyengar, S. R. K., & Jain, R. K. (2019). Numerical methods for scientific and engineering computation (7th ed.). New Age International Pvt. Ltd.
6. Sastry, S. S. (2012). Introduction to numerical analysis (5th ed.). Prentice Hall of India.

Law for Engineers

CBSN-401

L	T	P	Cr
2	0	0	2

Course Outcomes:
At the end of this course, students will demonstrate the ability to:

1. Understand constitutional law concepts, including fundamental rights, duties, and emergency provisions.
2. Gain knowledge of human rights in international law and enforcement mechanisms in India.
3. Explore the general principles of contract under the Indian Contract Act and the arbitration and ADR system.
4. Study intellectual property laws in India, including copyrights, trademarks, patents, and related international conventions.
5. Learn about labor laws, corporate law, election provisions under the Indian Constitution, and gender studies.

Module 1A:
Constitutional Law covering the Preamble; Fundamental Rights, JudicialActivism including Equality and Social Justice; Directive principles of State policy; Fundamental Duties; Emergencyprovisions – kinds, legal requirements and legal effects; (5 Lectures)

Module 1B:
Human Rights and Public International Law covering Human Rights in International Law-Theoretical foundation, UN Mechanism and specialized agencies, (UNICEF, UNESCO, WHO, ILO, FAO, etc.);
International NGOs – Amnesty International, Human Rights Watch, Greenpeace Foundation;
Enforcement of Human Rights in India including Supreme Court, High Courts, Public International Law covering: Customs, Treaties, State territories including Recognition of States and governments, Law of Sea; (5 Lectures)

Module 2A:
General Principles of Contract under Indian Contract Act, 1872 covering General principles of contract – Sec. 1 to 75 of Indian Contract Act and including Government. as contracting party, Kinds of government contracts (4 Lectures)

Module 2B:
Arbitration, Conciliation and ADR system covering Arbitration – meaning, scope
and types, Arbitration tribunal – appointment, challenge, Distinction between conciliation, negotiation, mediation and arbitration, (5 Lectures)

Module 3A:
Law relating to Intellectual property covering Introduction – meaning of intellectual property, main forms of IP, Copyright, Trademarks, Patents and Designs, Secrets;Other new forms such as plant varieties and geographical indications; International instruments on IP – Berne

convention, TRIPS, Paris convention and international organizations relating IPRs, WIPO, WTO etc; Law relating to Copyright in India, including Historical evolution of Copy Rights Act, 1957, Law relating to Trademarks under Trademark Act, 1999; Law relating to Patents under Patents Act, 1970, Patent protection for computer programs, Duration of patents – law and policy considerations, Infringement and related remedies; (8 Lectures)

Module 3B:
Right to Information Act, 2005 covering, Evolution and concept; Practice and procedures; Official Secret Act, 1923; Indian Evidence Act, 1872; Information Technology – legislation and procedures, Cyber crimes – issues and investigations; (3 Lectures)

Module 4A:
Labour Laws, covering Industrial Disputes Act, 1947; Collective bargaining; Workmen's Compensation Act, 1923; (3 Lectures)

Module 4B:
Corporate Law, covering Meaning of corporation; Law relating to companies, public and private (Companies Act, 1956) general provisions; FEMA 1999, collaboration agreements for technology transfer; Corporate liability, civil and criminal; (4 Lectures)

Module 4C:
Election provisions under Indian Constitution (Art.324–329); Superintendence, directions and control of elections to be vested in Election Commission; Prohibition as to ineligibility for inclusion in electoral roll on ground of religion, race, caste or sex; Power of parliament to make provisions with respect to elections to legislatures; Bar to interference by courts in electoral matters; Offences relating to elections under IPC1860 (Sec.171-A to 171-I). *(4 Lectures)*

Module 5:
Gender Studies,covering Meaning of gender, international perspective andnational perspective; Laws relating women in India; Judicial approach and responses Vishaka V/s State of Rajasthan 1997 SC; Rights enforcement mechanism in India; Landmark judicial decisions of Supreme Court relating to women; *(4 Lectures)*

Text/Reference Books:

1. D.D. Basu (1996), *Shorter Constitution of India*, Prentice Hall of India
2. M.P. Jain (2005), *Indian Constitutional Law*, Wadhwa& Co.
3. M.P. Singh (1998), *Constitutional Law of India,* Eastern Book Co.
4. P.M. Bakshi (2003), *Constitution of India,* Universal Law Publishing Co.
5. H.M. Seervai (1993), *Constitutional Law of India,* Tripathi Publications
6. *Constituent Assembly Debates* (1989), Vol.1 - 12
7. Agarwal H.O.(2008), *International Law and Human Rights,* Central Law Publications
8. S.K. Awasthi& R.P. Kataria(2006), *Law relating to Protection of Human Rights*, Orient Publishing
9. S.K. Kapur(2001), *Human Rights under International Law and Indian Law,* Central Law Agency
10. MeenaRao (2006), *Fundamental concepts in Law of Contract, 3rd Edn.* Professional Offset
11. NeelimaChandiramani (2000),*The Law of Contract: An Outline, 2nd Edn.* Avinash Publications Mum
12. Avtarsingh(2002), *Law of Contract,* Eastern Book Co.

13. Dutt(1994), *Indian Contract Act,* Eastern Law House
14. Anson W.R.(1979), *Law of Contract,* Oxford University Press
15. Kwatra G.K.(2005), *The Arbitration & Conciliation of Law in India with case law on UNCITRAL*
Model Law on Arbitration, Indian Council of Arbitration
16. Avtarsingh (2005), *Law of Arbitration and Conciliation,* Eastern Book Co.
17. Cornish W. R. (2008), *Intellectual Property Rights, Patents, Trademarks, Copyrights & Allied Rights*,Sweet& Maxwell
18. Wadhera (2004), *Intellectual Property Rights,* Universal Law Publishing Co.
19. P. S. Narayan (2000), *Intellectual Property Rights*, Gogia Law Agency
20. T. Ramappa (2010), *Intellectual Property Rights Law in India,* Asia Law House
21. Bare text (2005), *Right to Information Act*
22. O.P. Malhotra, *Law of Industrial Disputes*, N.M. Tripathi Publishers
23. K.M. Desai(1946), *The Industrial Employment (Standing Orders) Act*
24. RustamjiR.F.,*Introduction to the Law of Industrial Disputes*, Asia Publishing House

Intellectual Property Rights

CBSN-401 A

L	T	P	Cr
2	0	0	2

Course Outcomes:
At the end of this course, students will demonstrate the ability to:

1. Understand the concept of intellectual property (IP) and its types, including patents, copyrights, trademarks, and trade secrets.
2. Learn the legal framework and international treaties that govern the protection of intellectual property.
3. Develop skills to identify and protect intellectual property assets in business and innovation.
4. Understand the process of registering and enforcing intellectual property rights globally.
5. Analyze the ethical and economic implications of intellectual property protection in various industries.

Unit-1

INTRODUCTION TO IPR: Meaning of property, Origin, Nature, Meaning of Intellectual Property Rights

Introduction to TRIPS and WTO.

Kinds of Intellectual property rights—Copy Right, Patent, Trade Mark, Trade Secret and trade dress, Design, Layout Design, Geographical Indication, Plant Varieties and Traditional Knowledge.

Unit-2

PATENT RIGHTS AND COPY RIGHTS— Origin, Meaning of Patent, Types, Inventions which are not patentable, Registration Procedure, Rights and Duties of Patentee, Assignment and licence , Restoration of lapsed Patents, Surrender and Revocation of Patents, Infringement, Remedies & Penalties. – 6 hours

COPY RIGHT—Origin, Definition &Types of Copy Right, Registration procedure, Assignment &licence, Terms of Copy Right, Piracy, Infringement, Remedies, Copy rights with special reference to software.

Unit-3

TRADE MARKS— Origin, Meaning & Nature of Trade Marks, Types, Registration of Trade Marks, Infringement & Remedies, Offences relating to Trade Marks, Passing Off, Penalties. Domain Names on cyber space.

Unit-4

DESIGN- Meaning, Definition, Object, Registration of Design, Cancellation of Registration, International convention on design, functions of Design. Semiconductor Integrated circuits and layout design Act-2000.

Unit-5

BASIC TENENTS OF INFORMATION TECHNOLOGY ACT-2000 – IT Act - Introduction E-Commerce and legal provisions E- Governance and legal provisions Digital signature and Electronic Signature.

Course outcomes:

The students once they complete their academic projects, they get awareness of acquiring the patent

They also learn to have copyright for their innovative works.

They also get the knowledge of plagiarism in their innovations which can be questioned legally.

TEXT BOOKS:

1. Intellectual Property Rights and the Law, Gogia Law Agency, by Dr. G.B. Reddy

2. Law relating to Intellectual Property, Universal Law Publishing Co, by Dr. B.L.Wadehra

3. IPR by P. Narayanan

4. Law of Intellectual Property, Asian Law House, Dr.S.R. Myneni

Employment Law

CBSN-401 B

L	T	P	Cr
2	0	0	2

Course Outcomes:

At the end of this course, students will demonstrate the ability to:

1. Understand the fundamental principles of employment law and workers' rights.
2. Learn about employment contracts, employee benefits, and workplace policies.
3. Analyze the legal framework surrounding discrimination, harassment, and wrongful termination.
4. Develop skills in handling labor disputes, negotiations, and conflict resolution in the workplace.
5. Understand the role of government regulations and labor unions in shaping employment practices.

Unit 1: Introduction to Employment Law

In this unit, students will be introduced to the fundamental concepts of Employment Law, including its definition and significance in contemporary society. The historical evolution of labor laws will be explored, starting from the Industrial Revolution and highlighting key legislative milestones such as the Fair Labor Standards Act and the National Labor Relations Act.

Unit 2: Employment Contracts

The focus of this unit will be on employment contracts, which are essential to the employment relationship. Students will explore the different types of employment contracts, including written, oral, and implied agreements. Emphasis will be placed on the key elements that constitute a valid employment contract, such as offer, acceptance, consideration, and essential terms like job duties and compensation.

Unit 3: Employment Rights and Obligations

In this unit, students will delve into the rights of employees and the corresponding obligations of employers. The discussion will include employees' rights to fair wages, benefits, and safe working conditions, as well as protections against retaliation for exercising these rights. The unit will provide an overview of the legal framework governing minimum wage laws and overtime regulations under the Fair Labor Standards Act.

Unit 4: Discrimination in the Workplace

This unit will address the critical issue of discrimination in the workplace. Students will learn about various types of discrimination based on protected classes, including race, gender, age, disability, and religion. The legal framework surrounding discrimination, particularly Title VII of the Civil Rights Act, the Americans with Disabilities Act, and the Age Discrimination in Employment Act, will be thoroughly examined.

Unit 5: Health and Safety Regulations

In this unit, students will study the Occupational Safety and Health Act (OSHA) and its implications for workplace safety. The unit will cover employer responsibilities regarding safety protocols and training, as well as the rights of employees to a safe work environment. Students will learn about the right to refuse unsafe work and the protections available for whistleblowers who report safety violations.

Dispute Resolution and Litigation

CBSN 401-C

L	T	P	Cr
2	0	0	2

Course Outcomes:
At the end of this course, students will demonstrate the ability to:

1. Understand the various methods of dispute resolution, including negotiation, mediation, and arbitration.
2. Learn the legal framework and procedures involved in litigation and court processes.
3. Develop skills in drafting legal documents, including complaints, motions, and settlements.
4. Analyze the advantages and disadvantages of alternative dispute resolution (ADR) vs. litigation.
5. Understand the ethical considerations and strategies for effectively managing disputes in legal contexts.

UNIT-1. INTRODUCTION:
Evolution of mediation/conciliation as a mode of settlement of disputes, distinction between arbitration, mediation, conciliation, negotiation.
Nature, Scope, Limitations and necessity of alternative models of disputes resolution
Introduction of ADRMs in the Indian Legal System
What is Alternative Dispute Resolution Methods?
Advantages of ADRMs over the Conventional Adjudicatory System
Dispute Resolution at grass root level, LokAdalats, NyayaPanchayath, Legal Aid, Preventive and Strategic legal aid.
International Perspective/International Scenario

UNIT-2. ARBITRATION: [ARBITRATION AND CONCILIATION ACT, 1996]
Origin and Development of Arbitration Meaning, features, theories and types of arbitration Arbitration Agreement – Formation, essentials, validity, rule of severability, parties to arbitration agreement. Arbitral Tribunal – Structure, Powers, Functions and Jurisdiction "Fast Track" arbitration, Arbitration proceedings

UNIT-3. CONCILIATION: [ARBITRATION AND CONCILIATION ACT, 1996]
Meaning, features and modes and techniques of Conciliation, Appointment and role of conciliators Conciliation proceedings – submission of statements – communication between conciliator and parties, suggestions for settlement – confidentiality of information – Admissibility of evidence in other proceedings, Termination of conciliation proceedings; costs and deposits. Contractual provisions about conciliation, Difference between Arbitration and Conciliation

UNIT-4. MEDIATION

What is Mediation? Characteristics of Mediation, Essential Elements of Mediation, Advantages/ Benefits of Mediation,What Kinds of Cases Can Be / Cannot Be Mediated? Convening for Mediation, Guidelines to the Parties and Mediator, Training of the Mediator.

UNIT-5. NEGOTIATION

Eight Pillars of Negotiation Wisdom, Qualities of a Good Negotiator, Various phases in Negotiation, disadvantages of Negotiation and Setting the Stage for Productive Negotiations Certain Specific Titles in the Negotiation Process, Alternative Paths. Practical Approach towards Concepts – Mixed Motive Exchange, Winner's Curse, and Interest based Bargaining, Negotiation 'Dance', BATNA, WATNA, MALATNA, Integrative Negotiation & Distributive Negotiation

Suggested Readings:

G. K. Kwatra-The New Arbitration &Conciliation Law of India, ICA,1998.

Gabrielle Kaufmann- Online Dispute Resolution: Challenges for Contemporary Justice, Kohler & Thomas Wolters Kluwer, UK Schultz.

"Law & Practice of Alternative Dispute Resolution in India – A Detailed Analysis", by AnirbanChakraborty; 2016 Edition, LexisNexis, Gurgaon.

Madabhushi Sridhar – Alternative Dispute Resolution, Butterworth Lexis Nexis, (Reprint 2010) Ist edition.

O. P. Malhotra &Indu Malhotra, The Law and Practice of Arbitration and Conciliation, 3 rd ed. (2014).

Environmental law

CBSN-401 D

L	T	P	Cr
2	0	0	2

Course Outcomes:
At the end of this course, students will demonstrate the ability to:

1. Understand the legal principles governing environmental protection and sustainability.
2. Learn about key environmental laws, regulations, and international treaties focused on conservation and pollution control.
3. Develop skills to assess the impact of industrial activities on the environment and navigate legal frameworks.
4. Analyze the role of government agencies, non-governmental organizations, and the public in environmental governance.
5. Understand legal approaches to addressing climate change, natural resource management, and environmental justice.

UNIT-1
Basic Concepts in Environmental Law.An introduction to the legal system; Constitution, Acts, Rules,
Regulations; Indian Judiciary, Doctrine of precedents, judicialreview, Writ petitions, PIL–liberalization of the rule of locusstandi, Judicial activism.Introduction to environmental laws in India; Constitutional
provisions, Stockholm conference; Bhopal gas tragedy; Rioconference.General principles in Environmental law: Precautionaryprinciple; Polluter pays principle; Sustainable development; Public trust doctrine.Overview of legislations and basic concepts.

UNIT-2
Forest, Wildlife and Biodiversity related lawsEvolution and Jurisprudence of Forest and Wildlife laws;
Colonial forest policies; Forest policies after independenceStatutory framework on Forests, Wildlife and Biodiversity: IFA, 1927; WLPA, 1972; FCA, 1980; Biological Diversity Act, 2002; Forest Rights Act, 2006.
Strategies for conservation–Project Tiger, Elephant, Rhino, Modulew leopard

UNIT-3
Air, Water and Marine Laws National Water Policy and some state policies Laws relating to prevention of pollution, access and management of water and institutional mechanism: Water Act, 1974; Water Cess Act, 1977, EPA, 1986. Pollution Control Boards Ground water and law Judicial remedies and procedures Marine laws of India; Coastal zone regulations. Legal framework on Air pollution: Air Act,1981; EPA, 1986

UNIT-4

Environment protection laws and large Projects Legal framework on environment protection- Environment Protection Act as the framework legislation–strength and weaknesses; EIA; National Green tribunal The courts infrastructure projects

UNIT-5

Hazardous Substances and Activities Legal framework: EPA and rules made thereunder; PLI Act, 199 Principles of strict and absolute liability

Suggested readings

1. Birnie P. (2009) et al., International Law and the Environment, 3rd ed., Oxford.
2. Desai A. (2002) Environmental Jurisprudence, 2nd ed., Modern Law House, Allahabad.
3. Gadgil M. and Guha R. (1995) Ecology and Equity, Oxford, New Delhi.
4. Gadgil M. and Guha R. (1997) This Fissured Land, Oxford, New Delhi.
5. Guha R. (2000) Environmentalism: A Global History, Oxford, New Delhi.
6. Kamala S. and Singh U.K. (eds.) (2008) Towards Legal Literacy: An Introduction to Law in India, Oxford, New Delhi.
7. Leelakrishnan P. (2006) Environmental Law Case Book, 2nd ed, Lexis Nexis, India.
8. Sands P. (2002) Principles of International Environmental Law, 2nd ed, Cambridge.
9. Singh C. (1986) Common Property and Common Poverty, Oxford, New Delhi.
10. Upadhyay S. and Upadhyay V. (2002) Hand Book on Environmental Law- Forest Laws, Wildlife Laws and the Environment; Vols. I, II and III, Lexis Nexis- Butterworths-India, New Delhi.

Artificial Intelligence Lab

CCSN-451

L	T	P	Cr
0	0	2	1

Course Outcomes:
At the end of this course, students will demonstrate the ability to:

1. Develop practical skills in implementing AI algorithms and techniques using programming languages like Python.
2. Apply machine learning methods to solve real-world problems and analyze data patterns.
3. Experiment with neural networks, deep learning, and natural language processing for AI applications.
4. Use AI tools and frameworks, such as TensorFlow and scikit-learn, for model training and testing.
5. Understand the ethical considerations and limitations of artificial intelligence in practical settings.

Course Objectives: This course is designed to:

1. Explore the methods of implementing algorithms using artificial intelligence techniques

2. Illustrate search algorithms 3. Demonstrate building of intelligent agents

List of Experiments:

1. Write a program to implement DFS

2. Write a program to implement BFS

3. Write a Program to find the solution for travelling salesman Problem

4. Write a program to implement Simulated Annealing Algorithm

5. Write a program to find the solution for wampus world problem

6. Write a program to implement 8 puzzle problem

7. Write a program to implement Towers of Hanoi problem

8. Write a program to implement A* Algorithm

9. Write a program to implement Hill Climbing Algorithm

10. Build a bot which provides all the information related to you in college.

11. Build a virtual assistant for Wikipedia using Wolfram Alpha and Python

12. The following is a function that counts the number of times a string occurs in another string:

Distributed Computing Systems Lab

CCSN-453

L	T	P	Cr
0	0	2	1

Course Outcomes:
At the end of this course, students will demonstrate the ability to:

1. Understand the principles of distributed computing and the challenges in coordinating multiple systems.
2. Develop skills in designing and implementing distributed algorithms for resource management and synchronization.
3. Use tools and frameworks to build and test distributed systems, focusing on fault tolerance and scalability.
4. Implement communication protocols like RPC (Remote Procedure Call) and message-passing for distributed networks.
5. Analyze the performance of distributed systems in terms of latency, throughput, and reliability.

EXPERIMENT-1- Implement concurrent echo client-server application
EXPERIMENT-2 Implement concurrent day-time client-server application.
EXPERIMENT-3 Configure following options on server socket and tests them: SO_KEEPALIVE, SO_LINGER, SO_SNDBUF, SO_RCVBUF, TCP_NODELAY
EXPERIMENT-4 Incrementing a counter in shared memory.
EXPERIMENT-5 Create CORBA based server-client application
EXPERIMENT-6 Design XML Schema and XML instance document
EXPERIMENT-7 WSDL based: Implement Arithmetic Service that implements add, and subtract operations / Java based: Implement Trigonometric Service that implements sin, and cos operations.
EXPERIMENT-8 Configuring reliability and security options
EXPERIMENT-9 Monitor SOAP request and response packets. Analyze parts of it and compare them with the operations (java functions) headers.
EXPERIMENT-10 Design and test BPEL module that composes Arithmetic Service and Trigonometric Service.
EXPERIMENT-11 Test open source ESB using web service. LABWORK BEYOND CURRICULA
EXPERIMENT-12 Implementing Publish/Subscribe Paradigm using Web Services, ESB and JMS
EXPERIMENT-13 Implementing Stateful grid services using Globus WS-Core-4.0.3

Seminar and Group Discussion

CCSN-481

L	T	P	Cr
0	0	2	1

Course Outcomes:

At the end of this course, students will demonstrate the ability to:

1. Develop skills in presenting ideas clearly and confidently during seminars and discussions.
2. Enhance critical thinking and analytical abilities through active participation in group discussions.
3. Learn how to research, organize, and present information effectively to an audience.
4. Foster teamwork and collaboration skills by engaging in structured group discussions on various topics.
5. Improve communication strategies, including listening, questioning, and providing constructive feedback.

- **Educational technology-**A common topic at Decamps, this includes practical examples of using modern tools in the classroom and how to solve problems that technology can cause.
- **Current events-**Students can track current events and create a news show or podcast about them.
- **Artificial intelligence-**Seminars can help you learn about responsible AI development and deployment, and build a professional network.
- **Case studies and debates-**These activities can help students engage with the material and develop communication, critical analysis, and teamwork skills.
- **Classroom management-**This includes strategies and techniques for creating a learning environment that reduces disruptions.
- **Global issues in education and research-**This can include topics such as the impact of crisis on education, ethical issues in education, and technology in teaching and learning.
- **Psychology**-This includes core areas such as biological, cognitive, developmental, social, and individual differences.

17th Meeting of BOS (Item No. 17.5 Annexure -5)

Advanced Applied Mathematics

CE- 511 D **L T P Cr.**

2 1 0 0

Course Outcomes:
At the end of this course, students will demonstrate the ability to:
CO1 Learn linear algebra concepts like vector spaces and eigenvalues.
CO2 Solve ordinary and partial differential equations.
CO3 Understand real analysis concepts, including series and functions.
CO4 Apply complex analysis in solving real-world problems.
CO5 Use numerical methods for solving mathematical problems.

Unit 1: Linear Algebra
Study of vector spaces, linear transformations, and matrix theory. Exploration of eigenvalues and eigenvectors, and their applications in various fields.

Unit 2: Differential Equations
Introduction to ordinary differential equations (ODEs) and partial differential equations (PDEs). Methods of solving linear and non-linear differential equations and their applications.

Unit 3: Real Analysis
Fundamental concepts of sequences, series, and functions. Exploration of limits, continuity, differentiability, and integration. Theoretical foundations and practical applications.

Unit 4: Complex Analysis
Study of complex numbers, analytic functions, and contour integration. Applications of complex analysis in solving real-world problems, including residue theory.

Unit 5: Numerical Methods
Introduction to numerical techniques for solving mathematical problems. Topics include numerical integration, interpolation, and numerical solutions of differential equations.

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional
Area Gangoh, Distt. Saharanpur (U.P.)
247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

17th Meeting of BOS (Item No. 17.5 Annexure -5)

SHOBHIT UNIVERSITY GANGOH
SCHOOL OF ENGINEERING AND TECHNOLOGY
List of Examiners (2021-2022)

Sr. No.	Course code with Title	Name, Designation, Institution and Correspondence address of the Paper Setter/Examiner	Contact number with E. Mail ID
	Fundamental of Computer and C Programming (BCA-101)	External Examiner	
		1. Dr. Arun Giri	arungiri123@yahoo.com, 9818809053
		2. Dr. Nidhi Tyagi 3. Dr. Maheep Singh	nidhi.tyagi9785@gmail.com, 9927007273 kingmaheep@gmail.com, 9411293327
		Internal Examiner 1. Dr. Tarun Kumar Sharma	Tarun.sharma@shobhituniversity.ac.in, 9456086759
		2. Dr. Varun Bansal	Varun.bansal@shobhituniversity.ac.in, 9411295559
	Problem Solving using Computer (BCA-102)	External Examiner 1. Dr. Abahay Bhatia	dr.abhay@ritrookee.ac.in, 9837386973
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com, 97604492192
		3. Dr. Mamta	mamta.bansal345@gmail.com, 9997025606
		Internal Examiner 1. Mr. Kuldeep Chauhan	Kuldeep.chauhan@shobhituniversity.ac.in, 9756997090
		2. Mr. Vinod Kumar	Vinod.kumar@shobhituniversity.ac.in, 9758749227

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional
Area Gangoh, Distt. Saharanpur (U.P.)
247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

3	Professional Communication(BCA-103)	External Examiner 1. Dr. Abahay Bhatia	dr.abhay@ritrookee.ac.in, 9837386973
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com, 97604492192
		3. Dr. Mamta	mamta.bansal345@gmail.com,9997025606
		Internal Examiner 1.Dr. Varun Bansal	Varun.bansal@shobhituniversity.ac.in, 9411295559
		2.Mr. Nitin Kumar	nitin.kumar@shobhituniversity.ac.in, 9758170029
4	Mathematics(BCA-104)	External Examiner 1. Dr. Abahay Bhatia	dr.abhay@ritrookee.ac.in, 9837386973
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com, 97604492192
		3. Dr. Mamta	mamta.bansal345@gmail.com,9997025606
		Internal Examiner 1. Dr. Varun Bansal	Varun.bansal@shobhituniversity.ac.in, 9411295559
		2. Mr. Kuldeep Chauhan	Kuldeep.chauhan@shobhituniversity.ac.in, 9756997090
5	Fundamental of Computer and C Programming Lab(BCA-151)	External Examiner 1. Dr. Abahay Bhatia	dr.abhay@ritrookee.ac.in, 9837386973
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com, 97604492192
		3. Dr. Mamta	mamta.bansal345@gmail.com,9997025606
		Internal Examiner 1.Dr. Varun Bansal	Varun.bansal@shobhituniversity.ac.in, 9411295559

Shobhit University
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Babu Vijendra Marg, Adarsh Institutional
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247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

		2.Sumika Jain	Sumika.jai@shobhituniversity.ac.in, 9456666326
6	Software Lab using Python(BCA-152)	External Examiner 1. Dr. Abahay Bhatia	dr.abhay@ritrookee.ac.in, 9837386973
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com, 97604492192
		3. Dr. Mamta	mamta.bansal345@gmail.com,9997025606
		Internal Examiner 1. Dr. Tarun Kumar Sharma	Tarun.sharma@shobhituniversity.ac.in, 9456086759
		2. Mr. Vinod Kumar	Vinod.kumar@shobhituniversity.ac.in, 9758749227
7	English Communication Lab(BCA-153)	External Examiner 1. Dr. Abahay Bhatia	dr.abhay@ritrookee.ac.in, 9837386973
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com, 97604492192
		3. Dr. Mamta	mamta.bansal345@gmail.com,9997025606
		Internal Examiner 1. Dr. Tarun Kumar Sharma	Tarun.sharma@shobhituniversity.ac.in, 9456086759
		2. Mr. Vinod Kumar	Vinod.kumar@shobhituniversity.ac.in, 9758749227
8	Seminar Based on Learning (BCA-154)	External Examiner 1 Dr. Abahay Bhatia	dr.abhay@ritrookee.ac.in, 9837386973
		3. Dr. Ankit Sharma	gurukul.ankit@gmail.com, 97604492192
		4. Dr. Mamta	mamta.bansal345@gmail.com,9997025606
		Internal Examiner	

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional
Area Gangoh, Distt. Saharanpur (U.P.)
247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

		1. Dr. Tarun Kumar Sharma	Tarun.sharma@shobhituniversity.ac.in, 9456086759
		2. Mr. Vinod Kumar	Vinod.kumar@shobhituniversity.ac.in, 9758749227
9	Operating Systems(BCA-301)	External Examiner 1.Dr Mamta	mamta.bansal345@gmail.com,9997025606
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com, 97604492192
		3. Dr. Abahay Bhatia	dr.abhay@ritrookee.ac.in, 9837386973
		Internal Examiner 1. Ms. Sumika Jain	Sumika.jai@shobhituniversity.ac.in, 9456666326
		2. Mr. Vinod Kumar	Vinod.kumar@shobhituniversity.ac.in, 9758749227
10	HTML, DHTML and CSS Programming(BCA-302)	External Examiner 1. Dr. Abahay Bhatia	dr.abhay@ritrookee.ac.in, 9837386973
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com, 97604492192
		3. Dr. Mamta	mamta.bansal345@gmail.com,9997025606
		Internal Examiner 1. Dr. Varun Bansal	Varun.bansal@shobhituniversity.ac.in, 9411295559
		2. Mr. Kuldeep Chauhan	Kuldeep.chauhan@shobhituniversity.ac.in, 9756997090
11	Theory of Computation(BCA-303)	External Examiner 1. Dr. Mamta	mamta.bansal345@gmail.com,9997025606
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com, 97604492192

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional
Area Gangoh, Distt. Saharanpur (U.P.)
247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

		3. Dr. Abahay Bhatia	dr.abhay@ritrookee.ac.in, 9837386973
		Internal Examiner 1. Mr. Nitin Kumar	nitin.kumar@shobhituniversity.ac.in, 9758170029
		2. Mr. Vinod Kumar	Vinod.kumar@shobhituniversity.ac.in, 9758749227
12	Multimedia and Applications(BCA-304)	External Examiner 1. Dr. Ankit Sharma	gurukul.ankit@gmail.com, 97604492192
		2. Dr. Mamta	mamta.bansal345@gmail.com,9997025606
		3. Dr. Abahay Bhatia	dr.abhay@ritrookee.ac.in, 9837386973
		Internal Examiner 1. Mr. Kuldeep Chauhan	Kuldeep.chauhan@shobhituniversity.ac.in, 9756997090
		2. Mr. Nitin Kumar	nitin.kumar@shobhituniversity.ac.in, 9758170029
13	Optimization Techniques(BCA-305)	External Examiner 1. Dr. Abahay Bhatia	dr.abhay@ritrookee.ac.in, 9837386973
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com, 97604492192
		3. Dr. Mamta	mamta.bansal345@gmail.com,9997025606
		Internal Examiner 1. Mr. Vinod Kumar	Vinod.kumar@shobhituniversity.ac.in, 9758749227
		2. Ms. Sumika Jain	Sumika.jai@shobhituniversity.ac.in, 9456666326
14	Operating Systems	External Examiner	

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional
Area Gangoh, Distt. Saharanpur (U.P.)
247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

	Lab(BCA-351)	1. Dr. Abahay Bhatia	dr.abhay@ritrookee.ac.in, 9837386973
		2. Dr. Mamta	mamta.bansal345@gmail.com,9997025606
		3. Dr. Ankit Sharma	gurukul.ankit@gmail.com, 97604492192
		Internal Examiner 1. Mr. Kuldeep Chauhan	Kuldeep.chauhan@shobhituniversity.ac.in, 9756997090
		2. Mr. Nitin Kumar	nitin.kumar@shobhituniversity.ac.in, 9758170029
15	HTML Programming Lab(BCA-352)	External Examiner 1. Dr. Mamta	mamta.bansal345@gmail.com,9997025606
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com, 97604492192
		3. Dr. Abahay Bhatia	dr.abhay@ritrookee.ac.in, 9837386973
		Internal Examiner 1. Ms. Sumika Jain	Sumika.jai@shobhituniversity.ac.in, 9456666326
		2. Mr. Vinod Kumar	Vinod.kumar@shobhituniversity.ac.in, 9758749227
16	Seminar Based on Learning(BCA-353)	External Examiner 1. Dr. Abahay Bhatia	dr.abhay@ritrookee.ac.in, 9837386973
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com, 97604492192
		3. Dr. Mamta	mamta.bansal345@gmail.com,9997025606
		Internal Examiner 3. Mr. Kuldeep Chauhan	Kuldeep.chauhan@shobhituniversity.ac.in, 9756997090
		4. Mr. Nitin Kumar	nitin.kumar@shobhituniversity.ac.in,

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional
Area Gangoh, Distt. Saharanpur (U.P.)
247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

			9758170029
17	Software Engineering(BCA-501)	External Examiner 1. Dr. Abahay Bhatia	dr.abhay@ritrookee.ac.in, 9837386973
		2. Dr. Mamta	mamta.bansal345@gmail.com,9997025606
		3. Dr. Ankit Sharma	gurukul.ankit@gmail.com, 97604492192
		Internal Examiner 1. Dr. Varun Bansal	Varun.bansal@shobhituniversity.ac.in, 9411295559
		2. Mr. Vinod Kumar	Vinod.kumar@shobhituniversity.ac.in, 9758749227
18	Analysis of Algorithms & Data Structures(BCA-502)	External Examiner 1. Dr. Ankit Sharma	gurukul.ankit@gmail.com, 97604492192
		2. Dr. Mamta	mamta.bansal345@gmail.com,9997025606
		3. Dr. Abahay Bhatia	dr.abhay@ritrookee.ac.in, 9837386973
		Internal Examiner 1. Mr. Kuldeep Chauhan	Kuldeep.chauhan@shobhituniversity.ac.in, 9756997090
		2. Mr. Nitin Kumar	nitin.kumar@shobhituniversity.ac.in, 9758170029
19	Mobile Computing(BCA-503)	External Examiner 1. Dr. Mamta	mamta.bansal345@gmail.com,9997025606
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com, 97604492192
		3. Dr. Abahay Bhatia	dr.abhay@ritrookee.ac.in, 9837386973

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional
Area Gangoh, Distt. Saharanpur (U.P.)
247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

		Internal Examiner 1. Dr. Varun Bansal	Varun.bansal@shobhituniversity.ac.in, 9411295559
		2. Mr. Vinod Kumar	Vinod.kumar@shobhituniversity.ac.in, 9758749227
20	Big Data and Machine Learning(BCA-504)	External Examiner 1. Dr. Ankit Sharma	gurukul.ankit@gmail.com, 97604492192
		2. Dr. Mamta	mamta.bansal345@gmail.com,9997025606
		3. Dr. Abahay Bhatia	dr.abhay@ritrookee.ac.in, 9837386973
		Internal Examiner 1. Mr. Kuldeep Chauhan	Kuldeep.chauhan@shobhituniversity.ac.in, 9756997090
		2. Mr. Nitin Kumar	nitin.kumar@shobhituniversity.ac.in, 9758170029
21	Software Engineering Lab(BCA-551)	External Examiner 1. Dr. Mamta	mamta.bansal345@gmail.com,9997025606
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com, 97604492192
		3. Dr. Abahay Bhatia	dr.abhay@ritrookee.ac.in, 9837386973
		Internal Examiner 3. Dr. Varun Bansal	Varun.bansal@shobhituniversity.ac.in, 9411295559
		4. Mr. Vinod Kumar	Vinod.kumar@shobhituniversity.ac.in, 9758749227
22	Algorithms and Data	External Examiner	

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional
Area Gangoh, Distt. Saharanpur (U.P.)
247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

	Structures with C++ Lab (BCA-552)	1. Dr. Ankit Sharma	gurukul.ankit@gmail.com, 97604492192
		2. Dr. Abahay Bhatia	dr.abhay@ritrookee.ac.in, 9837386973
		3. Dr. Mamta	mamta.bansal345@gmail.com,9997025606
		Internal Examiner 1. Dr. Varun Bansal	Vinod.kumar@shobhituniversity.ac.in, 9758749227
		2. Mr. Vinod Kumar	Vinod.kumar@shobhituniversity.ac.in, 9758749227
23	Research Project-I(BCA-558)	External Examiner 1. Dr. Abahay Bhatia	dr.abhay@ritrookee.ac.in, 9837386973
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com, 97604492192
		3. Dr. Mamta	mamta.bansal345@gmail.com,9997025606
		Internal Examiner 1. Dr. Varun Bansal	Varun.bansal@shobhituniversity.ac.in, 9411295559
		2. Mr. Vinod Kumar	Vinod.kumar@shobhituniversity.ac.in, 9758749227

MCA (List of Examiners)

Sr. No.	Course code with Title	Name, Designation, Institution and Correspondence address of the Paper Setter/Examiner	Contact number with E. Mail ID
1.	Java (MCA-101)	External Examiner 4. Dr. Abhay Bhatia	Dr.abhay@ritroorkee.ac.in 9837386973 Dr.abhay@ritroorkee.ac.in 9837386973
		5. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional
Area Gangoh, Distt. Saharanpur (U.P.)
247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

		6. Dr. Mamta Singh	Mamta.bansal345@gmail.com 9997025606
		Internal Examiner 3. Mr. Jitendra K. Saini	Jitendra.saini@shobhituniversity.ac.in 7669110295
		4. Mr. Shahnawaaj	Mohd.shahnawaz@shobhituniversity.ac.in 9536940100
2	Advanced DBMS (MCA-102)	External Examiner 4. Dr. Ankit Sharma	Gurukul.ankit@gmail.com 9760492192
		5. Dr. Arun Giri	Arungiri123@yahoo.com 981880953
		6. Dr. Nidhi Tyagi	Nidhi.tyagi9785@gmail.com 9927007273
		Internal Examiner 3. Dr. Varun Bansal	Varun.bansal@shobhituniversity.ac.in 9675478559
		4. Mr. Shubham Kumar	Shubham.k@shobhituniversity.ac.in 7895408519
	Advanced DAA (MCA-103)	External Examiner 1. Dr. Mamta Bansal	Mamta.bansal345@gmail.com 9997025606
		2. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		3. Dr. Abhay Bhatia	Dr.abhay@ritroorkee.ac.in 9837386973
		Internal Examiner 1. Ms. Sumika Jain	Sumika.jain@shobhituniversity.ac.in 9456666326
		2. Mr. Kuldeep Chauhan	Kuldeep.chauhan@shobhituniversity.ac.in 9756997090
4	Network Fundamentals (MCA-	External Examiner 1. Dr. Abhay Bhati	Dr.abhay@ritroorkee.ac.in 9837386973

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional
Area Gangoh, Distt. Saharanpur (U.P.)
247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

	104)	2. Dr. Ankit Sharma	Gurukul.ankit@gmail.com 9760492192
		3. Dr. Mamta Bansal	Mamta.bansal345@gmail.com 9997025606
		Internal Examiner 1. Ms. Sumika Jain	Sumika.jain@shobhituniversity.ac.in 9456666326
		2. Mr. Kuldeep Chauhan	Kuldeep.chauhan@shobhituniversity.ac.in 9756997090
5	Optimization Techniques (MCA-133)	External Examiner 1. Dr. Abhay Bhati	Dr.abhay@ritroorkee.ac.in 9837386973
		2. Dr. Ankit Sharma	Gurukul.ankit@gmail.com 9760492192
		3. Dr. Mamta Bansal	Mamta.bansal345@gmail.com 9997025606
		Internal Examiner 1. Ms. Sumika Jain	Sumika.jain@shobhituniversity.ac.in 9456666326
		2. Mr. Kuldeep Chauhan	Kuldeep.chauhan@shobhituniversity.ac.in 9756997090
6	Lab JAVA (MCA-151)	External Examiner 1. Dr. Ankit Sharma	Gurukul.ankit@gmail.com 9760492192
		2. Dr. Arun Giri	Arungiri123@yahoo.com 981880953
		3. Dr. Nidhi Tyagi	Nidhi.tyagi9785@gmail.com 9927007273
		Internal Examiner 1. Dr. Varun Bansal	Varun.bansal@shobhituniversity.ac.in 9675478559
		2. Mr. Shubham Kumar	Shubham.k@shobhituniversity.ac.in 7895408519
7	Lab Advanced DBMS	External Examiner 1. Dr. Abhay Bhatia	Dr.abhay@ritroorkee.ac.in 9837386973

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional
Area Gangoh, Distt. Saharanpur (U.P.)
247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

	(MCA-152)	2. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		3. Dr. Mamta Bansal	Mamta.bansal345@gmail.com 9997025606
		Internal Examiner 1. Mr. Jitendra K. Saini	Jitendra.saini@shobhituniversity.ac.in 7669110295
		2. Mr. Shahnawaaj	Mohd.shahnawaz@shobhituniversity.ac.in 9536940100
8	Lab Design and analysis of Algorithm (MCA-153)	External Examiner 1. Dr. Nidhi Tyagi	Nidhi.tyagi9785@gmail.com 9927007273
		2. Dr. Mamta Bansal	Mamta.bansal345@gmail.com 9997025606
		3. Dr. Abhay Bhatia	Dr.abhay@ritroorkee.ac.in 9837386973
		Internal Examiner 1. Mr. Jitendra K. Saini	Jitendra.saini@shobhituniversity.ac.in 7669110295
		2. Dr. Tarun Kumar Sharma	Tarun.sharma@shobhituniversity.ac.in 9456086759
9.	PHP (MCA-301)	External Examiner 1. Dr. Ankit Sharma	Gurukul.ankit@gmail.com 9760492192
		2. Dr. Arun Giri	Arungiri123@yahoo.com 981880953
		3. Dr. Nidhi Tyagi	Nidhi.tyagi9785@gmail.com 9927007273
		Internal Examiner 1. Dr. Varun Bansal	Varun.bansal@shobhituniversity.ac.in 9675478559
		2. Ms. Sumika Jain	Sumika.jain@shobhituniversity.ac.in 9456666326
10.	Data Science (MCA-302)	External Examiner 1. Dr. Mamta Bansal	Mamta.bansal345@gmail.com 9997025606
		2. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		3. Dr. Abhay Bhatia	Dr.abhay@ritroorkee.ac.in 9837386973

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional
Area Gangoh, Distt. Saharanpur (U.P.)
247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

		Internal Examiner 1. Dr. Varun Bansal	Varun.bansal@shobhituniversity.ac.in 9675478559
		2. Ms. Sumika Jain	Sumika.jain@shobhituniversity.ac.in 9456666326
11.	Cryptography and Network Security(MCA-304)	External Examiner 1. Dr. Ankit Sharma	Gurukul.ankit@gmail.com 9760492192
		2. Dr. Arun Giri	Arungiri123@yahoo.com 981880953
		3. Dr. Nidhi Tyagi	Nidhi.tyagi9785@gmail.com 9927007273
		Internal Examiner 1. Mr. Nitin Kumar	Nitin.kumar@shobhituniversity.ac.in 9758170029
		2. Ms. Sumika Jain	Sumika.jain@shobhituniversity.ac.in 9456666326
12.	Compiler Design(MCA-322)	External Examiner 1. Dr. Ankit Sharma	Gurukul.ankit@gmail.com 9760492192
		2. Dr. Arun Giri	Arungiri123@yahoo.com 981880953
		3. Dr. Nidhi Tyagi	Nidhi.tyagi9785@gmail.com 9927007273
		Internal Examiner 1. Dr. Varun Bansal	Varun.bansal@shobhituniversity.ac.in 9675478559
		2. Mr. Shubham Kumar	Shubham.k@shobhituniversity.ac.in 7895408519
13.	Lab PHP(MCA-351)	External Examiner 1. Dr. Abhay Bhatia	Dr.abhay@ritroorkee.ac.in 9837386973
		2. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional
Area Gangoh, Distt. Saharanpur (U.P.)
247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

		3. Dr. Mamta Bansal	Mamta.bansal345@gmail.com 9997025606
		Internal Examiner 1. Mr. Vinod Kumar	Vinod.kumar@shobhituniversity.ac.in 9758749227
		2. Mr. Anuj Kumar	Anju.k@shobhituniverstiy.ac.in 7249989555
14.	Lab Data Science(MCA-352)	External Examiner 1. Dr. Arun Giri	Arungiri123@yahoo.com 981880953
		2. Dr. Nidhi Tyagi	Nidhi.tyagi9785@gmail.com 9927007273
		3. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		Internal Examiner 1. Mr. Vinod Kumar	Vinod.kumar@shobhituniversity.ac.in 9758749227
		2. Mr. Anuj Kumar	Anju.k@shobhituniverstiy.ac.in 7249989555
15.	Lab Cryptography and Network Security(MCA-353)	External Examiner 1. Dr. Abhay Bhati	Dr.abhay@ritroorkee.ac.in 9837386973
		2. Dr. Ankit Sharma	Gurukul.ankit@gmail.com 9760492192
		3. Dr. Mamta Bansal	Mamta.bansal345@gmail.com 9997025606
		Internal Examiner 1. Ms. Sumika Jain	Sumika.jain@shobhituniversity.ac.in 9456666326
		2. Mr. Kuldeep Chauhan	Kuldeep.chauhan@shobhituniversity.ac.in 9756997090
24.	Minor Project (MCA-	External Examiner 1. Dr. Arun Giri	Arungiri123@yahoo.com 981880953

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional
Area Gangoh, Distt. Saharanpur (U.P.)
247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

	354)	2. Dr. Nidhi Tyagi	Nidhi.tyagi9785@gmail.com 9927007273
		3. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		Internal Examiner 1. Mr. Vinod Kumar	Vinod.kumar@shobhituniversity.ac.in 9758749227
		2. Mr. Anuj Kumar	Anju.k@shobhituniverstiy.ac.in 7249989555
	Seminar Based on Learning(MCA-355)	External Examiner 1. Dr. Ankit Sharma	Gurukul.ankit@gmail.com 9760492192
		2. Dr. Nidhi Tyagi	Nidhi.tyagi9785@gmail.com 9927007273
		3. Dr. Arun Giri	Arungiri123@yahoo.com 981880953
		Internal Examiner 1. Mr. Nitin Kumar	Nitin.kumar@shobhituniversity.ac.in 9758170029
		2. Mr. Vinod Kumar	Vinod.kumar@shobhituniversity.ac.in 9758749227

M.Tech(List of Examiners)

Sr. No.	Course code with Title	Name, Designation, Institution and Correspondence address of the Paper Setter/Examiner	Contact number with E. Mail ID
1.	Software Engineering Methodologies CE- 501	External Examiner 7. Dr. Arun Giri	arungiri123@yahoo.com 9818809053
		8. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		9. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		Internal Examiner 1. Mr. Kuldeep Chauhan	kuldeep.chauhan@shobhituniversity.ac.in 9756997090

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional
Area Gangoh, Distt. Saharanpur (U.P.)
247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

		2. Mr. Vinod Kumar	vinod.kumar@shobhituniversity.ac.in 9758749227
2.	Analysis and Design of Algorithms CE-503	External Examiner 7. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		8. Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192
		9. Dr. Mamta Bansal	mamta.bansal345@gmail.com 9997025606
		Internal Examiner 5. Ms. Sumika Jain	sumika.jain@shobhituniversity.ac.in 9456666326
		2. Mr. Raveendra Kr. Bharati	raveendra.bharati@shobhituniversity.ac.in 9953328744
3.	Advanced Database Management Systems CE- 505	External Examiner 1. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		2. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		3. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		Internal Examiner 1. Mr. Raveendra Kr. Bharati	raveendra.bharati@shobhituniversity.ac.in 9953328744
		2. Mr. Nitin Kumar	nitin.kumar@shobhituniversity.ac.in 9758170029
4.	Computer Communication and	External Examiner 1. Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional
Area Gangoh, Distt. Saharanpur (U.P.)
247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

	Networks CE- 507	2. Dr. Mamta Bansal	mamta.bansal345@gmail.com 9997025606
		3. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		Internal Examiner 1. Mr. Raveendra Kr. Bharati	anil.nishad@shobhituniversity.ac.in 8171418088
		2. Mr. Kuldeep Chauhan	kuldeep.chauhan@shobhituniversity.ac.in 9756997090
5.	Fundamental of Computer Programming (Audit) CE- 509	External Examiner 1. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192
		3. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		Internal Examiner 1. Mr. Vinod Kumar	vinod.kumar@shobhituniversity.ac.in 9758749227
		2. Ms. Sumika Jain	sumika.jain@shobhituniversity.ac.in 9456666326
6.	Fundamental of Mathematics (Audit) CE- 511	External Examiner 1. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192
		3. Dr. Mamta Bansal	mamta.bansal345@gmail.com 9997025606

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional
Area Gangoh, Distt. Saharanpur (U.P.)
247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

		Internal Examiner 1. Mr. Madhav P. Namdev	Madhav.namdev@shobhituniversity.ac.in 94572731592
		2. Mr. Raveendra Kr. Bharati	raveendra.bharati@shobhituniversity.ac.in 9953328744
7.	Algorithms Lab CE-551	External Examiner 1. Dr. Arun Giri	arungiri123@yahoo.com 9818809053
		2. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		3. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		Internal Examiner 1. Mr. Vinod Kumar	vinod.kumar@shobhituniversity.ac.in 9758749227
		2. Mr. Raveendra Kr. Bharati	raveendra.bharati@shobhituniversity.ac.in 9953328744
	Seminar-I CE- 581	External Examiner 1. Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192
		2. Dr. Mamta Bansal	mamta.bansal345@gmail.com 9997025606
		3. Dr. Arun Giri	arungiri123@yahoo.com 9818809053
		Internal Examiner 1. Mr. Varun Bansal	varun.bansal@shobhituniversity.ac.in 9675478559
		2. Ms. Sumika Jain	sumika.jain@shobhituniversity.ac.in

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EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional
Area Gangoh, Distt. Saharanpur (U.P.)
247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

			9456666326
9	Data Mining and Warehousing CE-601	External Examiner	
		1. Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192
		2. Dr. Mamta Bansal	mamta.bansal345@gmail.com 9997025606
		3. Dr. Arun Giri	arungiri123@yahoo.com 9818809053
		Internal Examiner 1. Mr. Vinod Kumar	vinod.kumar@shobhituniversity.ac.in 9758749227
		2. Mr. Raveendra Kr. Bharati	raveendra.bharati@shobhituniversity.ac.in 9953328744
10	Internet and Web Technology CE- 603	External Examiner	
		1. Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192
		2. Dr. Mamta Bansal	mamta.bansal345@gmail.com 9997025606
		3. Dr. Arun Giri	arungiri123@yahoo.com 9818809053
		Internal Examiner 1. Mr. Varun Bansal	varun.bansal@shobhituniversity.ac.in 9675478559
		2. Ms. Sumika Jain	sumika.jain@shobhituniversity.ac.in 9456666326
11	Medical Image	External Examiner	

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EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional
Area Gangoh, Distt. Saharanpur (U.P.)
247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

	Processing CE- 605	1. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192
		3. Dr. Mamta Bansal	mamta.bansal345@gmail.com 9997025606
		Internal Examiner 1. Mr. Madhav P. Namdev	Madhav.namdev@shobhituniversity.ac.in 94572731592
		2. Mr. Raveendra Kr. Bharati	raveendra.bharati@shobhituniversity.ac.in 9953328744
12	Software Verification, Validation and Testing CE- 607	External Examiner	
		1. Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192
		2. Dr. Mamta Bansal	mamta.bansal345@gmail.com 9997025606
		3. Dr. Arun Giri	arungiri123@yahoo.com 9818809053
		Internal Examiner 1. Ms. Sumika Jain	sumika.jain@shobhituniversity.ac.in 9456666326
		2. Mr. Raveendra Kr. Bharati	raveendra.bharati@shobhituniversity.ac.in 9953328744
13	Network Security CE-625	External Examiner	
		1. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional
Area Gangoh, Distt. Saharanpur (U.P.)
247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192
		3. Dr. Mamta Bansal	mamta.bansal345@gmail.com 9997025606
		Internal Examiner 1. Mr. Vinod Kumar	vinod.kumar@shobhituniversity.ac.in 9758749227
		2. Mr. Raveendra Kr. Bharati	raveendra.bharati@shobhituniversity.ac.in 9953328744
14	Minor Project CE-671	External Examiner	
		1. Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192
		2. Dr. Mamta Bansal	mamta.bansal345@gmail.com 9997025606
		3. Dr. Arun Giri	arungiri123@yahoo.com 9818809053
		Internal Examiner 1. Mr. Kuldeep Chauhan	kuldeep.chauhan@shobhituniversity.ac.in 9756997090
		2. Mr. Vinod Kumar	vinod.kumar@shobhituniversity.ac.in 9758749227

B.tech CSE (Examiner)

Sr. No.	Course code with Title	Name, Designation, Institution and Correspondence address of the Paper Setter/Examiner	Contact number with E. Mail ID
1.	MATHEMATICS-I	External Examiner 10. Dr. Arun Giri	arungiri123@yahoo.com

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional
Area Gangoh, Distt. Saharanpur (U.P.)
247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

	(CMAN 101)		9818809053
		11. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		12. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		Internal Examiner 5. Mr. Raveendra Kr. Bharati	raveendra.bharati@shobhituniversity.ac.in 9953328744
		6. Mr. Abdulla Khan	abdulla.khan@shobhituniversity.ac.in 7454976780
2.	ENGINEERING MECHANICS (CMEN 101)	External Examiner 10. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		11. Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192
		12. Dr. Mamta Bansal	mamta.bansal345@gmail.com 9997025606
		Internal Examiner 1. Mr. Shoyab Hussain	shoyab.hussain@shobhituniversity.ac.in 9837446390
		2. Mr. Anil Kumar Joshi	anil.joshi@shobhituniversity.ac.in 9690758787
3.	FUNDAMENTALS OF ELECTRONICS (CECN 101)	External Examiner 4. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		5. Dr. Maheep Singh	kingmaheep@gmail.com

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional
Area Gangoh, Distt. Saharanpur (U.P.)
247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

			9411293327
		6. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		Internal Examiner 1. Dr. Jasvir Singh Rana	jasvirsingh.rana@shobhituniversity.ac.in 9759233859
		2. Mr. Hamid Ali	hamid.ali@shobhituniversity.ac.in 9759302770
4.	ENGINEERING CHEMISTRY AND ENVIRONMENTAL (CESN 101)	External Examiner 1. Dr. Arun Giri	arungiri123@yahoo.com 9818809053
		2. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		3. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		Internal Examiner 1. Mr. Y.P Malik	yp.malik@shobhituniversity.ac.in 8650145236
		2. Ms. Abhilasha R. Goel	abhilasha.goel@shobhituniversity.ac.in 6396705043
5.	PRESENTATION AND COMMUNICATION SKILLS (CPCN 101)	External Examiner 1. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192
		3. Dr. Mamta Bansal	mamta.bansal345@gmail.com

Shobhit University
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Babu Vijendra Marg, Adarsh Institutional
Area Gangoh, Distt. Saharanpur (U.P.)
247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

			9997025606
		Internal Examiner 1. Ms. Abhilasha R. Goel	abhilasha.goel@shobhituniversity.ac.in 6396705043
		2. Ms. Sumika Jain	sumika.jain@shobhituniversity.ac.in 9456666326
6.	ENGINEERING WORKSHOP PRACTICE (CMEN 151)	External Examiner 7. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		8. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		9. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		Internal Examiner 1. Mr. Shoyab Hussain	shoyab.hussain@shobhituniversity.ac.in 9837446390
		2. Mr. Anil Kumar Joshi	anil.joshi@shobhituniversity.ac.in 9690758787
7.	ENGINEERING GRAPHICS LAB (CMEN 153)	External Examiner 1. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192
		3. Dr. Mamta Bansal	mamta.bansal345@gmail.com 9997025606
		Internal Examiner	jasvirsingh.rana@shobhituniversity.ac.in

Shobhit University
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Babu Vijendra Marg, Adarsh Institutional
Area Gangoh, Distt. Saharanpur (U.P.)
247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

		1. Dr. Jasvir Singh Rana	9759233859
		2. Mr. Hamid Ali	hamid.ali@shobhituniversity.ac.in 9759302770
8.	COMMUNICATION LAB (CPCN 151)	External Examiner 1. Dr. Arun Giri	arungiri123@yahoo.com 9818809053
		2. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		3. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		Internal Examiner 1. Dr. Shri Kant Gupta	shrikant.gupta@shobhituniversity.ac.in 8279909590
		2. Mr. Varun Bansal	varun.bansal@shobhituniversity.ac.in 9675478559
9.	DATA STRUCTURE USING 'C' (CCSN 201)	External Examiner 1. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		2. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		3. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		Internal Examiner 1. Mr. Varun Bansal	varun.bansal@shobhituniversity.ac.in 9675478559

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Babu Vijendra Marg, Adarsh Institutional
Area Gangoh, Distt. Saharanpur (U.P.)
247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

		2. Ms. Sumika Jain	sumika.jain@shobhituniversity.ac.in 9456666326
10.	DBMS (CCSN 203)	External Examiner 1. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192
		3. Dr. Mamta Bansal	mamta.bansal345@gmail.com 9997025606
		Internal Examiner 1. Dr. Tarun Kumar Sharma	tarun.sharma@shobhituniversity.ac.in 9456086759
		2. Mr. Nitin Kumar	nitin.kumar@shobhituniversity.ac.in 9758170029
11.	OPERATING SYSTEMS (UNIX PROGRAMMING) (CCSN 205)	External Examiner 1. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		2. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		3. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		Internal Examiner 1. Ms. Sumika Jain	sumika.jain@shobhituniversity.ac.in 9456666326
		2. Mr. Nitin Kumar	nitin.kumar@shobhituniversity.ac.in 9758170029

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional
Area Gangoh, Distt. Saharanpur (U.P.)
247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

12.	JAVA PROGRAMMING (CCSN 207)	External Examiner 1. Dr. Arun Giri	arungiri123@yahoo.com 9818809053
		2. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		3. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		Internal Examiner 1. Mr. Vinod Kumar	vinod.kumar@shobhituniversity.ac.in 9758749227
		2. Mr. Varun Bansal	varun.bansal@shobhituniversity.ac.in 9675478559
13.	DISCRETE MATHEMATICS (CCSN 209)	External Examiner 1. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192
		3. Dr. Mamta Bansal	mamta.bansal345@gmail.com 9997025606
		Internal Examiner 1. Dr. Vishvas Chand	vishvas.chand@shobhituniversity.ac.in 9286093196
		2. Ms. Abhilasha R. Goel	abhilasha.goel@shobhituniversity.ac.in 6396705043
14.	VALUE EDUCATION, HUMAN RIGHTS	External Examiner 1. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional
Area Gangoh, Distt. Saharanpur (U.P.)
247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

	ANDLEGISLATIVE PROCEDURES (CBSN 201)	2. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		3. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		Internal Examiner 1. Dr. Shri Kant Gupta	shrikant.gupta@shobhituniversity.ac.in 8279909590
		2. Ms. Taruna Pahuja	
15.	DATA STRUCTURE USING 'C' LAB (CCSN 251)	External Examiner 1. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		2. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		3. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		Internal Examiner 1. Mr. Varun Bansal	varun.bansal@shobhituniversity.ac.in 9675478559
		2. Ms. Sumika Jain	sumika.jain@shobhituniversity.ac.in 9456666326
16.	DBMS LAB (CCSN 253)	External Examiner 1. Dr. Arun Giri	arungiri123@yahoo.com 9818809053
		2. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		3. Dr. Maheep Singh	kingmaheep@gmail.com

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional
Area Gangoh, Distt. Saharanpur (U.P.)
247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

			9411293327
		Internal Examiner 1. Dr. Tarun Kumar Sharma	tarun.sharma@shobhituniversity.ac.in 9456086759
		2. Mr. Nitin Kumar	nitin.kumar@shobhituniversity.ac.in 9758170029
17.	JAVA PROGRAMMING LAB (CCSN 255)	External Examiner 1. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		2. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		3. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		Internal Examiner 1. Mr. Vinod Kumar	vinod.kumar@shobhituniversity.ac.in 9758749227
		2. Mr. Varun Bansal	varun.bansal@shobhituniversity.ac.in 9675478559
18.	SOFTWARE ENGINEERING (CCSN 301)	External Examiner 1. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		2. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		3. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		Internal Examiner	tarun.sharma@shobhituniversity.ac.in

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional
Area Gangoh, Distt. Saharanpur (U.P.)
247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

		1. Dr. Tarun Kumar Sharma	9456086759
		2. Mr. Varun Bansal	varun.bansal@shobhituniversity.ac.in 9675478559
19.	COMPILER DESIGN (CCSN 303)	External Examiner 4. Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192
		5. Dr. Mamta Bansal	mamta.bansal345@gmail.com 9997025606
		6. Dr. Arun Giri	arungiri123@yahoo.com 9818809053
		Internal Examiner 1. Mr. Varun Bansal	varun.bansal@shobhituniversity.ac.in 9675478559
		2. Mr. Nitin Kumar	nitin.kumar@shobhituniversity.ac.in 9758170029
20.	OBJECT ORIENTED ANALYSIS AND DESIGN (CCSN 305)	External Examiner 1. Dr. Arun Giri	arungiri123@yahoo.com 9818809053
		2. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		3. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		Internal Examiner 1. Mr. Vinod Kumar	vinod.kumar@shobhituniversity.ac.in 9758749227
		2. Ms. Sumika Jain	sumika.jain@shobhituniversity.ac.in

Shobhit University
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Babu Vijendra Marg, Adarsh Institutional
Area Gangoh, Distt. Saharanpur (U.P.)
247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

			9456666326
21.	CRYPTOGRAPHY & INFORMATION SECURITY (CCSN 307)	External Examiner 1. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		2. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		3. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		Internal Examiner 1. Ms. Sumika Jain	sumika.jain@shobhituniversity.ac.in 9456666326
		2. Mr. Kuldeep Chauhan	kuldeep.chauhan@shobhituniversity.ac.in 9756997090
22.	CLOUD COMPUTING (CUCS 345)	External Examiner 1. Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192
		2. Dr. Mamta Bansal	mamta.bansal345@gmail.com 9997025606
		3. Dr. Arun Giri	arungiri123@yahoo.com 9818809053
		Internal Examiner 1. Dr. Tarun Kumar Sharma	tarun.sharma@shobhituniversity.ac.in 9456086759
		2. Mr. Varun Bansal	varun.bansal@shobhituniversity.ac.in 9675478559
23.	ENERGY STUDIES	External Examiner	dr.abhay@ritroorkee.ac.in

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional
Area Gangoh, Distt. Saharanpur (U.P.)
247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

	(CBSN 301)	1.Dr. Abhay Bhatia	9837386973
		2.Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192
		3. Dr. Mamta Bansal	mamta.bansal345@gmail.com 9997025606
		Internal Examiner 1. Dr. Mahipal Singh	registrargangh@shobhituniversity.ac.in 9759174581
		2. Dr. Shri Kant Gupta	shrikant.gupta@shobhituniversity.ac.in 8279909590
24.	SOFTWARE ENGINEERING LAB (CCSN 351	External Examiner 1. Dr. Arun Giri	arungiri123@yahoo.com 9818809053
		2. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		3. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		Internal Examiner 1. Dr. Tarun Kumar Sharma	tarun.sharma@shobhituniversity.ac.in 9456086759
		2. Mr. Varun Bansal	varun.bansal@shobhituniversity.ac.in 9675478559
25.	COMPILER DESIGN LAB (CCSN 353)	External Examiner 1. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		2. Dr. Maheep Singh	kingmaheep@gmail.com

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional
Area Gangoh, Distt. Saharanpur (U.P.)
247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

			9411293327
		3. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		Internal Examiner 1. Mr. Varun Bansal	varun.bansal@shobhituniversity.ac.in 9675478559
		2. Mr. Nitin Kumar	nitin.kumar@shobhituniversity.ac.in 9758170029
26.	OBJECT ORIENTED ANALYSIS AND DESIGN LAB (CCSN 355)	External Examiner 1. Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192
		2. Dr. Mamta Bansal	mamta.bansal345@gmail.com 9997025606
		3. Dr. Arun Giri	arungiri123@yahoo.com 9818809053
		Internal Examiner 1. Mr. Vinod Kumar	vinod.kumar@shobhituniversity.ac.in 9758749227
		2. Ms. Sumika Jain	sumika.jain@shobhituniversity.ac.in 9456666326
27.	ARTIFICIAL INTELLIGENCE (CCSN 401)	External Examiner 1. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192
		3. Dr. Mamta Bansal	mamta.bansal345@gmail.com

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional
Area Gangoh, Distt. Saharanpur (U.P.)
247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

			9997025606
		Internal Examiner 1. Ms. Sumika Jain	sumika.jain@shobhituniversity.ac.in 9456666326
		2. Mr. Anil Kumar	anil.joshi@shobhituniversity.ac.in 9690758787
28.	DISTRIBUTED COMPUTING SYSTEMS (CCSN 403)	External Examiner 1. Dr. Arun Giri	arungiri123@yahoo.com 9818809053
		2. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		3. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		Internal Examiner 1. Mr. Nitin Kumar	nitin.kumar@shobhituniversity.ac.in 9758170029
		2. Mr. Kuldeep Chauhan	kuldeep.chauhan@shobhituniversity.ac.in 9756997090
29.	ADVANCED COMPUTER SYSTEM ARCHITECTURE (CCSN 405)	External Examiner 1. Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192
		2. Dr. Mamta Bansal	mamta.bansal345@gmail.com 9997025606
		3. Dr. Arun Giri	arungiri123@yahoo.com 9818809053
		Internal Examiner	mohd.ahamad@shobhituniversity.ac.in

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Babu Vijendra Marg, Adarsh Institutional
Area Gangoh, Distt. Saharanpur (U.P.)
247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

		1. Mohd Ahamad	9548159750
		2. Mr. Hamid Ali	hamid.ali@shobhituniversity.ac.in 9759302770
30.	PYTHON (CCSN 415)	External Examiner 1. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		2. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		3. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		Internal Examiner 1. Mr. Vinod Kumar	vinod.kumar@shobhituniversity.ac.in 9758749227
		2. Mr. Kuldeep Chauhan	kuldeep.chauhan@shobhituniversity.ac.in 9756997090
31.	COMPUTER BASED NUMERICAL & STATISTICAL TECHNIQUES (CUCS 447)	External Examiner 1. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192
		3. Dr. Mamta Bansal	mamta.bansal345@gmail.com 9997025606
		Internal Examiner 1. Mr. Abdulla Khan	abdulla.khan@shobhituniversity.ac.in 7454976780
		2. Mr. Raveendra Kr. Bharati	raveendra.bharati@shobhituniversity.ac.in

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EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional
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247341. India
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E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

			9953328744
32.	LAW FOR ENGINEERS (CBSN 401)	External Examiner 1. Dr. Arun Giri	arungiri123@yahoo.com 9818809053
		2. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		3. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		Internal Examiner 1. Mr. Kuldeep Chauhan	kuldeep.chauhan@shobhituniversity.ac.in 9756997090
		2. Mr. Mahendra Kumar	mahendra.kumar@shobhituniversity.ac.in 9458432303
33.	ARTIFICIAL INTELLIGENCE LAB (CCSN 451)	External Examiner 1. Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192
		2. Dr. Mamta Bansal	mamta.bansal345@gmail.com 9997025606
		3. Dr. Arun Giri	arungiri123@yahoo.com 9818809053
		Internal Examiner 1. Ms. Sumika Jain	sumika.jain@shobhituniversity.ac.in 9456666326
		2. Mr. Anil Kumar	anil.joshi@shobhituniversity.ac.in 9690758787
34.	DISTRIBUTED	External Examiner	dr.abhay@ritroorkee.ac.in

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EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional
Area Gangoh, Distt. Saharanpur (U.P.)
247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

	COMPUTING SYSTEMS LAB (CCSN 453)	1. Dr. Abhay Bhatia	9837386973
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192
		3. Dr. Mamta Bansal	mamta.bansal345@gmail.com 9997025606
		Internal Examiner 1. Mr. Nitin Kumar	nitin.kumar@shobhituniversity.ac.in 9758170029
		2. Mr. Kuldeep Chauhan	kuldeep.chauhan@shobhituniversity.ac.in 9756997090
35.	SEMINAR & GROUP DISCUSSION (CCSN 481)	External Examiner 1. Dr. Arun Giri	arungiri123@yahoo.com 9818809053
		2. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		3. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		Internal Examiner 1. Dr. Tarun Kumar Sharma	tarun.sharma@shobhituniversity.ac.in 9456086759
		2. Dr. Mahipal Singh	registrargangh@shobhituniversity.ac.in 9759174581

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U: www.su.ac.in

SHOBHIT UNIVERSITY GANGOH
School of Engineering and Technology

Date: 09/12/2021

NOTICE

Subject: Meeting of the Board of Studies

All members of the Board of Studies are hereby informed that a meeting will be held as per the following details:

Date: 22/12/2021
Time: 10.00 AM
Venue: SOET, Shobhit University, Gangoh

Agenda:

1. Confirmation of minutes of the previous meeting
2. Approved Revision in Syllabus of B.Tech 2nd , 4th ,& 6th semester w. e. f. the academic session 2021-22
3. Analysis of the Students' feedback & Action taken report and Analysis of the feedback on curriculum from stakeholders
4. Approval of Examiners (Theory & Practical) and Paper Setters for the even semester courses in BCA, MCA, B.Tech & M.Tech for session **Jan. to June. 2022.**
5. Discussion on the value Added courses offered for students and ratification of the same.
6. Any other matter with the permission of the Chair

All members are requested to make it convenient to attend the meeting and come prepared with relevant documents and suggestions.

Prof.(Dr.) Tarun Kumar Sharma
Chairperson, Board of Studies
Head of the Department
09/12/2021

Shobhit University
EDUCATION EMPOWERS

Babu Vijendra Marg, Adarsh Institutional
Area Gangoh, Distt. Saharanpur (U.P.)
247341, India
Tel: +91 7830810052
E-mail:
U:

SHOBHIT UNIVERSITY GANGOH
School of Engineering and Technology

Date: 09/12/2021

To
Dr. Anil Lamba
Professor and Head
School of Computer Science and Application
Geeta University

Subject: Invitation to Attend the Board of Studies Meeting

Dear Sir

Greetings from School of Engineering and Technology

We are pleased to invite you to participate as an external subject expert in the upcoming meeting of the Board of Studies for the School of Engineering and Technology, scheduled as follows:

Date: 22/12/2021
Time: 10.00 AM
Mode: SOET, Shobhit University, Gangoh

The meeting will deliberate on important academic matters including syllabus revision, new course proposals, and academic planning for the upcoming session. Your expert insights and contributions would be invaluable to the academic enrichment of our programs.

We request you to kindly confirm your availability and mode of attendance at your earliest convenience. For online participation, a meeting link will be shared upon confirmation. If attending in person, necessary hospitality arrangements will be made.

We look forward to your positive response and support.

Thank you.

Warm regards,

Prof.(Dr.) Tarun Kumar Sharma
Chairperson, Board of Studies

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U.: www.sug.ac.in

SHOBHIT UNIVERSITY GANGOH
School of Engineering and Technology

Date: 09/12/2021

To
Dr. Amit Goyal
Professor and Head
School of Computer Science and Engineering
Chandigarh University

Subject: Invitation to Attend the Board of Studies Meeting

Dear Sir

Greetings from School of Engineering and Technology

We are pleased to invite you to participate as an external subject expert in the upcoming meeting of the Board of Studies for the School of Engineering and Technology, scheduled as follows:

Date: 22/12/2021
Time: 10.00 AM
Mode: SOET, Shobhit University, Gangoh

The meeting will deliberate on important academic matters including syllabus revision, new course proposals, and academic planning for the upcoming session. Your expert insights and contributions would be invaluable to the academic enrichment of our programs.

We request you to kindly confirm your availability and mode of attendance at your earliest convenience. For online participation, a meeting link will be shared upon confirmation. If attending in person, necessary hospitality arrangements will be made.

We look forward to your positive response and support.

Thank you.

Warm regards,

Prof.(Dr.) Tarun Kumar Sharma
Chairperson, Board of Studies

School of Engineering and Technology ★ Shobhit University Gangoh ★

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SHOBHIT UNIVERSITY GANGOH
School of Engineering and Technology

Date: 22/12/2021

Attendance Sheet (School of Engineering and Technology, BOS Meeting on 22/12/2021)

Sr. No	Name	External/Internal Member	Signature
1	Prof.(Dr.) Anil Lamba	External Expert	
2	Dr. Amit Goyal	External Expert	
3	Dr. Jasvir Singh Rana	Internal Member	
4	Mr. Anil Kumar	Internal Member	

Chairman

School of Engineering and Technology ★ Shobhit University Gangoh ★

Shobhit University
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School of Engineering & Technology

Date: 22.12.2021

Minutes of the Meeting of Board of Studies

18th meeting of the Board of Studies of the School of Engineering and Technology, Shobhit University Gangoh was organized on 22th Dec. 2021 at 10:00 am onwards. The following members were present in the meeting:

1.	Prof.(Dr.) Tarun Kumar Sharma Head of the Department (Computer Science and Engineering) Shobhit University Gangoh	Chairperson
2.	Prof.(Dr.) Anil Lamba Professor and Head School of Computer Science and Application Geeta University	External expert
3.	Dr. Amit Goyal Professor and Head School of Computer Science and Engineering Chandigarh University	External Expert
4.	Dr. Jasvir Singh Rana Associate Professor School of Engineering and Technology Shobhit University Gangoh	Member
5.	Mr. Anil Kumar Assistant Professor School of Engineering and Technology Shobhit University Gangoh	Member

Welcome address by Chairman
The Chairman extended a warm welcome to all the members of Board of Studies and the following information was tabled before the members of the Board of Studies:

Input given by the Subject Experts on the Scheme and syllabi of the ongoing Batches.

The following discussed and approved on Choice Based Credit System:

Item BOS 18.1: Approval of the Minutes of the 17th BOS Meeting held on 28 June 2021

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Was circulated among the members and the same were notified after the approval of the Board of Studies. {Annexure- 1}

Item BOS 18.2: Approval of Revision in Syllabus of B. Tech 2nd, 4th, & 6th semester w. e. f. the academic session 2021-22.

- **BOS approved Revision in Syllabus of B. Tech 2nd, 4th, & 6th semester {Annexure-2}**

Item BOS 18.3:Analysis of Students' feedback & Action taken report:

- BOS Chairman has expressed that the student feedback and action taken report process is done at the end of semester. The BOS members noted the same.

Item BOS 18.4: Analysis of the feedback on curriculum from stakeholders:

- The BOS chairman presented the analysis report of stakeholders' feedback on curriculum. The BOS members noted the same and advised to incorporate the suggestions as per the feasibility. The Action Taken Report is enclosed herewith. {Annexure-3}

Item BOS 18.5: Approval of Examiners (Theory & Practical) and Paper Setters for the even semester courses in BCA , MCA , B.Tech & M.Tech for the session **Jan. to June 2022**. The same is being sent to the Controller of Examinations, Shobhit University Gangoh, in a sealed cover. {Annexure-4}

Item BOS 18.6: Discussion on the Value Added courses offered for students and ratification of the same.

- BOS members approved the list of Value added courses offered to students.

The meeting ended with a vote of thanks to the Chairman, Board of Studies.

The suggestions given by the panel of BOS have been discussed with the Vice Chancellor and Dean Academics. The action taken on the suggestions has been approved by competent authorities.

Signed by:

(Chairman, BOS)

(Vice Chancellor)

(Dean Academics)

18th Meeting of BOS (Item No. 1 Annexure -1)

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EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
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U.: www.sug.ac.in

School of Engineering & Technology

Date: 28.06.2021

Minutes of the Meeting of Board of Studies

17th meeting of the Board of Studies of the School of Engineering and Technology, Shobhit University Gangoh was organized on 28th June 2021 at 10:00 am onwards. The following members were present in the meeting:

1.	Prof.(Dr.) Tarun Kumar Sharma Head of the Department (Computer Science and Engineering) Shobhit University Gangoh	Chairperson
2.	Prof.(Dr.) Anil Lamba Professor and Head School of Computer Science and Application Geeta University	External expert
3.	Dr. Amit Goyal Professor and Head School of Computer Science and Engineering Chandigarh University	External Expert
4.	Dr. Jasvir Singh Rana Associate Professor School of Engineering and Technology Shobhit University Gangoh	Member
5.	Mr. Anil Kumar Assistant Professor School of Engineering and Technology Shobhit University Gangoh	Member

Welcome address by Chairman

The Chairman extended a warm welcome to all the members of Board of Studies and the following information was tabled before the members of the Board of Studies:

Input given by the Subject Experts on the Scheme and syllabi of the ongoing Batches.

The following discussed and approved on Choice Based Credit System:

Item BOS 17.1: Approval of the Minutes of the 16th BOS Meeting held on 29 Dec.2020 Was circulated among the members and the same were notified after the approval of the Board of Studies. {Annexure- 1}

Shobhit University
EDUCATION EMPOWERS
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E-mail: registrar.gangoh@shobhituniversity.ac.in
U.: www.shobhituniversity.ac.in

Item BOS 17.2: Approval of Scheme & Syllabi of BCA 1st to 6th Semester updated w. e. f. the academic session 2021-22.

- **BOS approved Scheme & Syllabi of BCA 1st to 6th Semester {Annexure-2}**

Item BOS 17.3: Approval of the Scheme & Syllabi of MCA 1st to 4th Semester updated w. e. f. the academic session 2021-22.

- **BOS approved Scheme & Syllabi of MCA 1st to 4th Semester {Annexure-3}**

Item BOS 17.4: Approval of Syllabus update in B. Tech 1st,3rd, 5th & 7th semester w. e. f. the academic session 2021-22.

- **BOS members approved Syllabus update in B. Tech 1st,3rd, 5th & 7th semester {Annexure-4}**

Item BOS 17.5: Approval of the inclusion of Interdisciplinary course (CE-511D) in 1st semester of M. Tech

- **BOS members approved syllabus of Interdisciplinary course (CE-511D) in 1st semester of M. Tech. {Annexure-5}**

Item BOS 17.6: Approval of Examiners (Theory & Practical) and Paper Setters for the odd semester courses in BCA , MCA , B. Tech & M. Tech for session **July to Dec.. 2021**. The same is being sent to the Controller of Examinations, Shobhit University Gangoh, in a sealed cover. {Annexure-6}

Item BOS 17.7: Discussion on the Value Added courses offered for students and ratification of the same.

- BOS members approved the list of Value added courses offered to students.

The meeting ended with a vote of thanks to the Chairman, Board of Studies.

The suggestions given by the panel of BOS have been discussed with the Vice Chancellor and Dean Academics. The action taken on the suggestions has been approved by competent authorities.

Signed by:

(Chairman, BOS)

(Vice Chancellor)

(Dean Academics)

18th Meeting of BOS (Item No. 2 Annexure -2)

Shobhit University

EDUCATION EMPOWERS

Shobhit University, Gangoh

(Established by UP Shobhit University Act No. 3, 2012)

School of School of Engineering and Technology

Ordinances, Regulations & Syllabus

For

Bachelor of Engineering, Four Year Programme

Semester System

(w.e.f. session 2020-21)

Approved and adopted in the year 2021 (17th Meeting, Board of Studies)

TEACHING SCHEME OF B.TECH. 1ST YEAR (2ND SEMESTER)
W.E.F. Academic Session 2021-22

CODE	SUBJECT	CREDIT	L	T	P
CMAN-102	Mathematics-II	4	3	1	0
CMAN-102 A	Differential Equations				
CMAN-102 B	Probability and Statistics				
CMAN-102 C	Mathematical Logic				
CMAN-102 D	Differential Geometry				
CPHN -102	Engineering Physics	4	3	1	0
CPHN -102 A	Classical Mechanics				
CPHN -102 B	Electromagnetic Theory				
CPHN -102 C	Quantum Mechanics				
CPHN -102 D	Solid State Physics				
CCSN-102	Computer Fundamentals And Programming Using-C	4	3	1	0
CEEN-102	Basics of Electrical Engineering	4	3	1	0
CEEN-102 A	Circuit Theory				
CEEN-102 B	Electromagnetism				
CEEN-102 C	Digital Electronics				
CEEN-102 D	Electrical Measurements And Instrumentation				
CPCN-102	Technical Communication	3	3	0	0
CPCN-102 A	Business Communication				
CPCN-102 B	Presentation Skills				
CPCN-102 C	Digital Communication				
CPCN-102 D	Audience Analysis				
CPHN-152	Engineering Physics Lab	1	0	0	2
CPHN-152 A	Classical Mechanics Lab				
CPHN-152 B	Electromagnetic Theory Lab				
CPHN-152 C	Quantum Mechanics Lab				
CPHN-152 D	Solid State Physics Lab				
CCSN-152	Computer Programming Using C Lab	1	0	0	2
CEEN-152	Basic Electrical Engineering Lab	1	0	0	2
CEEN-152 A	Circuit Theory Lab				
CEEN-152 B	Electromagnetism Lab				
CEEN-152 C	Digital Electronics Lab				
CEEN-152 D	Electrical Measurements And Instrumentation Lab				
TOTAL		22	15	4	6

SHOBHIT UNIVERSITY, GANGOH (SAHARANPUR)

TEACHING SCHEME

W.E.F. Academic Session 2021-22

B. TECH. (COMPUTER SCIENCE & ENGINEERING)

IV semester

Code	Course Title	Cr.	L	T	P
CCSN-202	Object Oriented Programming Using C++	4	3	1	0
CCSN-204	Design and Analysis Of Algorithms	4	3	1	0
CCSN-206	Internet and Web Technology	4	3	1	0
CCSN-208	Computer Networks	4	3	1	0
CCSN-XXX	Professional Elective-Ii	4	3	1	0
CBSN-202 CBSN-202 A CBSN-202 B CBSN-202 C	Technical English Business Communication Technical Writing Intercultural Communication	2	2	0	0
CCSN-252	Object Oriented Programming Using C++ Lab	1	0	0	2
CCSN-254	Design and Analysis of Algorithms Lab	1	0	0	2
CCSN-256	Internet and Web Technology Lab	1	0	0	2
	Total	25	17	5	6

PROFESSIONAL ELECTIVE-II

1. CCSN 210 Formal Languages & Automation Theory
2. CCSN 212 Nano Sciences

INDUSTRIAL ENHANCEMENT ELECTIVE-I

1. CBSN-202 Technical English
2. CBSN-202 A Business Communication
3. CBSN-202 B Technical Writing
4. CBSN-202 C Intercultural Communication
5. CBSN-204 Operations Research

SHOBHIT UNIVERSITY, GANGOH (SAHARANPUR)

TEACHING SCHEME

W.E.F. Academic Session 2021-22

B. TECH. (COMPUTER SCIENCE & ENGINEERING)

VI Semester

Code	Course Title	Cr.	L	T	P
CCSN-302	Computer Graphics	4	3	1	0
CCSN-304	Data Warehousing & Data Mining	4	3	1	0
CCSN-306	Mobile Computing	4	3	1	0
CCSN-XXX	Professional Elective-IV	4	3	1	0
CUCS-XXX	Open Elective-II	4	3	1	0
CBSN-302 CBSN-302A CBSN-302B CBSN-302C	Environmental Studies Environmental Science Natural Resource Management Pollution Control	2	2	0	0
CCSN-352	Computer Graphics Lab	1	0	0	2
CCSN-354	Data Warehousing & Data Mining Lab	1	0	0	2
CCSN-356	Mini Project	1	0	0	2
	Total	25	17	5	6

PROFESSIONAL ELECTIVE-IV

1. CCSN 308 Knowledge Management & Expert System
2. CCSN 310 Embedded Computing Systems
3. CCSN 312 Simulation and Modeling
4. CCSN 314 Approximation of Algorithms

OPEN ELECTIVE-II

1. CUCS 342 Software Project Management
2. CUCS 344 Microwave Engineering
3. CUCS 346 Supply Chain Management-Planning
4. CUCS 348 Software Testing

VIII Semester

Code	Course Title	Cr.	L	T	P
CCSN-462	Internship and Report Presentation	20	0	0	40

Computer Graphics

CCSN 302

L	T	P	Cr
3	1	0	4

Course Outcomes:
At the end of this course, students will demonstrate the ability to:

1. Understand the fundamentals of computer graphics, including graphical input/output devices and algorithms for drawing primitives like lines, circles, and polygons.
2. Learn about 2D transformations such as translation, rotation, scaling, and shear, and how to apply composite transformations using homogeneous coordinates.
3. Study 2D viewing and clipping techniques, including window-to-viewport transformation and line and polygon clipping algorithms.
4. Explore 3D transformations, viewing techniques, and projections, along with curve and surface representation methods like Bezier and B-spline curves.
5. Learn about illumination models, visible surface detection methods, and surface rendering techniques, including basic ray tracing algorithms.

Unit – I
Fundamentals of Computer Graphics: Introduction, Area and Applications of computer Graphics, Graphical Input-Output Devices, Random scan displays, Raster scan displays. Cathode Ray Tube
GraphicsPrimitives: Algorithms for drawingvarious output primitives - Line, Circle, arcs &sectors, Polygon: PolygonRepresentation, Enteringpolygons, BoundaryFill& Flood Fillalgorithm

Unit – II
TwoDimensional Transformations: Introduction, Types of Transformation : Translation, Rotation, Scaling, Shear, Reflection, Homogenouscoordinate system, Composite transformations.

Unit – III
Viewing&Clippingin 2-D: 2D Windowing, Window to View port transformation, Line ClippingAlgorithms : Cohen Sutherland, LiangBarsky Line clippingalgorithms, Polygonclippingalgorithm : Sutherland Hodgeman,

Unit – IV
ThreeDimensional Transformation : 3-D geometry primitives, transformations. Viewing&Clipping: 3-D Viewing, Projections : Parallel and Perspective projections.
Curves&Surfaces: CurvedLines& surfaces, Interpolation & Approximation splines, Parametric&GeometricContinuity conditions, BezierCurves& surfaces, B-splinecurves& surfaces.

Unit – V

Illumination & Visible Surface DetectionMethods: : Classification of visible surface detectionalgorithms, Depth buffer method, Scan-line method, Depth-Sortingmethod, Subdivision Algorithm.
Illumination Models& Surface Rendering: Light sources, Light and Color, Phong Model, Surface Renderingmethods, Basic Ray tracingalgorithm.

Text Books:

1. Donald D Hearn, M. Pauline Baker, "Computer Graphics, C version", 2nd Edition,Pearson Education (1997).
2. James D. Foley, Andries van Dam, Steven K. Feiner, John F. Hughes, "Computer
3. Graphics: Principles & Practice in C", 2nd Edition, Addison Wesley Longman (1995).

Reference Books:

1. Donald Hearn and M Pauline Baker, "Computer Graphics with OpenGL", Pearsoneducation, 2004.
2. Zhigang Xiang, Roy A Plastock, "Computer Graphics", Schaums Outline, TMH(2007).
3. Dave Shreiner, Mason Woo, Jackie Neider, Tom Davis, "OpenGL ProgrammingGuide: The Official Guide to Learning OpenGL" (2013).

Data Warehousing & Data Mining

CCSN 304

L	T	P	Cr
3	1	0	4

Course Outcomes:
At the end of this course, students will demonstrate the ability to:

1. Understand the components and architecture of data warehousing, OLAP, and multidimensional data analysis.
2. Learn the processes involved in data mining, including preprocessing, data cleaning, integration, and transformation, and explore association rule mining.
3. Gain knowledge of classification and prediction techniques such as decision trees, Bayesian classification, SVMs, and performance evaluation metrics.
4. Explore clustering methods, including partitioning, hierarchical, density-based, and grid-based methods, as well as outlier analysis.
5. Study techniques for mining object, spatial, multimedia, text, and web data, along with multidimensional analysis and descriptive mining of complex data objects.

UNIT I
Data Warehousing and Business Analysis: - Data warehousing Components –Building a Data warehouse –Data Warehouse Architecture – DBMS Schemas for Decision Support – Data Extraction, Cleanup, and Transformation Tools –Metadata – reporting – Query tools and Applications – Online Analytical Processing (OLAP) – OLAP and Multidimensional Data Analysis.

UNIT II
Data Mining: - Data Mining Functionalities – Data Preprocessing – Data Cleaning – Data Integration and Transformation – Data Reduction – Data Discretization and Concept Hierarchy Generation- Architecture of A Typical Data Mining Systems- Classification Of Data Mining Systems.
Association Rule Mining: - Efficient and Scalable Frequent Item set Mining Methods – Mining Various Kinds of Association Rules – Association Mining to Correlation Analysis – Constraint-Based Association Mining.

UNIT III
Classification and Prediction: - Issues Regarding Classification and Prediction – Classification by Decision Tree Introduction – Bayesian Classification – Rule Based Classification – Classification by Back propagation – Support Vector Machines – Associative Classification – Lazy Learners – Other Classification Methods – Prediction – Accuracy and Error Measures – Evaluating the Accuracy of a Classifier or Predictor – Ensemble Methods – Model Section..

UNIT IV
Cluster Analysis: - Types of Data in Cluster Analysis – A Categorization of Major Clustering Methods – Partitioning Methods – Hierarchical methods – Density-Based Methods – Grid-Based Methods – Model-Based Clustering Methods – Clustering High-Dimensional Data – Constraint-Based Cluster Analysis – Outlier Analysis.

UNIT V

Mining Object, Spatial, Multimedia, Text and Web Data:

Multidimensional Analysis and Descriptive Mining of Complex Data Objects – Spatial Data Mining – Multimedia Data Mining – Text Mining – Mining the World Wide Web.

TEXT BOOKS

1. J. Han and M. Kamber, "Data Mining: Concepts and Techniques", Harcourt India /Morgan Kauffman, 2001. (UNITs 1 to IV)
2. Alex Berson and Stephen J. Smith, "Data Warehousing, Data mining and OLAP", Tata McGraw-Hill, 2004. (UNIT V)

REFERENCES

1. Margaret H. Dunham, "Data Mining: Introductory and Advanced Topics", Pearson Education, 2004.
2. Sam Anahory and Dennis Murry, "Data Warehousing in the Real World", Pearson Education, 2003.

Mathematics-I

CMAN-101

L	T	P	Cr
3	1	0	4

COURSE OBJECTIVES:.

The objectives of this course are to

1. Develop a strong foundation in matrix algebra, including matrix operations, eigenvalues, eigenvectors, and matrix diagonalization.
2. Understand and solve higher-order ordinary differential equations using various methods, including Euler-Cauchy and variation of parameters.
3. Learn numerical methods for solving ordinary differential equations, such as Picard's method and Euler methods.
4. Explore functions of several variables, including limits, differentiability, Jacobians, and Taylor's theorem.
5. Study series solutions of second-order linear differential equations and properties of Bessel functions and Legendre polynomials.

Course Outcomes:

At the end of this course, students will demonstrate the ability to:

1. Apply matrix algebra techniques to solve linear equations, calculate eigenvalues and eigenvectors, and understand matrix diagonalization.
2. Solve linear and simultaneous differential equations using various analytical methods like Euler-Cauchy and variation of parameters.
3. Implement numerical methods to solve ordinary differential equations and analyze the convergence of infinite series.
4. Evaluate functions of several variables, apply the chain rule, and find extrema using Taylor's theorem and Jacobians.
5. Solve second-order differential equations using series methods and understand the properties of Bessel functions and Legendre polynomials.

Unit-I

Matrix Algebra: Rank of a matrix, Inverse of a matrix by elementary operations; Solution of linear simultaneous equations and their numerical solutions by Gauss elimination , Eigenvalues and Eigenvectors of matrices by Cayley-Hamilton theorem; Diagonalisation of matrices; Orthogonal, Hermetian, Skew-Hermetian, Normal and Unitary matrices and their elementary properties.

Unit-II

Ordinary Differential Equations: Linear differential equation of nth order with constant coefficients, Simultaneous Linear differential equations, Euler-Cauchy equations, Solution of second order differential equations by change of dependent and independent variables; Method of variation of parameters for second order differential equations.

Unit-III

Numerical Solution of ODE: Picard's method, Taylor's series, Euler method & Modified Euler method. Definition of Sequence and series with example, Convergence of infinite series; Comparison test, Ratio test, Root test, Logarithmic test, De Morgan's test, Cauchy integral test.

Unit-IV

Functions of Several Variables: Limit cotinuity and differentiability of functions of two variables; Euler's theorem, Tangent plane and normal, Change of variables, Chain rule; Jacobians, Taylor's Theorem for two variables; Extrema of functions of two or more variables.

Unit-V

Solution in Series: Solution in series of second order linear differential equations with polynomial coefficients; Bessel and Legendre equations and their series solutions; Properties of Bessel functions and Legendre polynomials.

Reference Books :

1. Kreyszig, E. *Advanced Engineering Mathematics*. 8th Edition. Wiley Eastern, 2004.
2. Grewal, B.S. *Engineering Mathematics*. 39th Edition. Khanna Publishers, 2005.

Mathematics

CMAN-101 A

L	T	P	Cr
3	1	0	4

Course Outcomes:
At the end of this course, students will demonstrate the ability to:
1. Apply basic mathematical principles to real-world problems.
2. Develop problem-solving techniques using algebra and calculus.
3. Utilize theorems and formulas to solve mathematical problems.
4. Analyze data with statistical and probabilistic methods.
5. Use mathematical software for complex problem-solving and visualization.

Unit 1: Calculus
Functions, Limits, and Continuity: Definitions, limit laws, and continuity.
Differentiation: Differentiation of functions, product and quotient rules, chain rule, higher-order derivatives.
Applications of Differentiation: Tangents and normals, maxima and minima, optimization problems, curve sketching.
Integration: Definite and indefinite integrals, techniques of integration (substitution, integration by parts), improper integrals.
Applications of Integration: Area under curves, volumes of solids of revolution.

Unit 2: Linear Algebra

Matrices and Determinants: Basic operations, types of matrices, determinants, properties.
System of Linear Equations: Gaussian elimination, inverse of a matrix, rank of a matrix, consistency of linear systems.
Eigenvalues and Eigenvectors: Definitions, properties, diagonalization, Cayley-Hamilton theorem, applications to systems of differential equations.
Vector Spaces: Subspaces, linear independence, basis, and dimension.

Unit 3: Ordinary Differential Equations

First-order Differential Equations: Separable equations, exact equations, integrating factors, applications (growth models, electrical circuits).
Second and Higher-order Differential Equations: Solutions of linear differential equations, homogeneous and non-homogeneous equations, method of undetermined coefficients, variation of parameters.
Applications: Mechanical vibrations, electrical networks, and other physical applications.

Unit 4: Vector Calculus

Vector Functions: Differentiation and integration of vector functions, gradient, divergence, and curl.
Line, Surface, and Volume Integrals: Green's theorem, Stokes' theorem, and Gauss's divergence theorem.
Applications: Fluid flow, electromagnetism, and potential fields.

Unit 5: Probability and Statistics

Probability Theory: Basics of probability, conditional probability, independent events, Bayes' theorem.
Random Variables: Discrete and continuous random variables, probability density function (PDF), cumulative distribution function (CDF), and expectation.
Probability Distributions: Binomial, Poisson, and Normal distributions, applications to engineering problems.
Statistics: Measures of central tendency (mean, median, mode), measures of dispersion (variance, standard deviation), hypothesis testing, confidence intervals.

Recommended Textbooks:

1. Advanced Engineering Mathematics by Erwin Kreyszig, 11th Edition, Wiley, 2020.
2. Higher Engineering Mathematics by B.S. Grewal, 44th Edition, Khanna Publishers, 2022.
3. Linear Algebra and Its Applications by David C. Lay, 6th Edition, Pearson, 2021.
4. Introduction to Probability and Statistics for Engineers and Scientists by Sheldon M. Ross, 6th Edition, Academic Press, 2020.
5. Differential Equations and Boundary Value Problems: Computing and Modeling by C.H. Edwards and David E. Penney, 6th Edition, Pearson, 2018

Basic Mathematics

L	T	P	Cr
3	1	0	4

CMAN-101 B

Course Outcomes:
At the end of this course, students will demonstrate the ability to:

1. Understand fundamental mathematical operations and principles.
2. Solve basic algebraic equations and expressions.
3. Perform arithmetic calculations with accuracy.
4. Interpret and solve simple geometric problems.
5. Apply basic mathematical concepts to everyday situations.

Unit 1: Algebra

Polynomials: Degree, factorization, roots of polynomials, quadratic equations, and their applications.
Arithmetic and Geometric Progressions: Definitions, nth term, sum of series, applications in engineering.
Binomial Theorem: Expansion, general term, and applications.
Logarithms: Properties of logarithms, solving logarithmic equations, applications.

Unit 2: Trigonometry

Trigonometric Functions: Definitions, identities, and equations.
Inverse Trigonometric Functions: Domains, ranges, and basic properties.
Trigonometric Equations: General solutions, applications to physical problems.
Applications of Trigonometry: Heights and distances, simple harmonic motion, and waves.

Unit 3: Coordinate Geometry

Straight Lines: Equation of a line in different forms, slope, angle between two lines, distance formula, applications.
Circles: Standard equation, tangents and normals, intersection of a circle with a line.
Conic Sections: Parabola, ellipse, and hyperbola - standard equations and simple properties.
Applications in Engineering: Modelling of trajectories and orbits, structural designs.

Unit 4: Calculus

Limits and Continuity: Concept of a limit, properties of limits, continuity of a function.
Differentiation: Basic rules, derivatives of standard functions, product rule, quotient rule, chain rule.
Applications of Differentiation: Rate of change, maxima and minima, curve sketching.
Integration: Basic rules of integration, integration of standard functions, definite and indefinite integrals.

Applications of Integration: Area under curves, volumes of revolution, and simple applications in physics.

Unit 5: Probability and Statistics

Probability Basics: Definitions, sample space, events, conditional probability, independence, and Bayes' theorem.
Random Variables: Discrete and continuous, probability mass function (PMF), probability density function (PDF), cumulative distribution function (CDF).
Descriptive Statistics: Measures of central tendency (mean, median, mode), measures of dispersion (variance, standard deviation).
Basic Probability Distributions: Binomial, Poisson, and normal distributions.
Introduction to Hypothesis Testing: Null and alternative hypotheses, significance levels, z-tests and t-tests.

Recommended Textbooks:

1. Basic Engineering Mathematics by John Bird, 8th Edition, Routledge, 2021.
2. Engineering Mathematics by K.A. Stroud and Dexter Booth, 8th Edition, Palgrave Macmillan, 2020.
3. College Algebra and Trigonometry by Margaret Lial, John Hornsby, David Schneider, 7th Edition, Pearson, 2021.
4. Introduction to Probability and Statistics for Engineers and Scientists by Sheldon M. Ross, 6th Edition, Academic Press, 2020.
5. Calculus: Early Transcendentals by James Stewart, 9th Edition, Cengage Learning, 2020.

Applied Mathematics

CMAN-101 C

L	T	P	Cr
3	1	0	4

Course Outcomes:
At the end of this course, students will demonstrate the ability to:

1. Apply mathematical methods to solve real-world engineering problems.
2. Use differential equations to model and analyze dynamic systems.
3. Implement optimization techniques for resource allocation and decision-making.
4. Apply numerical methods to solve complex mathematical problems.
5. Utilize statistical tools to analyze and interpret data in applied contexts.

Unit 1: Advanced Calculus

Partial Differentiation: Functions of several variables, total derivatives, chain rule, Jacobians.
Taylor's Theorem for Multivariable Functions: Expansion of functions in two variables.
Maxima and Minima of Functions of Several Variables: Lagrange multipliers method and applications.
Multiple Integrals: Double and triple integrals, applications to area, volume, and center of mass.
Applications of Calculus: Engineering problems involving optimization, mass distribution, and fluid mechanics.

Unit 2: Ordinary and Partial Differential Equations

First-Order Differential Equations: Separable, exact, and linear equations, applications in mechanics and electrical circuits.
Higher-Order Differential Equations: Solutions of linear differential equations with constant coefficients, method of undetermined coefficients, and variation of parameters.
Partial Differential Equations (PDEs): Classification, method of separation of variables, wave equation, heat equation, and Laplace equation.
Applications: Mechanical vibrations, heat conduction, and fluid flow analysis.

Unit 3: Numerical Methods

Roots of Equations: Bisection method, Newton-Raphson method, and secant method.
Numerical Integration: Trapezoidal rule, Simpson's rule, and Gaussian quadrature.
Numerical Solutions to ODEs: Euler's method, Runge-Kutta methods (2nd and 4th order).
Finite Difference Methods for PDEs: Forward and backward difference methods, Crank-Nicolson method.
Applications: Numerical simulations in engineering problems such as heat transfer and structural analysis.

Unit 4: Complex Variables and Complex Analysis

Complex Numbers and Functions: Basic properties of complex numbers, polar form, complex functions, and their derivatives.
Analytic Functions: Cauchy-Riemann equations, harmonic functions, conformal mapping.
Complex Integration: Cauchy's theorem, Cauchy's integral formula, Taylor and Laurent series, residue theorem, and its applications.
Applications in Engineering: Fluid dynamics, electromagnetic fields, and signal processing.

Unit 5: Fourier Series and Laplace Transforms

Fourier Series: Periodic functions, Fourier series expansions, half-range expansions, and applications in engineering (signal processing, vibrations).
Laplace Transforms: Definition and properties, inverse Laplace transforms, solving ordinary differential equations using Laplace transforms.
Applications of Fourier Series and Laplace Transforms: Solution of heat, wave, and Laplace equations, control systems, and circuit analysis.

Recommended Textbooks:

1. Advanced Engineering Mathematics by Erwin Kreyszig, 11th Edition, Wiley, 2020.
2. Applied Mathematics for Engineers and Physicists by L.A. Pipes and L.R. Harvill, 4th Edition, Dover Publications, 2014.
3. Numerical Methods for Engineers by Steven C. Chapra and Raymond P. Canale, 8th Edition, McGraw-Hill, 2020.
4. Complex Variables and Applications by James Ward Brown and Ruel V. Churchill, 9th Edition, McGraw-Hill, 2021.
5. Fourier Analysis and Its Applications by Gerald B. Folland, 2nd Edition, American Mathematical Society, 2020.

Advanced Applied Mathematics

CMAN-101 D

L	T	P	Cr
3	1	0	4

Course Outcomes:
At the end of this course, students will demonstrate the ability to:

1. Solve complex partial differential equations in physical and engineering problems.
2. Apply advanced numerical methods for simulations and approximations.
3. Model and analyze systems using advanced optimization techniques.
4. Use advanced statistical methods for data analysis and prediction.
5. Implement mathematical theories in the analysis of complex real-world scenarios.

Unit 1: Optimization Techniques

Linear Programming: Formulation, graphical method, simplex method, duality, sensitivity analysis.
Non-Linear Programming: Introduction to non-linear optimization, Lagrange multipliers, Kuhn-Tucker conditions.
Dynamic Programming: Bellman's principle of optimality, recursive equations, applications to inventory control, resource allocation.
Applications: Optimization problems in engineering, project management, and operations research.

Unit 2: Advanced Numerical Methods

Interpolation and Extrapolation: Newton's forward and backward interpolation, Lagrange interpolation, spline interpolation.
Numerical Solutions to Nonlinear Systems: Fixed-point iteration, Newton's method for systems of equations.
Numerical Methods for ODEs and PDEs: Higher-order Runge-Kutta methods, finite element method (FEM), finite volume method (FVM).
Error Analysis and Stability: Concepts of error, stability, and convergence in numerical methods.
Applications: Numerical simulation of fluid dynamics, structural analysis, and heat transfer.

Unit 3: Integral Transforms

Fourier Transform: Fourier integrals, Fourier cosine and sine transforms, properties and applications to PDEs.
Laplace Transform: Review of Laplace transforms, inverse Laplace transforms, convolution theorem, application to ODEs and PDEs.

Z-Transform: Introduction, properties, inverse Z-transform, application in discrete-time systems and digital signal processing.
Applications: Signal processing, control systems, electrical circuits, and mechanical vibrations.

Unit 4: Special Functions

Gamma and Beta Functions: Definitions, properties, and applications in engineering problems.
Bessel Functions: Bessel's equation, Bessel functions of the first and second kinds, applications in vibration and heat conduction problems.
Legendre Polynomials: Legendre's equation, generating functions, orthogonality, applications in potential theory and electrostatics.
Applications: Solutions to boundary value problems in cylindrical and spherical coordinates.

Unit 5: Integral Equations and Calculus of Variations

Integral Equations: Volterra and Fredholm integral equations, kernel functions, methods of solving integral equations, applications.
Green's Function: Application of Green's function to solve boundary value problems.
Calculus of Variations: Euler-Lagrange equation, isoperimetric problems, Hamilton's principle, applications to mechanics and engineering.
Applications: Structural mechanics, fluid dynamics, and electrostatics.

Recommended Textbooks:

1. Advanced Engineering Mathematics by Erwin Kreyszig, 11th Edition, Wiley, 2020.
2. Numerical Methods for Engineers by Steven C. Chapra and Raymond P. Canale, 8th Edition, McGraw-Hill, 2020.
3. Applied Mathematical Methods by J. David Logan, 4th Edition, Wiley, 2018.
4. Introduction to Optimization by Pablo Pedregal, 3rd Edition, Springer, 2021.
5. Special Functions for Scientists and Engineers by W.W. Bell, 2nd Edition, Dover Publications, 2014.

Engineering Mechanics

CMEN 101

L	T	P	Cr
3	1	0	4

Course Outcomes:

At the end of this course, students will demonstrate the ability to:

1. Understanding of basic concepts in two-dimensional force systems and their application in analyzing concurrent and non-concurrent forces.
2. Ability to determine shear force and bending moment diagrams for statically determinate beams and analyze simple trusses using joint and section methods.
3. Knowledge of stress and strain, including the effects of normal and shear stresses, strain energy, and bending in beams and torsion in circular sections.
4. Proficiency in calculating centroids, moments of inertia for plane areas, and using theorems for composite bodies and mass moment of inertia.
5. Understanding of key thermodynamic principles such as laws of thermodynamics, entropy, and the Carnot cycle, along with their applications in energy analysis.

UNIT-I

Two Dimensional Force Systems: Basic concepts, Laws of motion, Principle of Transmissibility of forces, Resultant of a force system, Simplest Resultant of Two dimensional concurrent and Non-concurrent Force systems, Lami's Theorem, Distributed force system, Free body diagrams, Types of supports- Support reactions for beams with different types of loading- Concentrated, uniformly distributed and uniformly varying loading.

UNIT-II

Beam: Introduction, Shear force and Bending Moment, Shear force and Bending Moment Diagrams for StaticallyDeterminateBeams
Trusses: Introduction, Simple Truss and Solution of Simple truss, Method f Joints and Method of
Sections.

UNIT-III

Simple stress and strain: Normal and shear stresses. One Dimensional Loading; members of varying cross section, bars in series. Tensile Test diagram for ductile and brittle materials, Elastic constants, Strain energy. Bending of Beams: theory of pure bending, neutral surface and neutral axis, stresses in beams of different cross sections. Theory of Torsion, Torque and twist, Shear stress due to torsion circular sections.

UNIT-IV

Centroid and Moment of Inertia: Centroid of plane, curve, area and composite bodies, Moment of inertia of plane area, Parallel Axes Theorem, Perpendicular axes theorems, Mass Moment of Inertia

Unit-V

Engineering Thermodynamics: Thermodynamic system, Surrounding and the Universe, Control volume phase, Macroscopic & microscopic point of view, Thermodynamic equilibrium, Thermodynamic properties, State path process, Cyclic process, Laws of thermodynamics, Carnot cycle, Clausius inequality, Enthalpy and entropy, Principle of entropy increase.

References:

1. "Engineering Mechanics: Statics" , J.L Meriam , Wiley
2. "Engineering Mechanics: Dynamics" , J.L Meriam , Wiley
3. "Engineering Mechanics " , F L Singer
4. "Engineering Mechanics : Statics and Dynamics", R. C. Hibbler, Pearson
5. "Engineering Mechanics " , Thimoshenko& Young , 4ed, Tata McGraw Hill
6. "Engineering Mechanics: Statics and Dynamics", A. Nelason, McGraw-Hill
7. "Engineering Mechanics : Statics and Dynamics", Shames and Rao, Pearson
8. "Engineering Mechanics : Statics and Dynamics", S. Rajasekaran and G. Sankarasubramanian, Vikas
9. "Engineering Mechanics", V. Jayakumar and M. Kumar, PHI
10. "Engineering Mechanics", D. P. Sharma, PHI
11. "Engineering Mechanics", M. V. Sheshagiri Rao, and D. Rama Durgaiah, University Press.
12. "Engineering Mechanics" , K L Kumar and V. Kumar, McGraw Hill
13. "Engineering Mechanics" , Bhattacharya , Oxford Press
14. "Engineering Mechanics " , Dr Sadhu Singh , Umesh Publications
15. "Engineering Mechanics " , Bhavikatti , New Age

Structural Analysis

CMEN-101 A

L	T	P	Cr
3	1	0	4

Course Outcomes:
At the end of this course, students will demonstrate the ability to:

1. Analyze forces and moments in static structures.
2. Apply principles of equilibrium to solve structural problems.
3. Calculate deformations and displacements in structures.
4. Evaluate the stability and strength of structures under various loads.
5. Use advanced methods for analyzing complex structural systems.

UNIT I

Fundamentals of Statically Determinate Structures
Types of statically determinate & indeterminate structures, static and kinematic indeterminacy, stability of structures, principle of superposition, Maxwell's reciprocal theorems. Framed structure : Computation of internal forces in statically determinate framed structures such as plane truss, plane frame, grids.

UNIT II

Strain energy & Displacement of Statically Determinate structures
Strain Energy : Resilience, strain energy due to axial loads & flexure, proof resilience, modulus of resilience, impact loads, and sudden loads Displacement : Differential equation of elastic curve, relation between moment, slope and deflection, Displacement of beam by Macaulay's method

UNIT III

Direct and Bending stresses + Column & Struts
Direct and Bending stresses Members subjected to eccentric loads, middle third rule, kernel of Section, stress distribution. Applications of Direct & Bending stresses.Columns and Struts ,Buckling of columns, different end conditions, effective length, Least radius of gyration Applications: Euler's and Rankine's formulae,

UNIT IV

Statically Indeterminate beam
Types of statically indeterminate beams, Consistent Deformation Method, Basic principles for fixed beam, basics of moment distribution Method.Propped Cantilever beam : Analysis of propped cantilever beams. Fixed beam : Computation of fixed-end actions for various types of loads And secondary effects using basic principles, beams of varying moment of Inertia. Continuous beams

UNIT V

Computer Applications in Structural Engg. (for Laboratory Only)
Use of professional software such as STAAD-Pro, SAP, ETABS etc. for Determining response of frames structure of the topics related to this course

Reference Books:

1. Junarkar S.B. & Shah H.J.; Mechanics of Structures Vol-I; Charter publishing house, Anand
2. Wang. C.K., Intermediate Structural analysis. Tata McGraw Hill book Company.Delhi

Rigid Body Mechanics

CMEN-101 B

L	T	P	Cr
3	1	0	4

Course Outcomes:
At the end of this course, students will demonstrate the ability to:

1. Apply the principles of force and motion to rigid body systems.
2. Analyze the equilibrium of rigid bodies under applied forces and moments.
3. Solve problems involving the kinematics and kinetics of rigid bodies.
4. Use the concepts of angular velocity and acceleration in rigid body motion.
5. Apply energy methods to analyze work and power in rigid body systems.

UNIT I

Introduction to Rigid Body Mechanics
Definition and importance of rigid body mechanics. Basic concepts (position, displacement, velocity, acceleration). Reference frames (inertial, non-inertial). Rigid body idealization and modeling

UNIT II

Kinematics of Rigid Bodies
Translation, rotation, and general motion. Angular displacement, velocity, and acceleration. Euler's angles and rotation matrices. Relative motion and velocity analysis

UNIT III

Kinetics of Rigid Bodies
Newton-Euler equations. Angular momentum and moment of inertia. Work-energy principle and conservation of energy. Impulse-momentum principle

UNIT IV

Planar Motion of Rigid Bodies
. Planar kinematics and kinetics. Equations of motion (translation, rotation). Force and moment analysis. Application to linkages, gears, and cams

UNIT V

Three-Dimensional Motion of Rigid Bodies
3D kinematics and kinetics.Euler's equations and angular velocity. Gyroscopic motion and precession. Application to rotating shafts and machinery.Vibrations and Oscillations

Textbook Recommendations:
1. Hibbeler, R. C.Engineering Mechanics: Dynamics. 14th ed.
2. Bedford, A., & Fowler, W. . Engineering Mechanics: Statics & Dynamics. 6th ed. McGraw-Hill.

Fluid Mechanics

CMEN -101C

L	T	P	Cr
3	1	0	4

Course Outcomes:
At the end of this course, students will demonstrate the ability to:

1. Understand the properties and behavior of fluids at rest and in motion.
2. Apply principles of fluid statics and dynamics to solve engineering problems.
3. Analyze fluid flow using Bernoulli's equation and conservation laws.
4. Study the effects of viscosity and turbulence on fluid flow.
5. Use dimensional analysis to solve and scale fluid mechanics problems.

UNIT I
INTRODUCTION
Units & Dimensions. Properties of fluids - Specific gravity, specific weight, viscosity, compressibility, vapour pressure and gas laws capillarity and surface tension concepts of system, energy equation, momentum equation

UNIT II
FLOW THROUG CIRCULAR CONDUITS
Laminar flow though circular conduits and circular annuli. Boundary layer concepts. Boundary layer thickness. Hydraulic and energy gradient. Darcy Weisbach equation. Friction factor and Moody diagram. Commercial pipes. Minor losses. Flow though pipes in series and in parallel.

UNIT III
DIMENSIONAL ANALYSIS
Dimension and units: Buckingham's II theorem Discussion on dimensionless parameters. Models and similitude. Applications of dimensionless parameters.

UNIT IV
ROTO DYNAMIC MACHINES
Homologus units. Specific speed. Elementary cascade theory. Theory of turbo machines. Euler's equation. Hydraulic efficiency. Velocity components at the entry and exit of the rotor.radial flow and axial flow machines. Centrifugal pumps, turbines,

UNIT V
POSITIVE DISPLACEMENT
Recriprocating pumps, Indicator diagrams, Work saved by air vessels. Rotory pumps.

REFERENCES BOOKS
1. S. Fluid Mechanics, Hydraulics and Fluid Machines, DhanpatRai
2. Bansal, R.K., Fluid Mechanics and Hydraulics Machines, Laxmi Publications

Free Body Diagram Mechanics

CMEN-101 D

L	T	P	Cr
3	1	0	4

Course Outcomes:
At the end of this course, students will demonstrate the ability to:

1. Identify and represent forces acting on a body in a free-body diagram.
2. Apply equilibrium conditions to solve for unknown forces and moments.
3. Understand the role of support reactions and external loads in a system.
4. Analyze structures by breaking them down into individual components.
5. Use free-body diagrams to visualize and solve static and dynamic problems.

UNIT I

Introduction to Free Body Diagrams
Definition and importance of free body diagrams Basic concepts (forces, moments, torques) Drawing free body diagrams Identifying support reactions

UNIT II

Equilibrium of Particles and Rigid Bodies
Equilibrium equations (2D, 3D) Force and moment analysis Application to simple machines (levers, pulleys.) Center of gravity and center of mass; Moments and force

UNIT III

Force in Beams and Frames
Beam analysis (simply supported, cantilever). Frame analysis (simple, compound). Force and moment diagrams. Application to structural systems

UNIT IV

Torques and Rotational Equilibrium
Torque and rotational equilibrium. Application to gears, pulleys, and shafts. Rotational kinematic Angular momentum.

UNIT V

Stress and Strain Analysis
Introduction to stress and strain. Axial loading Torsional loading. Bending and shear stress
Textbook Recommendations:
1. Hibbeler, R. C. (2020). Engineering Mechanics: Statics & Dynamics. 14th ed. Pearson.
2. Beer, J. P., & Johnston, E. R. (2020). Mechanics of Materials. 8th ed. McGraw-Hill.

Fundamentals of Electronics

CECN-101

L	T	P	Cr
3	1	0	4

COURSE OBJECTIVES:

The objectives of this course are to

1. Understand the working principles of semiconductor diodes, their characteristics, and practical applications.
2. Learn the construction, operation, and configurations of Bipolar Junction Transistors (BJTs) and Field Effect Transistors (FETs).
3. Explore the basics and practical applications of Operational Amplifiers in analog circuits.
4. Master digital electronics concepts, including Boolean algebra, K-map minimization, and gate simplifications.
5. Gain knowledge of communication systems, focusing on modulation techniques and wireless communication technologies.

Course Outcomes:

At the end of this course, students will demonstrate the ability to:

1. Describe the concept of PN Junction and devices.
2. Explain the concept of BJT, FET and MOFET.
3. Apply the concept of Operational amplifier to design linear and non-linear applications.
4. Perform number systems conversions, binary arithmetic and minimize logic functions.
5. Describe the fundamentals of communication technologies.

UNIT-I

Semiconductor Diode: Depletion layer, V-I characteristics, ideal and practical Diodes, Diode Equivalent Circuits, Zener Diodes breakdown mechanism (Zener and avalanche)

Diode Application: Diode Configuration, Half and Full Wave rectification, Clippers, Clampers, Zener diode as shunt regulator, Voltage-Multiplier Circuits

Special Purpose two terminal Devices: Light-Emitting Diodes, Photo Diodes, Varactor Diodes. Tunnel Diodes.

UNIT-II

Bipolar Junction Transistor: Transistor Construction, Operation, Amplification action. Common Base, Common Emitter, Common Collector Configuration

Field Effect Transistor: Construction and Characteristic of JFETs. Transfer Characteristic. MOSFET (MOS) (Depletion and Enhancement) Type, Transfer Characteristic.

UNIT-III

Operational Amplifiers: Introduction, Op-Amp basic, Practical Op-Amp Circuits (Inverting Amplifier, Non-inverting Amplifier, Unit Follower, Summing Amplifier, Integrator, Differentiator).Differential and Common-Mode Operation, Comparators.

UNIT-IV

Digital Electronics: Number system & representation, Binary arithmetic, Introduction of Basic and Universal Gates, using Boolean algebra simplification of Boolean function. K Map Minimization upto 6 Variables.

UNIT-V

Fundamentals of Communication Engineering: Basics of signal representation and analysis, Electromagnetic spectrum Elements of a Communication System, Need of modulation and typical applications, Fundamentals of amplitude modulation and demodulation techniques.

Introduction to Wireless Communication: Overview of wireless communication, cellular communication, different generations and standards in cellular communication systems, Fundamentals of Satellite & Radar Communication.

Text Books:

1. Robert L. Boylestand / Louis Nashelsky "Electronic Devices and Circuit Theory", Pearson Education.
2. George Kennedy, "Electronic Communication Systems", McGrawPublication
3. David A. Bell, "Electronic Devices and Circuits", Oxford UniversityPress.
4. Jacob Millman, C.C. Halkias, StayabrataJit, "Electronic Devices and Circuits", McGrawHill.
5. A. Anand Kumar, "Fundamental of Digital Circuits," PHI 4th edition, 2018.

Analog Electronics

CECN-101 A

L	T	P	Cr
3	1	0	4

Course Outcomes:
At the end of this course, students will demonstrate the ability to:

1. Analyze and design basic analog circuits using resistors, capacitors, and inductors.
2. Understand the operation of diodes, transistors, and operational amplifiers in analog circuits.
3. Apply filtering techniques in analog signal processing.
4. Design and analyze amplifiers for various applications.
5. Use frequency response analysis to understand circuit behavior in the frequency domain.

Unit-I

Bipolar Junction Transistors: Transistor amplifier, small signal Equivalent circuits (Hybrid-pi model), Graphical Analysis, biasing the BJT for discrete-circuit design, Basic Single Stage BJT amplifier configurations.

Unit-II

MOSFETS: Construction of Enhancement and Depletion mode MOSFET, Drain & Transfer characteristics, Internal capacitances of MOSFET, MOSFET as an amplifier, Biasing in MOS amplifier circuits, Basic configurations of MOS amplifier, Analysis of Source follower.

Unit-III

Frequency Response: BJT internal capacitances and high frequency model, frequency response
of CE amplifier, MOSFET internal capacitances and high frequency model, frequency response of CS amplifier.

Unit-IV

Feed Back: Properties of negative feedback, four basic feedback topologies (series shunt; series-series; shunt-shunt; & shunt-series) determination of Loop gain

Unit-V

Oscillators: Basic principles of sinusoidal oscillator Different oscillator circuits (RC phase shift, Wein-bridge, Collpitts, Hartley, Clap. and Crystal Oscillators.)

Reference Books:

1. A.S. Sedra and K.C. Smith, "Microelectronic circuits", Oxford University Press (India).
2. Boylestad&Nashelsky "Electronic Device and Circuit."
3. Millman, J. and Grabel, A./"Microelectronics"/McGraw Hill.
4. Bell, David A/ "Electronic Devices & Circuits"/Prentice Hall (India) 4th Edition

Digital Electronics

CECN-101 B

L	T	P	Cr
3	1	0	4

Course Outcomes:
At the end of this course, students will demonstrate the ability to:

1. Understand the principles of binary systems and digital logic.
2. Design and analyze combinational and sequential logic circuits.
3. Apply Boolean algebra to simplify digital circuits.
4. Implement digital circuits using gates, flip-flops, and registers.
5. Use counters and shift registers in digital systems for data storage and processing.

Unit-I

Introduction: Types of Digital circuits and their characteristics, Number system: Direct conversion between bases, Negative numbers & BCD and their arithmetic's, Boolean algebra, Logic gates, Minimization of Boolean Functions: K-Map & Tabular method, Error detecting & correcting codes, hamming codes.

Unit-II

Combinational Logic Circuits: Design Procedure, Adders, Subtractors, Code conversion, Multiplexers/ Demultiplexers, Encoder/ decoders, decimal adders & amplitude comparators. Decoder and driver circuits for 7-segment LED displays.

Unit-III

Sequential Logic Circuits: Flip–Flops and their conversions, excitation table, state table & state diagram, state reduction, Shift registers and their applications. Design of synchronous and asynchronous counters.

Unit-IV

Memory and Programmable Logic: RAM, Types of RAM. ROM, Types of ROM. Programmable Logic Device (PLD), Programmable Logic Array(PLA),Programmable Array Logic(PAL).

Unit-V

Asynchronous Sequential Logic: Analysis procedure, circuit with latches, design procedure, reduction of state and flow table, race free state assignment, hazards.

Reference Books :

1. Digital Design by M Moris Mano, 2nd Edn.PHI
2. Introduction to Digital Microelectronic Circuits, by Gopalan, TMH.
3. Switching Circuit & Logic Design by Hill & Peterson, Wiley
4. Digital Circuit & Logic Design, by Holsworth.

Electrical Measurement & Instrumentation

CECN-101 C

L	T	P	Cr
3	1	0	4

Course Outcomes:
At the end of this course, students will demonstrate the ability to:

1. Use various electronic instruments to measure voltage, current, and resistance.
2. Calibrate and test electronic components for proper functionality.
3. Understand the principles of oscilloscopes, multimeters, and signal generators.
4. Perform frequency analysis and signal waveform testing.
5. Analyze and troubleshoot electronic circuits using measurement tools.

UNIT I

Measuring Instruments: Classification , deflecting, control and damping torques , Ammeters and Voltmeters , PMMC, moving iron type instruments , expression for the deflecting torque and control torque , Errors and compensations, extension of range using shunts and series resistance. Electrostatic Voltmeters-electrometer type and attracted disc type Extension of range of E.S. Voltmeters.

Instrument transformers: CT and PT – Ratio and phase angle errors , design considerations Type of P.F. Meters – dynamometer and moving iron type 1-ph and 3-ph meters , Frequency meters , resonance type and Weston type , synchroscopes.

UNIT II

Measurement of Power: Single phase dynamometer wattmeter, LPF and UPF, Double element and three element dynamometer wattmeter, expression for deflecting and control torques , Extension of range of wattmeter using instrument transformers , Measurement of active and reactive powers in balanced and unbalanced systems.

UNIT III

Measurement of Energy: Single phase induction type energy meter , driving and braking torques , errors and compensations , testing by phantom loading using R.S.S. meter. Three phase energy meter, trivector meter, maximum demand meters.

UNIT IV

Potentiometers: Principle and operation of D.C. Crompton's potentiometer, standardization Measurement of unknown resistance, current, voltage.

Resistance Measurements: Method of measuring low, medium and high resistance , sensitivity of Whetstone's bridge , Carey Foster's bridge, Kelvin's double bridge for measuring low resistance, measurement of high resistance , loss of charge method.

UNIT V

A.C. Bridges: Measurement of inductance, Quality Factor - Maxwell's bridge, Hay's bridge, Anderson's bridge, Owen's bridge. Measurement of capacitance and loss angle, Desauty Bridge. Wien's bridge, Schering Bridge.

Magnetic Measurements: Ballistic galvanometer, equation of motion, flux meter, constructional details, comparison with ballistic galvanometer. Determination of B-H Loop methods of reversals six point method , A.C. testing , Iron loss of bar samples, core loss measurements by bridges and potentiometers.

TEXT BOOKS:

1. Electrical Measurements and measuring Instruments – by E.W. Golding and F.C. Widdis, fifth Edition, Wheeler Publishing.
2. Electrical & Electronic Measurement & Instruments by A.K.Sawhney, DhanpathRai& Co.

REFERENCE BOOKS

1. Electrical Measurements by Buckingham and Price, Prentice Hall of India
2. Electrical Measurements: Fundamentals, Concepts, Applications by Reissland, M.U, New Age International (P) Limited, Publishers

Electromagnetics

CECN-101 D

L	T	P	Cr
3	1	0	4

Course Outcomes:
At the end of this course, students will demonstrate the ability to:

1. Understand the principles of electric fields, magnetic fields, and their interactions.
2. Analyze electromagnetic waves and their propagation in different media.
3. Apply Maxwell's equations to solve electromagnetic problems.
4. Study the behavior of waveguides and antennas in communication systems.
5. Use computational methods to model and solve electromagnetic field problems.

Unit-I
Review of Vector analysis, Rectangular, Cylindrical and Spherical coordinates and their transformation. Divergence, gradient and curl in different coordinate systems. Divergence's theorem and Stoke's theorem.

Unit-II
Electric field intensity, Electric Flux density, Energy and potential. Current and conductors, Dielectrics and capacitance, Poisson's and Laplace's equation.

Unit-III
Steady magnetic field, magnetic forces, materials and inductance, Time varying field and Maxwell's equation.

Unit-IV

Uniform plane waves: wave propagation in free space, dielectrics, and conductors. Poynting Vector, Plane wave reflection at normal incidence.

Unit-V
Transmission lines: Line equations, line parameters and line examples. Smith chart, Application of transmission lines.

Reference Books:

1. William H.Hayt, John A.Buck, 'Engineering Electromagnetics', Tata McGraw Hill Publishing Co. Ltd., New Delhi Sixth edition.
2. Jordan E.C. and Balmain K.G. "Electromagnetic wave and radiating systems",PHI, Second edition.
3. Mathew M.O.Sadiku, "Element of Electromagnetics", Oxford Press, 4th Edition.

Engineering Chemistry and Environmental Studies

CESN-101

L	T	P	Cr
3	1	0	4

Course Outcomes

- Understanding of different fuel types, their calorific value, and methods of determining the calorific value of coal, biomass, biogas, and biodiesel.
- Knowledge of polymer types, polymerization processes, and applications of plastics, rubbers, and bio-polymers, including their degradation and vulcanization processes.
- Proficiency in water hardness types, associated problems in boilers, and various water softening methods like Permutit, De-ionization, and Lime-soda processes.
- Awareness of environmental pollution types, their impact on air, water, soil, and human health, including greenhouse effects and water contamination issues.
- Familiarity with pollution control and cleanup methods, including air and water pollution prevention, solid waste management, and bioremediation techniques like phytoremediation.

Unit 1: Fuels:

Introduction, Classification of fuels, Calorific value, Methods for determination of Calorific value of fuel, Classification of coal by rank, Analysis of coal, Proximate & Ultimate analysis of coal, Biomass, Biogas, Biodiesel: Definition, Types, Physical Characteristics and Biodiesel Production procedure.

Unit 2 Polymers:

Introduction, Nomenclature of polymers, Functionality, Types of Polymerization, Classification of Polymers, Plastics, Important Thermoplastic and Thermosetting Resins, Synthetic Fibres, Ion-exchange resins, Rubbers (Elastomers), Vulcanization of rubber, De-vulcanization, Synthetic rubbers or elastomers, Application of rubber, Bio-polymers, Degradation of polymers.

Unit 3 Water Technology:

Introduction, Hardness of water: Temporary and Permanent hardness; Equivalents of Calcium Carbonate, units of hardness, Disadvantage of hard water, Boiler troubles, Scale and sludge formation in boilers and their disadvantage, Boiler corrosion, Caustic embrittlement, Priming and foaming, water softening methods: Permutit process, De-ionization process, Lime-soda process.

Unit 4: Environmental pollution and its impact:

Environment and Atmosphere; Kinds of pollution; Air pollution: Greenhouse effect, Acid rains and global warming; Noise pollution; Water and Solid waste pollution: Industrial effluents and wastes, Ground water pollution, Lead pollution, Fluoride pollution; Radiation and chemical toxicology.

Unit 5 Pollution Cleanup:

Prevention and control of air pollution: Source correction, Collection of pollutants, Cooling, Treatment; Prevention and control of water pollution: Stabilization of the ecosystem, Reutilization and Recycling of waste, Removal of Pollutants; Solid waste management: Collection, Disposal, etc.; Bioremediation: Introduction, Phytoremediation.

Reference Books:

•Textbook of Engineering Chemistry, 2024, Wiley Publishers (ISBN: 9789357460972)972

•Jain, M. and Jain, P.C., Engineering Chemistry, 17th edition, DhanpatRai Publishing Company (P) Ltd., New Delhi.

•Engineering Chemistry Second Edition, Publisher: McGraw Hill Education India, ISBN: 9789352605774.

- Kuriacose and Rajaram, Chemistry in Engineering and Technology, TMH, Delhi.
- Sharma, P.D., Ecology and Environment, 11th edition, Rastogi Publications, Meerut.
- Gupta, K.M. Environmental Studies, Umesh Publications, Delhi.
- Gopalan, R.R., Environmental Studies: from crisis to cure, Oxford University Press, New Delhi.

Chemical Thermodynamics

CESN-101 A

L	T	P	Cr
3	1	0	4

Course Outcomes:

At the end of this course, students will demonstrate the ability to:

1. Understand the laws of thermodynamics and their application in chemical processes.
2. Analyze energy changes in chemical reactions using enthalpy, entropy, and Gibbs free energy.
3. Apply the concept of equilibrium to chemical reactions and phase transitions.
4. Calculate the work, heat, and efficiency in thermodynamic cycles.
5. Use thermodynamic principles to predict the spontaneity and direction of chemical reactions.

Unit 1: Basic Concepts of Thermodynamics

Thermodynamic Systems and Processes:Definition of system, surroundings, and boundaries, Types of systems: isolated, closed, and open systems, Thermodynamic processes: isothermal, adiabatic, isobaric, and isochoric processes, State and path functions (internal energy, work, heat)

Zeroth Law of Thermodynamics: Concept of thermal equilibrium, Temperature and its measurement

First Law of Thermodynamics: Concept of internal energy (U) and enthalpy (H), Mathematical form of the first law: $\Delta U = q + w$, Work done in various processes (PV work, electrical work), Specific heat capacities (Cp and Cv) and their relation

Application of the First Law: Internal energy changes in ideal and real gases, Joule-Thomson effect, Joule-Thomson coefficient, inversion temperature

Unit 2: Second Law of Thermodynamics and Entropy

Second Law of Thermodynamics: Limitations of the first law, Concepts of heat engines and refrigerators, Carnot cycle and its efficiency

Entropy (S): Definition of entropy and its physical significance, Entropy changes in reversible and irreversible processes, Entropy of the universe and the second law

Applications of the Second Law: Clausius inequality, Entropy change in mixing of gases, Free expansion of gases and its relation to entropy

Third Law of Thermodynamics: Nernst heat theorem, Absolute entropy and its significance

Unit 3: Thermodynamic Potentials and Equilibrium

Thermodynamic Potentials:Definitions of thermodynamic potentials (Gibbs free energy, Helmholtz free energy, Enthalpy, Internal energy), Maxwell relations and their applications, Gibbs-Helmholtz equation and its significance
Criteria for Spontaneity:Conditions for equilibrium and spontaneity ($\Delta G < 0$ for spontaneous processes), Phase equilibrium and phase rule, Le Chatelier's principle and its applications
Chemical Equilibrium:Law of mass action and equilibrium constant, Temperature dependence of equilibrium constant (Van't Hoff equation), Relation between free energy and equilibrium constant,
Phase Equilibria:Phase diagrams for one-component systems (water and sulfur), Clausius-Clapeyron equation and its applications

Unit 4: Thermodynamics of Solutions

Ideal and Non-Ideal Solutions:Raoult's law and deviations from ideal behavior, Henry's law and its applications, Activity, activity coefficient, and their significance
Thermodynamics of Mixing:Partial molar quantities (partial molar volume, partial molar Gibbs free energy), Gibbs-Duhem equation, Chemical potential and its variation with temperature and pressure
Colligative Properties:Lowering of vapor pressure, elevation of boiling point, depression of freezing point, Osmotic pressure and its applications in determining molecular weight
Applications in Electrolyte Solutions:Thermodynamic properties of electrolytes, Debye-Hückel theory of ion-ion interactions

Recommended Books:

1. "Thermodynamics: An Engineering Approach" by Yunus A. Çengel and Michael A. Boles (2021)
2. "Introduction to Chemical Engineering Thermodynamics" by J.M. Smith, H.C. Van Ness, and M.M. Abbott (2017)
3. "Chemical Thermodynamics: Advanced Applications" by J. Bevan Ott and Juliana Boerio-Goates (2019)
4. "Modern Thermodynamics: From Heat Engines to Dissipative Structures" by DilipKondepudi and Ilya Prigogine (2014)
5. "Molecular Driving Forces: Statistical Thermodynamics in Biology, Chemistry, Physics, and Nanoscience" by Ken A. Dill and Sarina Bromberg (2018)

Chemical Kinetics

CESN-101 B

L	T	P	Cr
3	1	0	4

Course Outcomes:
At the end of this course, students will demonstrate the ability to:

1. Understand the rate laws and factors affecting reaction rates.
2. Analyze reaction mechanisms and determine rate-determining steps.
3. Apply the Arrhenius equation to study temperature dependence of reaction rates.
4. Determine the effect of concentration, temperature, and catalysts on reaction rates.
5. Use integrated rate laws to calculate concentration changes over time in chemical reactions.

Unit 1: Fundamentals of Chemical Kinetics

Basic Concepts:Definition of reaction rate and rate laws, Order and molecularity of a reaction, Rate constant and its units for different orders of reactions, Elementary and complex reactions
Integrated Rate Equations:Zero-order, first-order, second-order reactions, Half-life period for different orders of reactions, Determination of order of reaction using integrated rate laws
Experimental Methods of Studying Kinetics:Methods of determining reaction rates (flow, stopped-flow, relaxation methods), Spectroscopic methods, electrical methods, and pressure measurement

Unit 2: Theories of Reaction Rates

Collision Theory:Basic postulates of collision theory, Effective collisions and activation energy, Dependence of rate on temperature and concentration
Transition State Theory (TST):Concept of activated complex, Energy profiles of reactions, Eyring equation and its applications
Arrhenius Equation:Temperature dependence of reaction rates, Interpretation of Arrhenius parameters (A and Ea), Determination of activation energy
Comparative Study of Collision and Transition State Theories:Merits and limitations of both theories

Unit 3: Reaction Mechanisms

Reaction Mechanisms:Elementary steps and their importance in mechanisms, Steady-state approximation and rate-determining step theory
Unimolecular and Bimolecular Reactions:Lindemann-Hinshelwood mechanism for unimolecular reactions, Chain reactions: H_2-Br_2 reaction and decomposition of acetaldehyde
Catalysis and Reaction Mechanism:Homogeneous and heterogeneous catalysis

Enzyme catalysis: Michaelis-Menten mechanism, Role of catalysts in altering reaction pathways

Unit 4: Complex Reactions and Kinetics in Solutions

Complex Reactions:Parallel, consecutive, and reversible reactions, Analysis of complex reaction mechanisms, Chain reactions and explosion limits (e.g., hydrogen-oxygen reaction)
Reactions in Solutions:Factors influencing reaction rates in solution (solvent effect, ionic strength), Diffusion-controlled and activation-controlled reactions
Kinetics of fast reactions in solutions: relaxation methods, flash photolysis
Kinetics of Polymerization:Free-radical polymerization kinetics, Chain initiation, propagation, and termination

Recommended Books:

1. "Chemical Kinetics and Reaction Dynamics" by Paul L. Houston (2020)
2. "Essentials of Chemical Kinetics" by C. Kalidas and V. Rajaram (2019)
3. "Chemical Kinetics: From Molecular Structure to Chemical Reactivity" by Luis Arnaut, Sebastiao Jose Formosinho, and Hugh Burrows (2018)
4. "Reaction Kinetics: Principles and Applications in Organic and Biological Chemistry" by Keith J. Laidler (2018)
5. "Chemical Reaction Engineering and Kinetics" by Jorge Ancheyta (2021)

Environmental Chemistry

CESN-101 C

L	T	P	Cr
3	1	0	4

Course Outcomes:
At the end of this course, students will demonstrate the ability to:

1. Understand the chemical processes occurring in the environment.
2. Analyze the impact of pollutants on air, water, and soil quality.
3. Study the chemistry of natural cycles, such as carbon, nitrogen, and sulfur cycles.
4. Investigate the sources, behavior, and fate of hazardous chemicals in the environment.
5. Apply chemical principles to develop strategies for pollution control and sustainable practices.

Unit 1: Fundamentals of Environmental Chemistry

Introduction to Environmental Chemistry:Definition, scope, and importance of environmental chemistry, Segments of the environment: atmosphere, hydrosphere, lithosphere, and biosphere, Chemical composition of air, water, and soil
Environmental Cycles:Biogeochemical cycles (carbon, nitrogen, sulfur, phosphorus cycles), Role of microorganisms in biogeochemical cycles
Concepts of Green Chemistry:Principles of green chemistry and sustainability, Environmental impact of chemical processes and industrial activities, green solvents, catalysts, and alternative energy sources

Unit 2: Atmospheric Chemistry

Structure and Composition of Atmosphere:Layers of the atmosphere: troposphere, stratosphere, mesosphere, thermosphere, Composition and chemical reactions in the atmosphere
Air Pollution and Global Warming:Primary and secondary pollutants (SOx, NOx, CO, particulate matter, VOCs), Greenhouse gases and their effects on global warming, Photochemical smog, acid rain, and ozone depletion
Monitoring and Control of Air Pollution:Air quality standards and monitoring techniques (AQI, particulate matter sensors), Control measures: scrubbers, electrostatic precipitators, catalytic converters

Unit 3: Water Chemistry and Pollution

Water Quality Parameters:Physical parameters (temperature, color, turbidity), Chemical parameters (pH, dissolved oxygen, BOD, COD, alkalinity, hardness), Biological parameters (coliform bacteria, microbial contamination)
Water Pollution:Sources of water pollution (domestic, industrial, agricultural), Heavy metals in water (lead, mercury, cadmium, arsenic) and their toxicity, Eutrophication and its effects on aquatic ecosystems
Water Treatment and Purification:Primary, secondary, and tertiary treatment of wastewater

Methods of water purification: filtration, coagulation, flocculation, sedimentation, disinfection (chlorination, UV treatment), Desalination and reverse osmosis techniques

Unit 4: Soil Chemistry and Waste Management

Soil Composition and Chemistry:Composition of soil: minerals, organic matter, water, air, Soil properties: pH, cation exchange capacity, nutrient availability, Soil pollutants: pesticides, heavy metals, industrial wastes
Soil Pollution:Sources of soil contamination: fertilizers, pesticides, industrial discharge, Effects of soil pollution on plant growth and food safety, Remediation techniques: bioremediation, phytoremediation, chemical methods
Solid Waste Management:Types of solid waste: municipal, hazardous, biomedical
Waste management practices: recycling, composting, incineration, landfills, Hazardous waste management and disposal

Recommended Books:

1. "Environmental Chemistry: A Global Perspective" by Gary W. vanLoon and Stephen J. Duffy (2021)
2. "Environmental Chemistry" by Stanley E. Manahan (2022)
3. "Principles of Environmental Chemistry" by James Girard (2020)
4. "Introduction to Environmental Chemistry" by Julian E. Andrews, Peter Brimblecombe, and Tim D. Jickells (2020)
5. "Environmental Chemistry: Fundamentals" by Ronald A. Hites and Jonathan D. Raff (2021)

Natural Resource Management

CESN-101 D

L	T	P	Cr
3	1	0	4

Course Outcomes:

At the end of this course, students will demonstrate the ability to:

1. Understand the principles of sustainable management of natural resources.
2. Analyze the impact of human activities on natural ecosystems and biodiversity.
3. Develop strategies for the conservation and efficient use of water, soil, and energy resources.
4. Apply environmental policies and regulations to manage natural resources effectively.
5. Use modern technologies to monitor and assess natural resource availability and health.

Unit 1: Introduction to Natural Resources

Definition and Classification of Natural Resources: Renewable and non-renewable resources Biotic and abiotic resources, Resource availability, scarcity, and carrying capacity
Global and National Resource Distribution: Geographical distribution of resources (water, forests, minerals), Resource consumption patterns: global vs. local scenarios, Depletion and degradation of natural resources
Principles of Sustainable Resource Management: Sustainability concepts and sustainable development goals (SDGs), The role of science, technology, and innovation in resource management

Unit 2: Water Resource Management

Water Resources:Types of water resources: surface water, groundwater, glaciers, oceans, Hydrological cycle and water balance, Freshwater availability and demand
Water Pollution and Scarcity:Sources and types of water pollution (industrial, agricultural, domestic), Impact of water pollution on ecosystems and human health, Global water scarcity and strategies to combat it
Water Conservation and Management:Rainwater harvesting, groundwater recharge, watershed management, Irrigation management techniques
Policies for sustainable water resource management: National Water Policy, Integrated Water, Resource Management (IWRM)

Unit 3: Forest Resource Management

Importance of Forests:Forest ecosystems and their role in maintaining biodiversity, Forest resources and their economic, ecological, and social significance

Deforestation and Forest Degradation:Causes of deforestation (agriculture, urbanization, logging), Impacts of deforestation on climate, biodiversity, and indigenous communities
Forest Conservation and Sustainable Management:Afforestation, reforestation, and agroforestry, Forest certification programs (FSC) and sustainable logging practices, Community-based Forest management and Joint Forest Management (JFM)

Unit 4: Soil and Mineral Resource Management

Soil Resources:Types of soils, soil formation, and soil profiles, Soil fertility and its importance in agriculture, Soil erosion, desertification, and degradation
Soil Conservation Techniques:Soil conservation methods: contour plowing, terracing, crop rotation, Integrated soil management practices, Policies for sustainable agriculture and soil conservation
Mineral Resources:Types of mineral resources: metallic and non-metallic mineralsGlobal distribution of minerals and mining activities
Environmental impacts of mining: pollution, habitat destruction, land degradation
Sustainable Mining Practices:Techniques for reducing environmental impact of mining (e.g., rehabilitation, reforestation), Waste management in mining (tailings and their treatment), Responsible mining initiatives and policies

Recommended Books:

1. "Sustainable Resource Management: Global Trends, Visions, and Policies" by Stefan Bringezu and AnkeSchandl (2021)
2. "Natural Resource and Environmental Economics" by Roger Perman, Yue Ma, and Michael Common (2020)
3. "Natural Resource Conservation: Management for a Sustainable Future" by Daniel D. Chiras and John P. Reganold (2021)
4. "Natural Resource Management: Principles and Practices" by B.W. Pandey (2020)
5. "Water Resources Management: Principles, Challenges and Solutions" by Neil S. Grigg (2020)

Presentation and communication skills

CPCN-101

L	T	P	Cr
3	0	0	3

Course Outcome:

- Mastery of essential grammar rules, sentence structures, and correct usage of word classes, articles, tenses, and prepositions.
- Expanded vocabulary through synonyms, antonyms, idioms, one-word substitutes, and technical terms, with focus on word formation using prefixes and suffixes.
- Enhanced linguistic skills through active listening, speaking, reading, and writing activities, including phonetics and reading comprehension techniques.
- In-depth understanding of language through literature, with analysis of essays, poems, and plays from authors like Bacon, Lamb, Keats, and Tagore.
- Development of professional speaking skills for job interviews, group discussions, public speaking, and presentations, with emphasis on body language and argumentative skills.

Unit – I

Essential Grammar: Basic Clause/Sentence Patterns, Correct Usage of Different Word-Classes, Articles, Tense, Syntactic Concord, Prepositions, Transformation, Synthesis, Graded Syntactic Structures.

Unit – II

Essential Vocabulary: Basic words, Synonyms, Antonyms, Homophones, One-Word Substitutes, Idioms and Phrases, Word-formation-Suffix and Prefix, Technical Vocabulary.
Linguistic Skills: Listening, Speaking, Reading, and Writing (Activities to be Selected by the Teacher).Strategies for Active Listening, Introduction to Phonetics-Monophthongs, Diphthongs and Consonant sound symbols.Newspaper reading and Precis Writing, SQ3R technique of Reading& Comprehension Passage.

Unit – III

Language Through Literature: Non-Fiction &/or Fiction, Verse, and Play
Bacon's *Essays* (Selection) and/or Lamb's *Tales from Shakespeare* (Selection)
Keats' *The Eve of St Agnes/ Ode To Autumn/Ode to A Nightingale*
Tagore's *Chitra/ Gitanjali(Lyric 1-5)*

Unit – IV

Speaking Professionally: Job Interviews, Group-Discussions, Difference between GD and Debate, Public Speaking, Argumentative Skills, Role-Plays, Presentation Skills, Significance of Body Language

Reference Books :

1. Hornby, A.S. *Guide to Patterns & Usage in English*. 2nded. New Delhi: Oxford University Press, 2002. Print.

2. Swan, Michael. *Practical English Usage*. 3rd ed. New Delhi: Oxford University Press, 2006. Print.
3. Carter, R. and M. McCarthy. *Cambridge Grammar of English*. New Delhi: Cambridge University Press, 2006.CD-ROM, Print.
4. McCarthy, M. and F. O'Dell. *English Vocabulary in Use*. New Delhi: Cambridge University Press, 2006. Print.
5. Kumar, E. Suresh and P. Sreehari. *A Handbook for English Language Laboratories*. New Delhi: Cambridge University Press, 2007. Print.

English Communication

CPCN-101 A

L	T	P	Cr
3	0	0	3

Course Outcomes:
At the end of this course, students will demonstrate the ability to:

1. Develop effective verbal and written communication skills in various contexts.
2. Enhance listening skills to understand and respond appropriately in conversations.
3. Use appropriate vocabulary, grammar, and sentence structures for clear communication.
4. Improve presentation skills for conveying ideas confidently and clearly.
5. Foster interpersonal communication skills for better collaboration and teamwork.

Units: 1

Introduction: Theory of Communication, Types and modes of Communication Language of Communication: - Verbal and Non-verbal (Spoken and Written) - Personal, Social and Business - Barriers and Strategies - Intra Personal, Inter Personal and Group Communication

Unit 2

Listening Skills- Listening to others, Listening short Lectures and Videos, Types of Listening, How to improve our listening skills?

Unit: 3

Speaking Skills: - Monologue - Dialogue - Group Discussion - Effective Communication/ Mis-Communication - Interview - Public Speech

Unit 4

Reading and Understanding - Close Reading - Comprehension - Summary Paraphrasing - Analysis and Interpretation - Translation(from Indian language to English and vice-versa) Literary/Knowledge Texts Unit 5

Writing Skills - Documenting - Report Writing - Making notes - Letter Writing

English

CPCN-101 B

L	T	P	Cr
3	0	0	3

Course Outcomes:
At the end of this course, students will demonstrate the ability to:

1. Improve reading comprehension and critical analysis of texts.
2. Enhance writing skills for clear and coherent expression of ideas.
3. Develop vocabulary and grammar for effective communication.
4. Practice spoken English for better fluency and pronunciation.
5. Analyze literary works to understand themes, characters, and contexts.

Unit: 1

Basic Essential Grammar: Parts of Speech, Tenses, Sentence Pattern, Correct Usage of different word classes, Syntax Concord, Transformation, Syntheses, Articles, Prepositions

Unit 2

Vocabulary: Synonyms, Antonyms, Homophones, Homonyms, One word substitution, Idiom and Phrases, Word Formation, Words often confused, Technical Vocabulary

Unit: 3

Linguistic Skills-Listening skills, Speaking Skills, Reading Skills, Writing Skills (Activities also done selected by teacher)

Unit 4

Professional Speaking- Group Discussion, Debate, Public Speaking, Job Interview, Role Plays, Presentation Skills

Unit 5

Writing Skills - Documenting - Report Writing - Making notes - Letter Writing, Proposal Writing, Paragraph Writing

Technical Communication

CPCN-101 C

L	T	P	Cr
3	0	0	3

Course Outcomes:
At the end of this course, students will demonstrate the ability to:

1. Develop clear and concise technical writing skills for manuals and reports.
2. Enhance the ability to present technical information to diverse audiences.
3. Use proper documentation techniques for technical processes and systems.
4. Improve oral communication skills for effective presentations and discussions.
5. Master the use of visuals and diagrams to support technical explanations.

Unit: 1

Grammar rules -articles, tenses, auxiliary verbs (primary & modal) prepositions, subject-verb agreement, pronoun-antecedent agreement, discourse markers and sentence linkers
General Reading and Listening comprehension – rearrangement & organization of sentences

Unit 2

Different kinds of written documents: Definitions- descriptions- instructions-recommendations-user manuals – reports – proposals, writing formal Letters, punctuation
Scientific Reading & Listening Comprehension

Unit: 3

Technical paper writing: documentation style – document editing – proof reading – Organizing and formatting, Modifiers, phrasal verbs, tone and style, graphical representation
Reading and listening comprehension of technical documents

Unit 4

Professional Speaking- Group Discussion, Debate, Public Speaking, Job Interview, Role Plays, Presentation Skills

Unit 5

Phonetics- International Phonetic Alphabet, Phonemes, Allophones, Phonetics Transcription, Organ of speech.

Human Values, De-addiction and Traffic Rules

CPCN-101 D

L	T	P	Cr
3	0	0	3

Course Outcomes:

At the end of this course, students will demonstrate the ability to:

1. Understand and apply ethical principles and human values in personal and professional life.
2. Promote awareness and practices to prevent addiction and its harmful effects.
3. Develop a sense of responsibility toward maintaining traffic safety and following traffic rules.
4. Foster respect for others' rights and well-being in society.
5. Encourage active participation in community efforts to enhance road safety and reduce substance abuse.

Unit: 1 Course Introduction - Need, Basic Guidelines, Content and Process for Value Education

- Understanding the need, basic guidelines, content and process for Value Education
- Self-Exploration– content and process; 'Natural Acceptance' and Experiential Validation- as the mechanism for self-exploration
- Continuous Happiness and Prosperity- A look at basic Human Aspirations
- Right understanding, Relationship and Physical Facilities- the basic requirements for fulfillment of aspirations of every human being with their correct priority
- Method to fulfill the above human aspirations: understanding and living in harmony at various levels

Unit 2 Understanding Harmony in the Human Being - Harmony in Myself!

- Understanding human being as a co-existence of the sentient 'I' and the material 'Body' Understanding the needs of Self ('I') and 'Body' - Sukh and Suvidha
- Understanding the Body as an instrument of 'I' (I being the doer, seer and enjoyer)
- Understanding the characteristics and activities of 'I' and harmony in 'I'
- Understanding the harmony of I with the Body: Sanyam and Swasthya; correct appraisal of Physical needs, meaning of Prosperity in detail
- Programs to ensure Sanyam and Swasthya

Unit: 3 Understanding Harmony in the Family and Society- Harmony in Human Relationship

- Understanding harmony in the Family- the basic unit of human interaction
- Understanding values in human-human relationship; meaning of Nyaya and program for its fulfillment to ensure Ubhay-tripti; Trust (Vishwas) and Respect (Samman) as the foundational values of relationship

- Understanding the meaning of Vishwas; Difference between intention and competence 16. Understanding the meaning of Samman, Difference between respect and differentiation; the other salient values in relationship
- Understanding the harmony in the society (society being an extension of family): Samadhan, Samridhi, Abhay, Sah-astitva as comprehensive Human Goals
- Visualizing a universal harmonious order in society- Undivided Society (Akhand Samaj), Universal Order (Sarvabhaum Vyawastha) - from family to world family!

Unit 4 Understanding Harmony in the Nature and Existence - Whole existence as Co-existence

- Understanding the harmony in the Nature
- Interconnectedness and mutual fulfillment among the four orders of nature recyclability and self-regulation in nature
- Understanding Existence as Co-existence (Sah-astitva) of mutually interacting units in all-pervasive space
- Holistic perception of harmony at all levels of existence

Unit 5 Implications of the above Holistic Understanding of Harmony on Professional Ethics

- Natural acceptance of human values
- Definitiveness of Ethical Human Conduct
- Basis for Humanistic Education, Humanistic Constitution and Humanistic Universal Order

Workshop Practice

CMEN-151

L	T	P	Cr
0	0	2	1

Course Outcome (CO)

At the end of this course, the students should be able to:

1. Study and practice on machine tools and their operations
2. Practice on manufacturing of components using workshop trades including fitting, carpentry, foundry and welding
3. Identify and apply suitable tools for machining processes including turning, facing, thread cutting and tapping
4. Welding and soldering operations
5. Apply basic electrical engineering knowledge for house wiring practice

LIST OF EXPERIMENTS

Machine shop:

- Study of machine tools in particular Lathe machine
- Demonstration of different operations on Lathe machine
- Practice of Facing, Plane Turning, step turning, taper turning, knurling and parting.
- Study of Quick return mechanism of Shaper.

Fitting shop:

- Preparation of T-Shape Work piece as per the given specifications.
- Preparation of U-Shape Work piece which contains: Filing, Sawing, Drilling, Grinding.
- Practice marking operations.

Carpentry:

- Study of Carpentry Tools, Equipment and different joints.
- Practice of Cross Half lap joint, Half lap Dovetail joint and Mortise Tenon Joint

Welding:

- Instruction of BI standards and reading of welding drawings.
- Butt Joint

- Lap Joint

Smithy

- Sharpening any arc and edge.
- Preparing small arc and edge,
- Repair of agricultural implements and power plough, use of power hammer etc.

Text Books:

1. Raghuwanshi B.S., Workshop Technology Vol. I & II, DhanpathRai& Sons.

2. Kannaiah P. and Narayana K.L., Workshop Manual, 2nd Edn, Scitech publishers.

3. John K.C., Mechanical Workshop Practice. 2nd Edn. PHI 2010.

4. JeyapoovanT.andPranitha S., Engineering Practices Lab Manual, 3rd Edn. Vikas Pub.2008.

Engineering Graphics Lab

CMEN-153

L	T	P	Cr
0	0	2	1

Course Outcomes:
At the end of this course, students will demonstrate the ability to:

1. Develop skills in creating accurate technical drawings using drafting tools.
2. Understand and apply basic geometric principles in design and construction.
3. Create 2D and 3D representations of engineering objects and structures.
4. Use computer-aided design (CAD) software to produce and modify technical drawings.
5. Interpret and analyze engineering drawings for practical application in projects.

Basic Drawing Operations

- Objective: Familiarize with basic drawing tools.
- Activities:
  - Draw a line using two endpoints.
  - Draw a circle given a center and radius.
  - Draw a rectangle with specified coordinates.

Transformations

- Objective: Apply geometric transformations.
- Activities:
  - Implement translation of shapes (move by dx, dy).
  - Implement rotation of shapes around a point.
  - Implement scaling of shapes (increase/decrease size).

Drawing 2D Shapes

- Objective: Create various 2D shapes.
- Activities:
  - Draw a triangle given three vertices.
  - Draw a polygon by specifying the number of vertices and their coordinates.

Basic CAD Commands

- Objective: Understand basic CAD functionalities.
- Activities:
  - Draw an arc using center, radius, start angle, and end angle.
  - Implement a Bezier curve using control points.

□ Parametric Equations for Curves

- Objective: Use parametric equations to draw curves.
- Activities:
  - Draw a parametric curve (e.g., a sine wave).
  - Visualize parametric equations in 2D space.

□ 3D Projections

- Objective: Understand 3D object representation.
- Activities:
  - Create isometric projections of simple shapes.
  - Draw orthographic views (front, top, side) of 3D objects.

□ Sectional Views

- Objective: Learn to create sectional views.
- Activities:
  - Generate a sectional view of a given solid object.
  - Illustrate the differences between full and half sections.

□ Dimensioning Techniques

- Objective: Apply dimensioning standards.
- Activities:
  - Add linear and angular dimensions to a drawing.
  - Practice dimensioning for clarity and accuracy.

□ Rendering Techniques

- Objective: Enhance drawings with rendering techniques.
- Activities:
  - Apply shading to 2D shapes.
  - Use textures and gradients for better visual representation.

□ CAD Software Basics

- Objective: Introduction to CAD software tools.
- Activities:
  - Create a simple project using CAD software.
  - Familiarize with layers, commands, and saving/exporting drawings.

Communication Lab

CPCN-151

L	T	P	Cr
0	0	2	1

Course Outcomes:
At the end of this course, students will demonstrate the ability to:

1. Improve verbal communication skills through practice in discussions and presentations.
2. Enhance listening skills for better comprehension and response.
3. Develop effective public speaking techniques for clear and confident delivery.
4. Practice writing skills for creating concise and well-structured documents.
5. Foster teamwork and interpersonal communication through group activities and exercises.

The Language Lab focuses on the production and practice of sounds of language and familiarizes the students with the use of English in everyday situations both in formal and informal contexts.

Syllabus: English Language and Communication Skills Lab (ELCS) shall have two parts:

a. Computer Assisted Language Learning (CALL) Lab

b. Interactive Communication Skills (ICS) Lab

Listening Skills

Objectives 1. To enable students develop their listening skills so that they may appreciate its role in the LSRW skills approach to language and improve their pronunciation.

2. To equip students with necessary training in listening so that they can comprehend the speech of people of different backgrounds and regions.

Students should be given practice in listening to the sounds of the language, to be able to recognize them and find the distinction between different sounds, to be able to mark stress and recognize and use the right intonation in sentences.

- Listening for general content
- Listening to fill up information
- Intensive listening
- Listening for specific information

Speaking Skills

Objectives 1. To involve students in speaking activities in various contexts

2. To enable students express themselves fluently and appropriately in social and professional contexts • Oral practice: Just a Minute (JAM) Sessions

• Describing objects/situations/people

• Role play – Individual/Group activities

Exercise – I

CALL Lab:

Understand: Listening Skill- Its importance – Purpose- Process- Types- Barriers of Listening. Practice: Introduction to Phonetics – Speech Sounds – Vowels and Consonants.

ICS Lab:

Understand: Communication at Work Place- Spoken vs. Written language. Practice: Ice-Breaking Activity and JAM Session- Situational Dialogues – Greetings – Taking Leave – Introducing Oneself and Others.

Exercise – II

CALL Lab:

Understand: Structure of Syllables – Word Stress and Rhythm– Weak Forms and Strong Forms in Context.

Practice: Basic Rules of Word Accent - Stress Shift - Weak Forms and Strong Forms in Context.

ICS Lab:

Understand: Features of Good Conversation – Non-verbal Communication. Practice: Situational Dialogues – Role-Play- Expressions in Various Situations –Making Requests and Seeking Permissions - Telephone Etiquette.

Exercise - III

CALL Lab:

Understand: Intonation-Errors in Pronunciation-the Influence of Mother Tongue (MTI).

Practice: Common Indian Variants in Pronunciation – Differences in British and American Pronunciation. **ICS Lab:**

Understand: How to make Formal Presentations. Practice: Formal Presentations.

Exercise – IV

CALL Lab:

Understand: Listening for General Details. Practice: Listening Comprehension Tests.

ICS Lab:

Understand: Public Speaking – Exposure to Structured Talks. Practice: Making a Short Speech – Extempore.

Exercise – V

CALL Lab:

Understand: Listening for Specific Details. Practice: Listening Comprehension Tests.

ICS Lab:

Understand: Interview Skills. Practice: Mock Interviews.

Minimum Requirement of infrastructural facilities for ELCS Lab:

1. Computer Assisted Language Learning (CALL) Lab:

The Computer Assisted Language Learning Lab has to accommodate 40 students with 40 systems, with one Master Console, LAN facility and English language learning software for self- study by students.

System Requirement (Hardware component):

Computer network with LAN facility (minimum 40 systems with multimedia) with the following specifications:

i) Computers with Suitable Configuration
ii) ii) High Fidelity Headphones

2. Interactive Communication Skills (ICS) Lab:

The Interactive Communication Skills Lab:

A Spacious room with movable chairs and audio-visual aids with a Public-Address System, a LCD and a projector etc.

English Communication Lab

CPCN-151 A

L	T	P	Cr
0	0	2	1

Course Outcomes:
At the end of this course, students will demonstrate the ability to:

1. Improve pronunciation and fluency in spoken English through interactive sessions.
2. Develop listening skills for better understanding of various English accents.
3. Enhance vocabulary and grammar for effective written and oral communication.
4. Practice group discussions and debates to build confidence in public speaking.
5. Learn to write clear, concise, and structured texts for different communication contexts.

1. Develop interactive quizzes or flashcards to enhance vocabulary through definitions, synonyms, and antonyms.
2. Create listening exercises using audio clips followed by questions to assess understanding and retention.
3. Implement a program for students to record, analyze, and improve their speeches based on feedback.
4. Design a workshop that allows students to practice and present topics using visual aids and presentation software.
5. Create a platform for conducting group discussions on various topics, focusing on turn-taking and effective communication.
6. Develop a program that provides writing prompts and feedback on grammar, structure, and style.
7. Implement role-playing exercises to simulate real-life situations and improve conversational skills and confidence.
8. Create an application that helps students practice pronunciation through audio playback and comparison.
9. Design a set of reading passages followed by comprehension questions to enhance critical reading skills.
10. Implement a digital journal for students to reflect on their communication experiences and receive peer feedback.

English Lab

CPCN-151 B

L	T	P	Cr
0	0	2	1

Course Outcomes:
At the end of this course, students will demonstrate the ability to:

1. Improve reading comprehension and interpretive skills through various texts.
2. Enhance vocabulary and grammar usage for effective communication.
3. Develop writing skills for essays, reports, and creative content.
4. Practice listening skills through audio materials and discussions.
5. Strengthen speaking skills through role-plays, debates, and presentations.

1) Develop a program that identifies and corrects grammatical errors in written text.
2) Create an application with quizzes and games to help users expand their vocabulary.
3) Implement audio-based comprehension exercises that include questions to test understanding.
4) Design a tool that records speeches and provides feedback on pace, tone, and clarity.
5) Develop a program that presents reading passages followed by comprehension questions.
6) Create an application that allows users to practice pronunciation and receive feedback using audio samples.
7) Implement a tool that provides creative writing prompts to stimulate writing practice.
8) Design a platform for virtual group discussions where participants can practice speaking and listening skills.
9) Develop a program that guides users through creating and delivering effective presentations.
10) Create a platform for students to share their writing and receive constructive feedback from peers.

Technical Communication Lab

CPCN-151 C

L	T	P	Cr
0	0	2	1

Course Outcomes:
At the end of this course, students will demonstrate the ability to:

1. Develop technical writing skills for creating manuals, reports, and documentation.
2. Enhance presentation skills for delivering technical information clearly and confidently.
3. Improve the ability to communicate complex technical concepts to diverse audiences.
4. Practice creating and interpreting technical diagrams and visuals to support communication.
5. Foster collaboration and teamwork through group technical projects and discussions.

- Writing Technical Reports
  - Focus on structure, clarity, and audience.
- Creating User Manuals
  - Emphasize step-by-step instructions and usability.
- Developing Proposals
  - Learn to draft persuasive and structured proposals.
- Designing Presentations
  - Use of visuals and effective delivery techniques.
- Conducting Oral Communication Workshops
  - Improve verbal skills through practice and feedback.
- Practicing Resume and Cover Letter Writing
  - Tailor documents for job applications.
- Engaging in Peer Review Sessions
  - Provide and receive constructive feedback on documents.

- Utilizing Visual Aids Effectively
  - Incorporate charts, graphs, and images to enhance communication.
- Exploring Digital Communication Tools
  - Familiarization with software for documentation and collaboration.
- Analyzing Case Studies in Technical Communication
  - Examine real-world examples to identify best practices.

Human Values, Deaddiction and Traffic Rules

CPCN-151 D

L	T	P	Cr
0	0	2	1

Course Outcomes:
At the end of this course, students will demonstrate the ability to:

1. Understand the importance of human values in personal and professional life.
2. Raise awareness about the dangers of addiction and promote preventive measures.
3. Learn and practice traffic rules for ensuring road safety and discipline.
4. Develop a sense of responsibility and ethical behavior in daily activities.
5. Encourage active participation in community efforts to promote de-addiction and road safety.

1. Workshops on Ethics and Morality
    - Discuss fundamental ethical principles and moral dilemmas.
2. Community Service Projects
    - Engage in activities promoting social responsibility and compassion.
3. Conflict Resolution Training
    - Teach effective communication and mediation skills.
4. Empathy Development Sessions
    - Activities to foster understanding and empathy towards others.
5. Cultural Awareness Programs
    - Explore diversity and promote respect for different cultures.

Addiction Awareness Programs

1. Substance Abuse Education
    - Provide information on the effects of drugs and alcohol.
2. Support Group Facilitation
    - Create safe spaces for sharing experiences and recovery stories.
3. Stress Management Workshops
    - Teach techniques for coping with stress without resorting to substances.
4. Healthy Lifestyle Promotion
    - Encourage activities like exercise and hobbies as alternatives to addictive behaviors.
5. Guest Lectures from Addiction Experts
    - Invite professionals to discuss prevention and treatment strategies.

Traffic Rules Programs

1. Road Safety Workshops
    - Educate on traffic laws and safe driving practices.

2. Mock Traffic Situations
    - Simulate real-life scenarios to practice safe behavior.
3. Pedestrian Safety Campaigns
    - Promote awareness of pedestrian rights and safety tips.
4. Bicycle and Motorcycle Safety Training
    - Teach specific rules and safety measures for non-vehicle commuters.
5. Community Awareness Drives
    - Organize events to highlight the importance of following traffic rules.

Mathematics-II

CMAM-102

L	T	P	Cr
3	1	0	4

Course Outcomes:
At the end of this course, students will demonstrate the ability to:

1. Students will be able to evaluate double and triple integrals and apply them to compute areas and volumes in different coordinate systems.
2. Graduates will demonstrate the ability to use vector differentiation concepts such as Gradient, Divergence, and Curl and apply fundamental vector calculus theorems in real-world applications.
3. Learners will acquire a strong understanding of Fourier Series and Fourier Transforms, enabling them to analyze periodic functions and signals effectively.
4. Students will be equipped with Laplace Transform techniques to solve linear differential equations and engineering-related problems efficiently.
5. Graduates will be capable of applying Z-Transforms to solve difference equations, which are crucial for discrete-time systems and digital signal processing.

Unit-I **10**

Integral Calculus: Double and triple integrals, change of order of integration, Change of variables; Gamma, Beta functions and their properties, Dirichlet's integral; Applications to area and volume.

Unit-II **08**

Vector Calculus:

Vectors Differentiation: Gradient, Divergence, Curl and their physical meaning; Differential operators and their identities.

Vector Integration: Line and surface integrals; Green's Theorem in a plane; Gauss's Divergence theorem and Stokes's theorem and their applications.

Unit-III **06**

Fourier Series & Fourier Transform: Trigonometric Fourier series, Half range series, Harmonic analysis; Fourier Transform: Definition, Fourier sine and cosine transforms, Fourier integral formula and applications.

Unit-IV **10**

Laplace Transform: Laplace transform, Existence theorem, Properties of Laplace Transform, Laplace transform of derivative and integrals, Unit step function, Laplace transform of periodic function, Inverse Laplace transform, Convolution theorem. Application of Laplace Transform to solve ordinary differential equation.

Unit-V **06**

Z-Transform: Definition of Z-transform of elementary functions; Shifting theorems, Convolution theorem, Initial and Final value theorems; Inverse of Z-transform; Application to solution of difference equations.

Reference Books :

1. Thomas, G. and R.L. Finney. *Calculus and Analytical Geometry*. 6th Edition. Addision Wesley/Narosa, 1998.
2. Grewal, B.S. *Engineering Mathematics*. 39th Edition. Khanna Publishers, 2005.
3. Prasad, C. *Mathematics for Engineers*. 19th Edition. Prasad Mudralaya.

Differential Equations

CMAN-102 A

L	T	P	Cr
3	1	0	4

Course Outcomes:
At the end of this course, students will demonstrate the ability to:

1. Solve ordinary differential equations (ODEs) using analytical and numerical methods.
2. Apply techniques like separation of variables and integrating factors to solve first-order ODEs.
3. Analyze and solve higher-order linear differential equations with constant coefficients.
4. Use methods like variation of parameters and undetermined coefficients for solving non-homogeneous ODEs.
5. Model real-world phenomena and systems using differential equations in various fields.

Unit 1: Introduction to Differential Equations
This unit covers the definitions and basic concepts of differential equations, distinguishing between ordinary and partial differential equations, as well as exploring their order and degree. It also addresses initial and boundary value problems.

Unit 2: First-Order Differential Equations
In this unit, students will learn about the various types of first-order differential equations, including separable, homogeneous, and linear equations. It also includes methods such as exact equations and integrating factors, along with applications of first-order equations in real-world scenarios.

Unit 3: Higher-Order Differential Equations
This unit focuses on linear differential equations of higher order with constant coefficients. Students will study methods for solving these equations, including the method of undetermined coefficients and variation of parameters, as well as exploring non-homogeneous equations and their applications.

Unit 4: Systems of Differential Equations
Students will be introduced to systems of first-order differential equations, learning techniques for solving linear systems. This unit also includes phase plane analysis and the stability of equilibrium points.

Unit 5: Laplace Transforms
This unit covers the definition and properties of the Laplace transform, along with the inverse Laplace transform and its applications. Students will learn how to solve ordinary differential equations using Laplace transforms.

Probability and Statistics

CMAN-102 B

L	T	P	Cr
3	1	0	4

Course Outcomes:
At the end of this course, students will demonstrate the ability to:

1. Understand the fundamentals of probability theory and random variables.
2. Apply statistical methods to analyze and interpret data sets.
3. Use probability distributions (normal, binomial, etc.) to model real-world scenarios.
4. Apply hypothesis testing and confidence intervals to make data-driven decisions.
5. Utilize statistical tools for regression analysis and correlation to understand relationships in data.

Unit 1: Introduction to Probability
This unit introduces the fundamental concepts of probability, including sample spaces, events, and the basic rules of probability. It covers conditional probability and independence, along with applications of the counting principles.

Unit 2: Random Variables and Probability Distributions
In this unit, students learn about random variables and their types—discrete and continuous. The unit covers important probability distributions such as binomial, Poisson, and normal distributions, including their properties and applications.

Unit 3: Expectation and Variance
This unit focuses on the concepts of expectation and variance for random variables. Students will learn how to calculate expected values, variance, and standard deviation for various probability distributions, along with properties of linear combinations of random variables.

Unit 4: Sampling Distributions and Estimation
Students will explore the concept of sampling distributions, the Central Limit Theorem, and point estimation. This unit covers properties of estimators, methods of estimation, and confidence intervals for population parameters.

Unit 5: Hypothesis Testing
In this unit, students learn the fundamentals of hypothesis testing, including formulating null and alternative hypotheses. The unit covers Type I and Type II errors, test statistics, p-values, and conducting hypothesis tests for means and proportions.

Mathematical Logic

CMAN-102 C

L	T	P	Cr
3	1	0	4

Course Outcomes:

At the end of this course, students will demonstrate the ability to:

1. Understand the basic principles of mathematical logic, including propositions and logical connectives.
2. Apply truth tables to analyze logical statements and determine their validity.
3. Study and use logical inference rules for constructing valid arguments.
4. Analyze set theory concepts and their relation to logical reasoning.
5. Solve problems using logical quantifiers, such as "for all" and "there exists."

Unit 1: Introduction to Mathematical Logic

This unit covers the fundamental concepts of mathematical logic, including syntax and semantics of formal languages, as well as the distinction between propositional logic and first-order logic. Students will explore the role of logic in mathematics and computer science.

Unit 2: Propositional Logic

In this unit, students learn about propositional variables, logical connectives, and truth tables. The unit includes methods for evaluating logical expressions and techniques for proving logical equivalences, including De Morgan's laws and distributive laws.

Unit 3: First-Order Logic

This unit introduces the syntax and semantics of first-order logic, including predicates, quantifiers, and the structure of first-order sentences. Students will learn how to express mathematical statements using first-order logic and explore the concepts of interpretation and validity.

Unit 4: Proof Techniques

Students will study various proof techniques, including direct proofs, indirect proofs, proof by contradiction, and proof by induction. The unit emphasizes the importance of rigorous reasoning and clarity in mathematical arguments.

Unit 5: Set Theory and Relations

This unit covers the basics of set theory, including operations on sets, relations, and functions. Students will learn about properties of relations, including equivalence relations and partial orders, and their relevance to logic.

Differential Geometry

CMAN-102 D

L	T	P	Cr
3	1	0	4

Course Outcomes:
At the end of this course, students will demonstrate the ability to:

1. Understand the basic concepts of curves, surfaces, and manifolds in differential geometry.
2. Apply techniques like curvature and torsion to study the geometry of curves.
3. Analyze the properties of surfaces using concepts such as geodesics and normal vectors.
4. Explore the relationship between geometry and topology in higher-dimensional spaces.
5. Use differential equations to model and understand geometric structures and transformations.

Unit 1: Introduction to Differential Geometry
This unit introduces the basic concepts and motivation behind differential geometry, covering the historical context and its applications in various fields such as physics and engineering. Students will learn about curves and surfaces, along with essential definitions and examples.

Unit 2: Curves in Euclidean Space
In this unit, students explore the properties of curves, including arc length, curvature, and torsion. The unit covers parameterizations of curves, the Frenet-Serret formulas, and the classification of curves based on their geometric properties.

Unit 3: Surfaces in Euclidean Space
This unit focuses on the study of surfaces, including definitions, parameterizations, and local properties. Students will learn about tangent planes, normal vectors, and the first and second fundamental forms, along with examples of standard surfaces.

Unit 4: Metric and Curvature on Surfaces
Students will explore the concepts of intrinsic and extrinsic geometry, including the definitions of Gaussian curvature and mean curvature. The unit covers important theorems, such as the Gauss-Bonnet theorem, and applications of curvature in understanding surface geometry.

Unit 5: Differential Forms and Exterior Calculus
In this unit, students are introduced to differential forms, their properties, and applications. The unit covers the exterior derivative, Stokes' theorem, and the concept of integration on manifolds, emphasizing the geometric interpretation of these concepts.

Engineering Physics

CPHN-102

L	T	P	Cr
3	1	0	4

Course Outcomes:
At the end of this course, students will demonstrate the ability to:

1. Understand the concepts of quantum physics for materials.
2. Use of equipment for low and high energy applications.
3. Solve engineering problems by applying the concepts of wave and particle nature of radiant energy.
4. Apply the concept of energy band for semiconductors.
5. Construct a quantum mechanical model to explain the behavior of a system at microscopic level.

UNIT-I :Relativstic Mechanics
Inertial and non inertial frames, Gallilean transformation equation, Einstein's postulates, Length contraction and time dilation, Addition of velocities, Mass energy equivalence. Lorentz transformation equation, Variation of mass with velocity.

UNIT-II : Laser and Wave optics
Spontaneous and stimulated emission of radiation, Einstein's coefficients, construction and working of Ruby, He- Ne lasers. Application of lasers.
Interference of light, Biprism experiment, displacement of fringes, Newtons ring, Polarization, Phenomena of double refraction, Nicol prism, Production and analysis of plane, circular and elliptical polarized light, specific rotation, Optical activity.

-III : Wave Mechanics
Introduction to wave particle duality, de Broglie matter waves, phase and group velocities, Heisenberg's uncertainty principle and its applications, Wave function characteristics and significance, Time dependent and time independent Schrodinger's wave equations, Particle in one dimensional rigid box.

UNIT- IV : Superconductivity and Nanomaterials
Temperaure dependence of resistivity, Effect of magnetic field (Meissner effect), isotope effect, London's equation, Type I and Type II superconductor, Temperature dependence of critical field, BCS theory, High temperature superconductors, Application of superconductors.
Introduction to nanomaterials, Basic principles of nano-science and technology, structure, properties and uses of carbon nanotubes, some application of nanomaterials.

UNIT- V : Electromagnetics

Maxwell's equations (intergral and differential forms), Equation of continuity, Transverse nature of EM waves, EM- wave propagation and its propagation in free space, Poynting vector. Gradient, Divergence and Curl, Statement of gauss divergence and stokes theorems and useful vector identities.

Reference Books :

1.S.K.Gupta 'Engineering Physics-I'KrishnaPrakashan Media (P) Ltd. Meerut.
2. .S.K.Gupta 'Engineering Physics-II'KrishnaPrakashan Media (P) Ltd. Meerut.
3. Avandhanulu, M.N. and P.G. Kshirsagar. A Text book of Engineering Physics. S. Chand Publication, New Delhi.
4. Subrahmanyam, N. and BrijLal. A Textbook of Optics. S. Chand Publication, New Delhi.

Classical Mechanics

CPHN -102 A

L	T	P	Cr
3	1	0	4

Course Outcomes:
At the end of this course, students will demonstrate the ability to:

1. Understand the fundamental principles of motion, forces, and energy in classical systems.
2. Apply Newton's laws to solve problems involving force and acceleration.
3. Analyze the dynamics of rigid bodies and systems using concepts like torque and angular momentum.
4. Study the behavior of oscillating systems and solve problems in harmonic motion.
5. Use Lagrangian and Hamiltonian mechanics to solve complex mechanical problems.

Unit 1: Introduction to Classical Mechanics
This unit introduces the fundamental concepts of classical mechanics, including the historical development of the field and the importance of mechanics in physics. Students will learn about the basic principles of motion and the laws governing classical systems.

Unit 2: Kinematics of Particles
In this unit, students explore the motion of particles in one and two dimensions. Topics include displacement, velocity, acceleration, and the equations of motion. The unit also covers projectile motion and circular motion.

Unit 3: Dynamics of Particles
This unit focuses on the forces acting on particles and the application of Newton's laws of motion. Students will study concepts such as mass, weight, friction, and the relationship between force and acceleration.

Unit 4: Work and Energy
Students will learn about the work-energy principle, the concept of kinetic and potential energy, and the conservation of mechanical energy. This unit also covers power and the work done by non-conservative forces.

Unit 5: Systems of Particles and Rigid Body Dynamics
This unit examines the dynamics of systems of particles, including center of mass and linear momentum. Students will also study rigid body motion, moments of inertia, and the rotation of rigid bodies about fixed axes.

Electromagnetic Theory

CPHN -102 B

L	T	P	Cr
3	1	0	4

Course Outcomes:
At the end of this course, students will demonstrate the ability to:

1. Understand the basic concepts of electric and magnetic fields and their interactions.
2. Apply Maxwell's equations to describe electromagnetic wave propagation.
3. Analyze the behavior of electromagnetic waves in different media and boundary conditions.
4. Study electromagnetic radiation and its applications in communication systems.
5. Solve problems involving electromagnetic induction, waveguides, and antennas.

Unit 1: Introduction to Electromagnetic Theory
This unit introduces the fundamental concepts of electromagnetism, including historical perspectives and the significance of electromagnetic theory in physics. Students will learn about the basic electromagnetic phenomena and the scope of the subject.

Unit 2: Electrostatics
In this unit, students will explore the principles of electrostatics, including Coulomb's law, electric fields, and electric potential. The unit covers Gauss's law, electric field lines, and the concept of dielectric materials.

Unit 3: Magnetostatics
This unit focuses on the study of magnetic fields and forces. Students will learn about the Biot-Savart law, Ampère's law, and the concept of magnetic flux. The unit also covers the properties of magnetic materials and their applications.

Unit 4: Electromagnetic Induction
Students will investigate the principles of electromagnetic induction, including Faraday's law and Lenz's law. This unit covers the concepts of self-inductance and mutual inductance, as well as applications in electrical circuits.

Unit 5: Maxwell's Equations
In this unit, students will study Maxwell's equations and their significance in electromagnetic theory. The unit covers the integral and differential forms of these equations, along with boundary conditions and their implications for electric and magnetic fields.

Quantum Mechanics

CPHN -102 C

L	T	P	Cr
3	1	0	4

Course Outcomes:
At the end of this course, students will demonstrate the ability to:

1. Understand the fundamental principles of quantum theory, including wave-particle duality and uncertainty.
2. Apply Schrödinger's equation to solve problems in quantum systems.
3. Analyze quantum states, wave functions, and probability distributions.
4. Study the behavior of particles in potential wells, barriers, and harmonic oscillators.
5. Explore quantum phenomena like superposition, entanglement, and tunneling.

Unit 1: Introduction to Quantum Mechanics
This unit introduces the fundamental concepts of quantum mechanics, including its historical development and the limitations of classical mechanics. Students will explore the basic principles and significance of quantum theory in modern physics.

Unit 2: Wave-Particle Duality
In this unit, students will study the dual nature of matter and light, focusing on experiments such as the double-slit experiment. The unit covers the concept of wave functions and the implications of wave-particle duality in quantum mechanics.

Unit 3: Quantum States and Operators
This unit covers the mathematical formulation of quantum mechanics, including the concepts of quantum states, state vectors, and operators. Students will learn about observables, commutation relations, and the role of Hermitian operators in measurements.

Unit 4: The Schrödinger Equation
Students will explore the time-dependent and time-independent Schrödinger equations, their physical significance, and applications to various quantum systems. The unit includes solving the Schrödinger equation for simple potentials and boundary conditions.

Unit 5: Quantum Mechanics of One-Dimensional Systems
This unit focuses on one-dimensional quantum systems, including the particle in a box, harmonic oscillator, and the potential barrier. Students will study the solutions to these systems and their physical interpretations.

Solid State Physics

CPHN -102 D

L	T	P	Cr
3	1	0	4

Course Outcomes:
At the end of this course, students will demonstrate the ability to:

1. Understand the crystal structure and properties of solids, including lattice and symmetry.
2. Analyze the electrical, thermal, and magnetic properties of materials at the atomic level.
3. Study the behavior of electrons in solids using concepts like band theory and energy bands.
4. Explore the phenomena of superconductivity and magnetism in solid materials.
5. Apply principles of solid-state physics to understand semiconductor devices and their applications.

Unit 1: Introduction to Solid State Physics
This unit provides an overview of solid state physics, including its significance, basic concepts, and the classification of solids. Students will learn about crystal structures and the importance of symmetry in solid materials.

Unit 2: Crystal Lattices and Structures
In this unit, students will study the concept of crystal lattices, unit cells, and the various types of crystal structures, such as face-centered cubic, body-centered cubic, and hexagonal close-packed. The unit covers lattice parameters and the calculation of atomic packing fractions.

Unit 3: X-ray Diffraction
This unit focuses on the principles of X-ray diffraction and its applications in determining crystal structures. Students will learn about Bragg's law, diffraction patterns, and methods for analyzing crystal structures using X-ray techniques.

Unit 4: Phonons and Thermal Properties
Students will explore the concept of phonons, their role in lattice vibrations, and their significance in thermal properties of solids. The unit covers specific heat, thermal conductivity, and the Debye model of heat capacity.

Unit 5: Band Theory of Solids
In this unit, students will learn about the electronic band structure of solids, including the concepts of conduction bands, valence bands, and band gaps. The unit discusses conductors, semiconductors, and insulators, along with their electronic properties.

Computer Fundamentals and Programming Using C

CCSN-102

L	T	P	Cr
3	1	0	4

Course Outcomes:
At the end of this course, students will demonstrate the ability to:

1. Understanding of computer systems, hardware organization, and components such as CPU, memory, and I/O devices, along with basic concepts of assemblers, compilers, and linkers.
2. Proficiency in number systems, binary arithmetic, and data representation techniques, including ASCII code and BCD, along with foundational knowledge of operating systems and algorithms.
3. Ability to write and execute basic C programs, understand syntax errors, and apply arithmetic expressions, operators, and precedence in C programming.
4. Knowledge of conditional branching, loops, and iteration using if, switch, while, for, and do-while statements, along with function definitions and recursion.
5. Proficiency in handling arrays, strings, structures, pointers, and dynamic memory allocation, along with file I/O operations in C programming.

Unit-I
Computer System: Basics of computer systems, history, types, capability and limitations of computer systems, Concept of assembler, compiler, interpreter, loader and linker. Genration of Computers.
Hardware Organization: Anatomy of a digital computer, CPU, Memory, processor, I/O Devices. **Memory Units:** Hierarchy, primary memory, cache; Auxiliary storage

Unit-II
Number System: Introduction to Number Systems-Types-Decimal, Binary, Octal, Hexadecimal; Conversion from one number system to other; Binary arithmetic operations; Representation of Negative Numbers;1's complement and 2's complement, BCD code, ASCII code
Computer Fundamentals-Introduction of Operating system, Basics of computer networks, Introduction of software
Idea of Algorithm: Representation of Algorithm, Flowchart, Pseudo code with examples, From algorithms to programs, source code.

Unit-III
Programming Basics: Structure of C program, writing and executing the first C program, Syntax and logical errors in compilation, object and executable code. Components of C language. Standard I/O in C, Fundamental data types, Variables and memory locations, Storage classes.

Arithmetic expressions and precedence : Operators and expression using numeric and relational operators, mixed operands, type conversion, logical operators, bit operations, assignment operator, operator precedence and associativity.

Unit-IV

Conditional Branching: Applying if and switch statements, nesting if and else, use of break and default with switch.

Iteration and loops: use of while, do while and for loops, multiple loop variables, use of break and continue statements.

Functions: Introduction, types of functions, Defining a Function, Function Declarations, Calling a Function , Passing parameters to functions, call by value, call by reference, recursive functions.

Unit-V

Arrays: Array notation and representation, manipulating array elements, using multi-dimensional arrays. Character arrays and strings, Structure, union, enumerated data types, Array of structures, Passing arrays to functions.

Character Arrays and Strings: Declaring and Initializing String Variables, Reading Strings from Terminal, Writing Strings to Screen, Arithmetic Operations on Characters, String-handling Functions, Example Programs (with and without using built-in string functions)

Pointers: Introduction, declaration, applications, Introduction to dynamic memory allocation (malloc, calloc, realloc, free)

File handling: File I/O functions

Structures: Introduction, Defining a structure, declaring structure variables, accessing structure members, structure initialization, array of structures

TEXT & REFERENCE BOOKS:

1. Fundamentals of computers and programming with C, A. K. Sharma, Dhanpat Rai Publications, Daryaganj New Delhi
2. The C Programming Language by Dennis M Ritchie, Brian W. Kernigham, 1988, PHI.
3. C Programming – A modern approach by K.N. King, 1996, WW Norton & Co.
4. Information technology, Dennis P. Curtin, Kim Foley, Kunal Sen, Cathleen Morin, 1998, TMH

Basic Electrical Engineering

CEEN-102

L	T	P	Cr
3	1	0	4

Course Outcomes:

At the end of this course, students will demonstrate the ability to:

1. Understanding of network fundamentals, circuit analysis techniques, and application of network theorems such as Thevenin's, Norton's, and Superposition.
2. Proficiency in analyzing steady-state single-phase AC circuits, resonance, power calculations, and three-phase balanced circuits.
3. Knowledge of transformer principles, construction, losses, and efficiency, along with magnetic circuit calculations.
4. Familiarity with the operation and construction of DC machines, single-phase motors, induction motors, and synchronous generators.
5. Ability to measure electrical quantities using moving iron instruments, understand electrical installations, and apply safety measures like earthing and lightning protection.

Unit-I

Network Fundamentals: Voltage and current sources, concept of linearity, unilateral and bilateral elements. Kirchoff's laws, Mesh and node analysis of D.C. networks; Transient analysis: RL & RC circuits; Network theorems: Thevenin's theorem, Norton's theorem, Superposition theorem, Maximum power theorem, Star-delta transformation.

Unit-II

Steady State Analysis of Single Phase AC Circuits: Representation of Sinusoidal waveforms – Average and effective values, Form and peak factors. Analysis of single phase AC Circuits consisting R-L-C combination (Series and Parallel) Apparent, active & reactive power, Power factor. Concept of Resonance in series & parallel circuits, bandwidth and quality factor. Three phase balanced circuits, voltage and current relations in star and delta connections.

Unit-III

Transformers: Magnetic Circuit, Analogy with electrical circuits, Calculation for series, parallel and series parallel magnetic circuits, Eddy current and Hysteresis losses.

Single Phase Transformer: Basic constructional features and operating principle. Ideal and practical transformer, equivalent circuit, losses in transformers, regulation and efficiency.

Unit-IV

Electrical Machines: Principle of operation and constructional features of DC machine, Emf and torques equation, Armature reaction, Types of D.C. motors starting and speed control of D.C. motors, Machines:

Principle of operation of single phase motor and methods of starting of single phase motor.

Three phase induction motor operating principle.

Constructional features, Synchronous generator, Basic principle of operation, Emf equation, Constructional features.

Unit-V

Measurement of Electrical Quantities: Measurement of voltage current power and energy moving iron instruments. Measurement of 3 phase power, Accuracy class of meters.

Unit-VI

Electrical Installations: Introduction of Switch Fuse Unit (SFU), MCB, ELCB, MCCB, ACB. Types of Wires, Cables and Bus-bars. Fundamentals of earthing and lightning protection. Types of Batteries.

Technical Communication

CPCN-102

L	T	P	Cr
3	0	0	3

Course Outcomes:

At the end of this course, students will demonstrate the ability to:

1. Develop interpersonal communication, small group interactions and public speaking.
2. Exercise the writing assignments, precise writing for informational, persuasive and creative purposes.
3. Apply right form of structural usage of sentences in their written and oral communication.
4. Develop confidence and skills related reading comprehension.
5. Improve a logical framework for the critical analysis of spoken, written, visual and mediated messages upon a diverse platforms.

Unit – I

Basics of Technical Communication: Meaning, Elements, Process, Origin, Scope and Significance, Forms, Channels & Media of Communication, Barriers to Communication, Organisation and Style in Technical Communication, Non-Verbal Communication. The flow of Communication: Downward; upward, Lateral or Horizontal; Barriers to Communication
Technical Reports: Nature & Significance, Types, Formats of Reports, Structure of Formal Reports: Project Report, Dissertation and Thesis, Strategies for Writing.
Technical Articles: Nature & Significance, Types, Elements, Research Methods, Writing Strategies.
Technical Proposals: Nature & Significance, Types, Structure of a Formal Proposal, Tips for Writing.

Unit – II

Guidelines for Effective Writing: Requisites of Good Sentence Writing; Elements of a Paragraph, Requisites of Impeccable Paragraph Writing: Unity, Coherence and Logical Order; Development of Paragraphs. Mechanics of Writing: Modifiers, phrasal verbs, tone and style, graphical representation
Specific Writing: Note-Making; Summarising& Paraphrasing; Referencing; Professional Memos; e-Mails; e-Writing.

Unit – III

Professional Correspondence: Letter Writing Skills; Form & Structure; Writing Personal & Official Letters, Technical paper writing: documentation style – document editing – proof reading – Organising and formatting Quotations, Supply Orders, Complaint and Adjustment

Letters, Minutes for Meeting, Designing Resume/CV/Bio-Data, Job Application, Follow-up Letters, E. Mail Writing.

Unit – IV

Basics of Phonetics: Kinesics: Definitions; importance; Features of Body Language; Voice Modulation: Quality, Pitch; Rhythm; intonation; Pronunciation; Articulation; stress & accent; Linguistic features of voice control: International Phonetic Alphabet, Phonemes, Allophones, Phonetic Transcription, Organs of Speech, Places and Manners of Articulation, Syllable, Stress, Rhythm, Intonation, Weak Forms.

Reference Books :

1. Rizvi, M Ashraf. *Effective Technical Communication*. New Delhi: Tata McGraw-Hill, 2005. Print.
2. Raman, M. and S. Sharma. *Technical Communication: Principles and Practice*. New Delhi: Oxford University Press, 2004. Print.
3. Anderson, Paul V. *Technical Communication: A Reader-Centered Approach*. 6th ed. New Delhi: Cengage Learning, 2007. Print.
4. Taylor, Shirely. *Model Business Letters. E-mails and Other Business Documents*. 6th ed. New Delhi: Pearson Education, 2004. Print.
5. Roach, Peter. *English Phonetics and Phonology: A Practical Course*. 4th ed. New Delhi: Cambridge University Press, 2009. CD-ROM, Print.

Presentation Skills

CPCN-102 B

L	T	P	Cr
3	0	0	3

Course Outcomes:
At the end of this course, students will demonstrate the ability to:

1. Develop the ability to organize and structure content for clear and engaging presentations.
2. Enhance verbal and non-verbal communication skills to effectively engage an audience.
3. Use visual aids and multimedia tools to support and enhance the presentation.
4. Build confidence in delivering presentations in front of diverse audiences.
5. Practice handling questions and discussions to effectively interact with the audience.

Unit 1: Essential Grammar

Application of tenses, Auxiliaries- correct usage and importance informal communication, Business Vocabulary - Vocabulary exercises through web-baseApplications,Written Communication

Unit 2: Written Communication Skills

Email writing- Formal and Informal email writing structure, Inquiry letters, Instruction letters, complaint letters, Routine business letters, Sales Letters etc. Technical writing, Essay writing, Paragraph writing.

Unit 3: Leader's Role, Responsibilities And Skill Required:

Understanding good Leadership Learning the difference between Leadership and Management, Gaining insight

into your Patterns, Beliefs and Rules, Defining Qualities and Strengths of leadership, Determining how well you perceive what's going on around you, interpersonal Skills and

Communication Skills, Learning about Commitment and How to Move Things Forward,

Making Key Decisions, Handling Your and Other People's Stress, Empowering, Motivating

and Inspiring Others, Leading by example, effective feedback. Problem Solving Skill:3: Writing Skills

Unit 4: Corporate business etiquettes

Corporate grooming & dressing, etiquettes in social & office Setting-Understand the importance of professional behaviour at the work place, Understand and Implement etiquettes in workplace, presenting oneself with finesse and making others comfortable in a business setting. Importance of first impression, Grooming, Wardrobe, Introduction to Ethics in engineering and ethical reasoning, rights and responsibilities Diversity and Inclusion Part 2: Socio-Cultural and Cross-Cultural

Reference Books:

Fred Luthans, Organizational Behaviour, McGraw Hill

Lesikar and petit, Report writing for Business

M. Ashraf Rizvi, Effective Technical Communication, McGraw Hill

Wallace and masters, Personal Development for Life and Work, Thomson Learning,

Hartman Lemay, Presentation Success, Thomson Learning

Malcolm Goodale, Professional Presentations

Farhathullah, T. M. Communication skills for Technical Students

Michael Muckian, John Woods, The Business letters Handbook

Herta A. Murphy, Effective Business Communication

Lehman, Dufrene, Sinha BCOM, Cengage Learning

Digital Communication

CPCN-102 C

L	T	P	Cr
3	0	0	3

Course Outcomes:
At the end of this course, students will demonstrate the ability to:

1. Understand the principles of digital communication systems and data transmission.
2. Analyze modulation techniques like AM, FM, and PM for effective signal transmission.
3. Study error detection and correction methods to improve communication reliability.
4. Explore digital encoding and decoding techniques for efficient data representation.
5. Apply concepts of bandwidth, noise, and channel capacity in designing communication systems.

Unit 1:

Pulse Digital Modulation: Elements of digital communication systems, advantages of digital communication systems, Elements of PCM: Sampling, Quantization & Coding, Quantization error, Companding in PCM systems. Differential PCM systems (DPCM). Time Division Multiplexing &Demultiplexing. Delta Modulation: Delta modulation, its draw backs, adaptive delta modulation, comparison of PCM and DM systems, Noise in PCM and DM systems. Illustrative Problems.

Unit 2:

Digital Modulation Techniques: Introduction, ASK modulator, Coherent and Non-Coherent ASK detector, FSK modulator, Spectrum of FSK, coherent reception, non-coherent detection of FSK. BPSK transmitter, Coherent reception of BPSK, DPSK, QPSK. Data Transmission: Base band signal receiver, probability of error, The optimum filter, Matched filter, probability of error using matched filter.Optimum filter using correlator.Probability of error of ASK,FSK,BPSK and QPSK. Illustrative Problems

Unit 3:

Information Theory: Discrete messages, Concept of amount of information and its properties. Average information, Entropy and its properties. Information rate, Mutual information and its properties, Illustrative Problems. Source Coding: Introduction, Advantages, Hartley Shannon's theorem, bandwidth –S/N trade off, Shanon- Fano coding, Huffman coding, Illustrative Problems

Unit 4:

Linear Block Codes: Introduction, Matrix description of Linear Block codes, Error detection and error correction capabilities of linear block codes, Hamming codes. Cyclic Codes: Encoding, Syndrome Calculation, Decoding's

Unit 5:

Convolution Codes: Introduction, encoding of convolution codes, time domain approach, transform domain approach. Graphical approach: State, Tree and Trellis diagram. Decoding using Viterbi algorithm Illustrative Problems

Reference Books:

Fred Luthans, Organizational Behaviour, McGraw Hill

Lesikar and petit, Report writing for Business

M. Ashraf Rizvi, Effective Technical Communication, McGraw Hill

Wallace and masters, Personal Development for Life and Work, Thomson Learning,

Hartman Lemay, Presentation Success, Thomson Learning

Malcolm Goodale, Professional Presentations

Farhathullah, T. M. Communication skills for Technical Students

Michael Muckian, John Woods, The Business letters Handbook

Herta A. Murphy, Effective Business Communication

Lehman, Dufrene, Sinha BCOM, Cengage Learning

Audience Analysis

CPCN-102 D

L	T	P	Cr
3	0	0	3

Course Outcomes:
At the end of this course, students will demonstrate the ability to:

1. Understand the importance of identifying the needs, interests, and characteristics of an audience.
2. Analyze audience demographics such as age, education, and cultural background to tailor communication.
3. Assess the knowledge level of the audience to ensure appropriate content complexity.
4. Develop strategies for engaging and maintaining the audience's attention during presentations.
5. Adapt communication style and tone based on audience feedback and responses.

Unit 1 : Fundamentals of Communication and Voice Dynamics: Role and Purpose of Communication, Types & Flow of Communication, Barriers to Effective Communication, 7 C's of Communication, Code and Content; Stimulus & Response, Vowel Sounds, Consonant Sounds, Tone: Rising and Falling Tone.

Unit 2 : Communication Skills for Career Building CV and Résumé Writing, Interview Skills, Group Discussion, Effective Profiling, Communication and Networking: Building relationships, Writing the Statement of Purpose (SOP) for admission in Higher Studies, Seminar & Conference Paper Writing, Expert Technical Lecture: Writing and Presenting.

Unit 3: Communication Skills for Presentation: Writing, Designing, and Speaking Thesis and Project Report Writing, Technical Proposal Writing, How to Pitch an Idea: Process, Preparation and Structure, Elements of Speech Delivery: Passion, Poise & Illustrations.

Unit 4: Communication and Leadership Development Leadership Communication, Communication and Social competence: context, feelings, intentions, and behaviors, Providing and Receiving feedback, Difference between Tact and Intelligence, Emotional Intelligence: Trust through Communication, Thinking Skills: Meaning and Types.

Unit 5: Digital Communication and Personality Making Content Creation for Social Media: Emails, Webinars, podcasts, Blogs. Effective and Ethical use of Social Media by Text and Technique, Speech and Personality, Personality Analysis: Types of Personality; Concept of Personality: Maslow, Freud, Vivekananda, and Jung Typology &Personality Assessment.

Prescribed Book:

1. Technical Communication – Principles and Practices by Meenakshi Raman &Sangeeta Sharma, Oxford Univ. Press, 2018, New Delhi

2. Personality Development and Soft Skills by Barun K. Mitra, OUP, 2012, New Delhi.

3. Technical Communication, by Pfeiffer, 6 thedn (Pearson)

4. Soft Skills & Employability, Sabina Pillai and Agna Fernandez Cambridge University Press 2018.

5. Practical Communication: Process and Practice by L.U.B. Pandey; A.I.T.B.S.Publications India Ltd.; Krishan Nagar, 2014, Delh

Reference Books:

Fred Luthans, Organizational Behaviour, McGraw Hill

Lesikar and petit, Report writing for Business

M. Ashraf Rizvi, Effective Technical Communication, McGraw Hill

Wallace and masters, Personal Development for Life and Work, Thomson Learning,

Hartman Lemay, Presentation Success, Thomson Learning

Malcolm Goodale, Professional Presentations

Farhathullah, T. M. Communication skills for Technical Students

Engineering Physics Lab

CPHN-152

L	T	P	Cr
0	0	2	1

Course Outcomes:
At the end of this course, students will demonstrate the ability to:

1. Perform experiments to understand the fundamental concepts of physics in engineering applications.
2. Use instruments to measure physical properties such as length, time, and temperature accurately.
3. Analyze experimental data to verify theoretical predictions and principles.
4. Develop practical skills in handling equipment and conducting laboratory procedures.
5. Prepare clear and concise lab reports to document findings and conclusions.

1. Measurement of wavelength of monochromatic light by Newton's rings
2. Measurement of the specific rotation of cane sugar solution using Biquartzpolarimeter
3. Measurement of wavelength of spectral lines using plane transmission grating
4. Measurement of the specific resistance of the material of a given wire using Carey Foster Bridge
5. Study of the variation of magnetic field along the axis of current carrying coil and then to estimate the radius of the coil
6. Calibration of the given voltmeter and ammeter with a potentiometer
7. Measurement of the resistivity and energy band gap of a semiconductor material (four probe)
8. Study of Hall effect and determination of Hall coefficient and carrier density of a given semiconductor material
9. Measurement of acceleration due to gravity by compound pendulum
10. Measurement of electro-chemical equivalent (ECE) of copper using Helmholtz galvanometer
11. Measurement of Planck's constant 'h' by measuring radiation in a fixed spectral range

12. Measurement of wavelength of He-Ne Laser using a narrow slit (Diffraction pattern)

13. Measurement of the dielectric constant of different solids

Reference Books :

1. Jain, R.K., DarakhshanSahar and D. Mishra. *Engineering Physics Practical Manual.* Shobhit University Publication, 2009.

Classical Mechanics Lab

CPHN-152 A

L	T	P	Cr
0	0	2	1

Course Outcomes:
At the end of this course, students will demonstrate the ability to:

1. Conduct experiments to verify the principles of motion, force, and energy in classical systems.
2. Measure and analyze parameters like velocity, acceleration, and displacement in mechanical setups.
3. Apply Newton's laws and other classical mechanics concepts to solve practical problems.
4. Develop skills in using mechanical instruments to observe and record physical phenomena.
5. Document experimental results and analyze them to draw conclusions related to classical mechanics.

List of Experiments:

1) Measurement of acceleration due to gravity using a simple pendulum.
2) Study of projectile motion using a projectile launcher.
3) Analysis of collisions using a ballistic pendulum.
4) Investigation of harmonic motion with a spring-mass system.
5) Determination of the moment of inertia using a rotational apparatus.
6) Study of the conservation of energy with a mechanical energy experiment.
7) Measurement of the coefficient of friction using an inclined plane.
8) Analysis of motion using a ticker tape timer.
9) Experiment to study the motion of a body under uniform circular motion.
10) Examination of the principles of linear momentum using a dynamics cart.
11) Investigation of damped harmonic motion with a damped oscillator setup.
12) Measurement of the gravitational force using a torsion balance.
13) Study of the laws of motion using a dynamic cart and track.
14) Experiment to analyze the motion of a pendulum with varying lengths.
15) Determination of the center of mass of a system of particles.
16) Investigation of rolling motion and its relation to translational motion.
17) Measurement of the energy loss during inelastic collisions.
18) Study of the oscillations of a compound pendulum.
19) Analysis of the effects of air resistance on falling objects.
20) Experiment to verify Kepler's laws using a planetary motion setup.
21) Investigation of the principles of energy transfer in a spring system.

Electromagnetic Theory Lab

CPHN-152 B

L	T	P	Cr
0	0	2	1

Course Outcomes:
At the end of this course, students will demonstrate the ability to:

1. Perform experiments to verify the principles of electric and magnetic fields.
2. Measure the properties of electromagnetic waves and analyze their behavior in different media.
3. Apply Maxwell's equations to real-world electromagnetic problems and scenarios.
4. Use instruments like oscilloscopes and signal generators to study electromagnetic phenomena.
5. Analyze experimental data to understand the relationship between electric fields, magnetic fields, and wave propagation.

List of Experiments:

1) Measurement of electric field strength using a parallel plate capacitor.
2) Determination of capacitance of various capacitors.
3) Study of magnetic field around a current-carrying conductor using a magnetic field sensor.
4) Investigation of Faraday's law of electromagnetic induction using coils and magnets.
5) Measurement of resistance of different materials using a Wheatstone bridge.
6) Analysis of resonance in an LC circuit.
7) Experiment to determine magnetic field strength using a solenoid.
8) Study of the Hall effect in semiconductors.
9) Investigation of electromagnetic waves using antennas and oscilloscopes.
10) Measurement of the dielectric constant of various materials.
11) Determination of the characteristics of a transformer.
12) Analysis of the behavior of RLC circuits.
13) Experiment to observe the phenomenon of self-inductance and mutual inductance.
14) Study of the principles of rectification using diodes.
15) Measurement of the frequency response of an RLC circuit.

Quantum Mechanics Lab

CPHN-152 C

L	T	P	Cr
0	0	2	1

Course Outcomes:
At the end of this course, students will demonstrate the ability to:

1. Conduct experiments to verify principles of quantum mechanics, such as wave-particle duality.
2. Measure quantum effects like interference and diffraction in particle behavior.
3. Use laboratory tools to observe and analyze quantum phenomena, such as energy levels and transitions.
4. Apply the concepts of superposition and entanglement in practical setups.
5. Analyze experimental data to explore the validity of quantum mechanical models and theories.

List of Experiments:

1. Measurement of Planck's constant using a photoelectric effect experiment.
2. Determination of the energy levels of hydrogen using the Balmer series.
3. Experiment to observe electron diffraction patterns.
4. Study of the Stern-Gerlach experiment to investigate spin states.
5. Measurement of the energy levels of a quantum harmonic oscillator.
6. Investigation of the Compton Effect using X-rays.
7. Experiment to demonstrate quantum tunneling using a tunneling microscope.
8. Analysis of the characteristics of semiconductor diodes.
9. Measurement of the properties of lasers and their quantum aspects.
10. Study of the effects of temperature on the resistance of superconductors.
11. Experiment to observe the double-slit interference pattern with single photons.
12. Determination of the energy distribution of thermal photons.
13. Investigation of the Rydberg formula for hydrogen-like atoms.
14. Measurement of Zeeman Effect in a magnetic field.
15. Study of quantum entanglement using polarization filters.
16. Analysis of wave-particle duality through various experiments.
17. Experiment to investigate the effect of temperature on quantum states in solids.

Solid State Physics Lab

CPHN-152 D

L	T	P	Cr
0	0	2	1

Course Outcomes:
At the end of this course, students will demonstrate the ability to:

1. Conduct experiments to study the electrical and thermal properties of solid materials.
2. Measure the band gap and conductivity of semiconductors and insulators.
3. Analyze the magnetic properties of materials and their response to external fields.
4. Investigate the crystal structure and symmetry of solids using diffraction techniques.
5. Apply solid-state physics principles to study phenomena like superconductivity and magnetism in materials.

List of Experiments:

1. Measurement of lattice parameters using X-ray diffraction.
2. Study of crystal structure using a polarizing microscope.
3. Determination of the thermal conductivity of a solid material.
4. Measurement of specific heat capacity of solids using the calorimetric method.
5. Investigation of electrical conductivity in different materials.
6. Analysis of the Hall effect in semiconductor samples.
7. Measurement of the band gap energy of semiconductors using a four-probe method.
8. Study of the magnetic properties of materials using a vibrating sample magnetometer.
9. Measurement of dielectric constant and loss tangent of materials.
10. Investigation of the characteristics of p-n junction diodes.
11. Determination of the resistivity of materials at varying temperatures.
12. Study of ferromagnetic hysteresis using a magnetometer.
13. Measurement of the phonon dispersion relation using inelastic neutron scattering.
14. Analysis of the temperature dependence of resistivity in metals and semiconductors.
15. Study of piezoelectric properties in certain crystals.
16. Measurement of the sound velocity in solids using ultrasonic methods.
17. Investigation of the mechanical properties of materials through stress-strain tests.
18. Study of the optical properties of semiconductors using a spectrophotometer.
19. Measurement of the thermal expansion of solid materials.
20. Investigation of defects in crystals using etch pit techniques.

Computer Programming Using C Lab

CCSN-152

L	T	P	Cr
0	0	2	1

Course Outcomes:

At the end of this course, students will demonstrate the ability to:

1. Develop programming skills using C for solving computational problems.
2. Write, compile, and debug C programs to implement algorithms and data structures.
3. Understand memory management concepts such as pointers, arrays, and dynamic memory allocation.
4. Apply control structures like loops, conditionals, and functions in C programming.
5. Implement file handling and develop practical applications using C programming concepts.

1. Write a program to display "hello world" in C.
2. Write a program to insert a new line using \n , make a line Single-line comment and make a line multi-line comment.
3. Write a program to create a variable and assign values to variables using scanf() function.
4. Write a program to print other types, use %c for char and %f for float.
5. Write a program to declare more than one variable of the same type.
6. Write a program to calculate the area of a rectangle and area of a triangle.
7. Write a program to perform operations on variables and values (+ , - , *, / ,%).
8. Write a program to perform addition assignment operator (+=) adds a value to a variable.
9. Write a program to find out if a person is old enough to vote using Scanf() function.
10. Write a program to Find out if a number is even or odd using Scanf() function.
11. Write a program for a condition using While Loop.
12. Write a program to print table for the given number using while Loop.
13. Write a program to make the multi-dimensional (2D) array using for Loop.
14. Write a program to print the Right-Angled Triangle Pattern using for loop.
15. Write a program to print the Inverted Right-Angled Triangle Pattern using for loop.
16. Write a program to print the Inverted Pyramid Pattern using for loop.
17. Write a program to print the Inverted Pyramid Pattern using for loop.
18. Write a program to print the Hollow Square Pattern using for loop.
19. Write a program to print the Diamond Pattern using for loop.
20. Convert temperatures between Celsius and Fahrenheit.

Simple Input Output Functions, Arithmetic/Logical & Relational Operators, Sequence Control, Decision Control, Iteration, Arrays Single/Multi dimensional(Numeric/Character), Functions (Call by value/Call by reference), Recursive functions, Structures, Pointers, Library functions, File streams.

Reference Books :

1. Sharma, A.K. *Fundamentals of Computers and Programming with C*. DhanpatRai Publications, New Delhi, 2005.
2. Sharma, Divya. *Lab. Manual: Fundamentals of Computers and Programming with C*, Shobhit University Publication, Meerut.

Basic Electrical Engineering Lab

CEEN 152

L	T	P	Cr
0	0	2	1

Course Outcomes:
At the end of this course, students will demonstrate the ability to:

1. Conduct experiments to understand the basic principles of electrical circuits and components.
2. Measure and analyze electrical quantities like voltage, current, and resistance using appropriate instruments.
3. Study the characteristics and operation of electrical devices like resistors, capacitors, and inductors.
4. Apply Ohm's law and Kirchhoff's laws to solve basic electrical circuit problems.
5. Develop skills in wiring and testing electrical circuits safely in a laboratory environment.

1. Verify the KCL
2. Verify the KVL
3. Short Circuit and Open Circuit
4. Study of Energy meter
5. Verification Thevenin Theorem
6. Verification of Norton theorem
7. Verification of superposition theorem
8. V-I Characteristics of PN Junction Diode
9. Study the half wave rectifier.
10. Study the full wave rectifier.

Circuit Theory Lab

CEEN-152 A

L	T	P	Cr
0	0	2	1

Course Outcomes:
At the end of this course, students will demonstrate the ability to:

1. Perform experiments to verify circuit theorems such as Ohm's law and Kirchhoff's laws.
2. Measure and analyze the voltage, current, and power in various electrical circuits.
3. Study the behavior of passive and active components like resistors, capacitors, and transistors.
4. Use tools like oscilloscopes and multimeters to test and troubleshoot circuits.
5. Develop practical skills in constructing, simulating, and analyzing electrical circuits.

1) Measurement of voltage, current, and resistance using a multimeter.
2) Analysis of series and parallel circuits using resistors.
3) Study of Ohm's law and its verification through experiments.
4) Investigation of Kirchhoff's voltage and current laws in circuit analysis.
5) Measurement of the characteristics of a diode.
6) Study of transistor characteristics and biasing configurations.
7) Experiment to analyze the behavior of RL circuits.
8) Measurement of capacitance using an RC circuit.
9) Study of the frequency response of an RLC circuit.
10) Analysis of AC and DC circuits using an oscilloscope.
11) Investigation of phase shift in RC and RL circuits.
12) Measurement of power in AC circuits using a wattmeter.
13) Study of the charging and discharging of a capacitor.
14) Analysis of resonance in RLC circuits.
15) Experiment to determine the time constant of an RC circuit.
16) Measurement of the input and output characteristics of a common-emitter amplifier.
17) Study of filter circuits: low-pass, high-pass, and band-pass filters.
18) Investigation of the use of breadboards for circuit prototyping.
19) Measurement of inductance using a series RLC circuit.
20) Study of the operation of a Wheatstone bridge.
21) Experiment to analyze the response of a feedback amplifier.

Electromagnetism Lab

CEEN-152 B

L	T	P	Cr
0	0	2	1

Course Outcomes:
At the end of this course, students will demonstrate the ability to:

1. Conduct experiments to study the properties of electric and magnetic fields.
2. Measure and analyze the behavior of electromagnetic waves in different materials.
3. Verify the principles of electromagnetic induction and Faraday's law.
4. Use instruments like galvanometers and oscilloscopes to observe electromagnetic phenomena.
5. Apply Maxwell's equations to practical problems involving electric and magnetic fields.

List of Practicals

1. Measurement of electric field strength using a parallel plate capacitor.
2. Investigation of electrostatic potential using an electroscope.
3. Study of magnetic field lines using iron filings and a magnet.
4. Measurement of the resistance of different materials using a multimeter.
5. Analysis of the magnetic field around a current-carrying conductor using a compass.
6. Experiment to demonstrate Faraday's law of electromagnetic induction.
7. Measurement of the capacitance of capacitors in series and parallel configurations.
8. Study of the properties of solenoids and their magnetic fields.
9. Investigation of the Hall effect in semiconductor materials.
10. Measurement of the permeability of free space using a solenoid.
11. Study of Lenz's law using a coil and a falling magnet.
12. Experiment to determine the characteristics of a transformer.
13. Measurement of the dielectric constant of various materials.
14. Analysis of the behavior of RC and RL circuits.
15. Study of electromagnetic waves using a dipole antenna.
16. Investigation of resonance in RLC circuits.
17. Measurement of the speed of electromagnetic waves in different media.
18. Study of electric fields using field line patterns and potential plots.
19. Investigation of capacitive and inductive reactance in AC circuits.
20. Measurement of the magnetic field strength using a Gauss meter.
21. Experiment to analyze the effect of frequency on inductive and capacitive reactance.

Digital Electronics Lab

CEEN-152 C

L	T	P	Cr
0	0	2	1

Course Outcomes:
At the end of this course, students will demonstrate the ability to:

1. Design and implement basic digital circuits using logic gates and flip-flops.
2. Verify and analyze the functionality of combinational and sequential logic circuits.
3. Use simulation tools and hardware to test and troubleshoot digital circuits.
4. Develop skills in using digital ICs, multiplexers, decoders, and counters.
5. Apply Boolean algebra to simplify and optimize digital circuit designs.

List of practicals

1. Study of basic logic gates: AND, OR, NOT, NAND, NOR, and XOR.
2. Construction and analysis of combinational circuits using logic gates.
3. Implementation of a half adder and full adder circuit.
4. Design and testing of a 4-bit binary adder/subtractor using full adders.
5. Construction of a 4-to-1 multiplexer and demultiplexer.
6. Implementation of a 2-bit binary comparator.
7. Design of a 7-segment display decoder using logic gates.
8. Analysis of flip-flops: SR, D, JK, and T flip-flops.
9. Construction of a 4-bit shift register and its operations.
10. Design and simulation of synchronous and asynchronous counters.
11. Study of digital-to-analog converters (DAC) and their applications.
12. Implementation of an analog-to-digital converter (ADC) circuit.
13. Experiment to analyze timing diagrams of digital circuits.
14. Design of a binary counter using flip-flops.
15. Construction of a state machine using flip-flops and logic gates.
16. Study of memory devices: RAM and ROM, and their applications.
17. Implementation of a priority encoder circuit.
18. Analysis of combinational and sequential logic circuit behaviors.
19. Simulation of digital circuits using software tools like Logisim or Multisim.
20. Study of noise margins and signal integrity in digital circuits.
21. Experiment to implement and analyze a basic ALU (Arithmetic Logic Unit).

Electrical Measurements and Instrumentation Lab

CEEN-152 D

L	T	P	Cr
0	0	2	1

Course Outcomes:
At the end of this course, students will demonstrate the ability to:

1. Use various electrical instruments to measure voltage, current, resistance, and power.
2. Calibrate and test measuring devices for accuracy and precision.
3. Analyze the working principles of analog and digital measurement instruments.
4. Conduct experiments to understand the characteristics of sensors and transducers.
5. Develop skills in data acquisition and analysis for electrical measurements.

1. Measurement of voltage using a digital multimeter.
2. Measurement of current using a clamp meter.
3. Determination of resistance using a Wheatstone bridge.
4. Calibration of an ammeter and voltmeter using standard references.
5. Measurement of power in an AC circuit using a wattmeter.
6. Study of the characteristics of different types of electrical instruments.
7. Measurement of frequency using a frequency counter.
8. Determination of the phase angle in an AC circuit using an oscilloscope.
9. Experiment to measure the insulation resistance of cables.
10. Analysis of a potentiometer for voltage measurement.
11. Measurement of temperature using thermocouples and RTDs.
12. Study of the operation of an LCR meter for inductance and capacitance measurement.
13. Measurement of capacitance using a capacitance meter.
14. Experiment to analyze the response of a digital oscilloscope.
15. Measurement of power factor in an AC circuit.
16. Study of various transducers and their applications in measurements.
17. Experiment to measure the Earth resistance using an Earth tester.
18. Analysis of load characteristics of different electrical machines.
19. Measurement of magnetic field strength using a Gauss meter.
20. Experiment to evaluate the performance of a signal generator.
21. Study of data acquisition systems and their applications in instrumentation.

Object Oriented Programming Using C++

CCSN- 202

L	T	P	Cr
3	1	0	4

Course Outcomes:
At the end of this course, students will demonstrate the ability to:

1. Understand OOPS Concepts: Students will comprehend the fundamental principles of OOPS, including encapsulation, abstraction, inheritance, polymorphism, and composition.
2. C++ Programming Skills: Students will learn to apply OOPS concepts using the C++ programming language.
3. Classes and Objects: Students will define classes and objects, understand their properties and methods, and use them effectively.
4. Inheritance and Polymorphism: Students will grasp inheritance and polymorphism, using them to create more flexible and reusable code.
5. Code Quality and Maintenance: Students will understand the importance of code quality and maintenance, using OOPS principles to create high-quality code.

UNIT I: Introduction to C++: History of C and C++, Overview of Procedural Programming and Object-Orientation Programming, Compiling and Executing Simple Programs in C++.
Data Types, Variables, Constants, Operators and Basic I/O: Declaring, Defining and Initializing Variables, Scope of Variables, Constants, Keywords, Data Types, Casting of Data Types, Operators (Arithmetic, Logical and Bitwise), Character I/O (getc, getchar, putc, putcharetc), Formatted and Console I/O (printf(), scanf(), cin, cout), Using Basic Header Files (stdio.h, iostream.h, conio.hetc).
UNIT II: Expressions, Conditional Statements and Iterative Statements: Operators in C++, Conditional Statements (if construct, switch-case construct), Understanding syntax and utility of Iterative Statements (while, do-while, and for loops), Use of break and continue in Loops, Using Nested Statements (Conditional as well as Iterative)
UNIT III: Functions: Utility of functions, Call, Functions returning value, void functions, Inline Functions, Return data type of functions, Functions parameters, Declaration and Definition of Functions, Command Line Arguments/Parameters in Functions, Functions with variable number of Arguments, virtual function.
Arrays: Creating and Using One Dimensional Arrays- (Declaring and Defining an Array, Initializing an Array, Accessing individual elements in an Array, Manipulating array elements using loops, use various types of arrays (integer, float and character arrays / Strings).
Two-dimensional Arrays- (Declaring, Defining and Initializing Two Dimensional Array, Working with Rows and Columns), Introduction to Multi-dimensional arrays
Derived Data Types (Structures and Unions), Pointers and References in C++,
Memory Allocation in C++: static and dynamic memory allocation, use of new and delete operators, storage of variables in static and dynamic memory allocation.
UNIT IV: File I/O, Preprocessor Directives: Opening and closing a file (use of fstream header file, ifstream, ofstream and fstream classes), Reading and writing Text Files, Using put(), get(), read() and write() functions, Random access in files, Understanding the Preprocessor Directives (#include, #define, #error, #if, #else, #elif, #endif, #ifdef, #ifndef and #undef),

Macros. **Using Classes in C++:** Principles of Object-Oriented Programming, Defining & Using Classes, Class Constructors, Function overloading in classes, Class level variable and local variable, Objects as parameters, Specifying the Protected and Private Access, Overview of Template classes and their use.

UNIT V: Overview of Function Overloading and Operator Overloading

Need of Overloading functions and operators, Overloading functions by number and type of arguments, looking at an operator as a function call, Overloading Operators (including assignment operators, unary operators), friend function in C++.

Inheritance, Polymorphism and Exception Handling

Inheritance, types of inheritance, Polymorphism (compile time and run time), Basics Exceptional Handling (using catch and throw, multiple catch statements), Catching all exceptions, Restricting exceptions, Rethrowing exceptions.

Reference Books

1. HerbtzSchildt, "C++: The Complete Reference", Fourth Edition, McGraw Hill.2003

CCSN-204

Design and Analysis of Algorithm

L	T	P	Cr
3	1	0	4

Course Outcomes:

1. Understand the fundamentals of algorithms, including characteristics, performance analysis, and asymptotic notations like Big-O, Omega, and Theta.
2. Gain knowledge of divide and conquer strategies, with applications to binary search, quick sort, merge sort, and graph algorithms.
3. Learn the greedy method and its applications in problems like job sequencing, knapsack, and minimum cost spanning trees.
4. Explore graph algorithms such as BFS, DFS, spanning trees, and dynamic programming applications like optimal binary search trees and the traveling salesperson problem.
5. Understand backtracking, branch and bound techniques, and NP-hard/NPC problems, including their impact on algorithm complexity and solution approaches.

Unit- I

Introduction: Basics of Algorithms, Characteristics of Algorithms, pseudo code for expressing algorithms, performance analysis-space complexity, time complexity, asymptotic notation- big (O) notation, omega notation, theta notation.

Unit- II

DIVIDE AND CONQUER: General method, applications-analysis of binary search, quick sort, merge sort, AND OR Graphs.

GREEDY METHOD: General method, Applications-job sequencing with deadlines, Fractional knapsack problem, minimum cost spanning trees, Single source shortest path problem.

Unit- III

GRAPHS (Algorithm and Analysis): Breadth first search and traversal, Depth first search and traversal, spanning trees, connected components and bi-connected components, Articulation points. DYNAMIC PROGRAMMING: General method, applications - optimal binary search trees, 0/1 knapsack problem, All pairs shortest path problem, Travelling sales person problem, Reliability design.

Unit- IV

BACKTRACKING: General method, Applications- n-queen problem, Sum of subsets problem, Graph coloring and Hamiltonian cycles. BRANCH AND BOUND: General method, applications - travelling sales person problem, 0/1 knapsack problem- LC branch and bound solution, FIFO branch and bound solution.

Unit- V

NP-HARD AND NP-COMPLETE PROBLEMS: Basic concepts, non-deterministic algorithms, NP-hard and NP-complete classes, Cook's theorem

Text books:

1) Thomas H. Coreman, Charles E. Leiserson and Ronald L. Rivest, "Introduction to Algorithms", Printice Hall of India.
2) E. Horowitz & S Sahni, "Fundamentals of Computer Algorithms",
3) Aho, Hopcraft, Ullman, "The Design and Analysis of Computer Algorithms" Pearson Education, 2008.

References:

1) Jon Kleinberg and ÉvaTardos, Algorithm Design, Pearson, 2005.
2) Michael T Goodrich and Roberto Tamassia, Algorithm Design: Foundations, Analysis, and Internet Examples, Second Edition, Wiley, 2006.
3) Harry R. Lewis and Larry Denenberg, Data Structures and Their Algorithms, Harper Collins, 1997 Robert Sedgewick and Kevin Wayne, Algorithms, fourth edition, Addison Wesley, 2011.
4) Harsh Bhasin,"Algorithm Design and Analysis",FirstEdition,Oxford University Press.
5) Gilles Brassard and Paul Bratley,Algorithmics:Theory and Practice,Prentice Hall,1995

Internet and Web Technology

CCSN- 206

L	T	P	Cr
3	1	0	4

Course Outcomes:

1. Understand web technologies, protocols, and the process of creating websites for individuals and businesses.
2. Gain knowledge of HTML, including text formatting, graphics, tables, and creating forms and links.
3. Learn how to use CSS for styling web pages, including font, text, and background attributes, and creating navigation links.
4. Understand JavaScript fundamentals like variables, functions, loops, events, and how to integrate JavaScript with HTML for interactive web pages.
5. Explore PHP syntax, working with forms, processing data, and handling error and exceptions in web development.

Unit 1

Introduction web: WWW, History, Protocols, Creating website for individual and corporate, Identification of objects, Cyber Laws, Web team, Communication, Quality assurance, Search Engine, Designing strategies, Database to web applications.

Unit 2

HTML: History of HTML, Header, HTML Tags: concept of Tag, types of HTML tags, structure of HTML program, Text formatting through HTML: Paragraph breaks, line breaks, background and BGcolor attributes, Emphasizing material in a web page: Heading styles, drawing lines, text styles, Text styles and other text effects-centering, spacing, controlling font size & color, Lists: Using unordered, ordered, definition lists Adding Graphics To HTML Documents: Using Image tag, attributes of Image tag, changing width & height of image, tables, linking documents, Forms,

Unit 3

Cascade Style Sheets: introduction to CSS, Need for CSS, basic syntax and structure, using CSS, font attributes, color and background attributes, text attributes, border attributes, margin related attributes, list attributes Using class and span tag, External Style Sheets, Creating Divs with ID style, Creating Tag& Class style, creating borders, Navigation links, creating effects with CSS.

Unit 4

JavaScript: Introduction, Variables, Conditional statements, Operators, Popup box, Functions, Loops, Strings, Events, JavaScript and HTML, JavaScript Object Oriented Programming, use of JavaScript in web pages. Understand JavaScript event model, Variable declaration, Operators, Control Statements, Error Handling, Understanding arrays, Function Declaration, Built In Functions, Standard Date and Time Functions, Working with Objects, Call method in JavaScript.

Unit 5

Introduction to PHP, Syntax, Common PHP Script Elements, Variables, String, Operators, If...Else, Switch, Arrays, Looping, Functions, Forms, $_GET, $_POST, Date, Include, Error, Exception, Filter, Working With Forms, Processing Forms, Form Validation

Reference Books:

1) Ivan Bayross" HTML, DHTML and JavaScript ", Prentice Hall Inc., 3rd Edition, 2003.
2) Uttam K. Roy, "Web Technoologies ", Oxford, 1st Edition 2010.
3) TanweerAlam, "Internet and Java Programming ", Khanna Book Publication, 1st Edition, 2010.

Computer Networks

CCSN-208

L	T	P	Cr
3	1	0	4

Course Outcomes:
At the end of this course, students will demonstrate the ability to:

1. Understand the history, structure, and goals of computer networks, including OSI and TCP/IP models and network topologies.
2. Learn about data link layer protocols, error control, and media access techniques like CSMA, FDMA, and CDMA.
3. Gain knowledge of network layer routing algorithms, IP addressing, and congestion control mechanisms in TCP/IP networks.
4. Explore transport and session layer issues, remote procedure calls, and presentation layer techniques like compression and cryptography.
5. Study application layer protocols, including HTTP, email protocols, DNS, and file transfer methods in computer networks.

UNIT I
Introduction - History of Computer Networking and the Internet, Goals and Applications of Networks, Network structure and architecture, The Layered Architecture: Protocol Layering, The OSI Reference Model and the TCP/IP protocol, Network Topology Design – Delay Analysis, Back Bone Design, Local Access Network Design, Physical Layer Transmission Media, Switching methods.

UNIT II
Data Link Layer: Communication at the Data Link Layer; Nodes and Links, Examples of Data Link layer protocols.
Design Issues: Framing techniques: Byte Oriented and Bit Oriented Protocols; Error Control: Error Detection and Correction; Sliding Window Flow Control Protocols.
Media Access Control: Aloha, CSMA, CSMA/CD, CSMA/CA; Collision free protocols with Controlled Access; Limited Contention Protocols; Channelization: FDMA, TDMA, CDMA; Wavelength Division Multiple access for Fiber-Optic Data Communication.
IEEE LAN standards: Ethernet (Physical specifications, Encoding, Frame Format & MAC protocol); Token Ring and FDDI, Introduction to Wireless Networks: IEEE 802.11 Wireless LAN

UNIT III
Network Layer: Services, Routing Algorithms: Shortest path Routing, Flooding, Distance Vector Routing, Link State Routing, Hierarchical Routing.
Network layer in TCP/IP: Basic characteristics of IP protocol; addressing and header format of IPv4 ; IPv6: Major goals& features.
Congestion Control & Quality of Service: General Principals; Congestion control in Virtual – Circuit Subnets; Congestion Control in Datagram Subnets: Choke packets, Load Shedding; Random Early Detection, Jitter Control; Over provisioning, Buffering, Traffic Shaping, Leaky bucket, token bucket, Resource Reservation, Admission Control, Packet Scheduling.

UNIT IV

Transport Layer: Transport Layer - Design issues, connection management, session Layer-Design issues, remote procedure call. Presentation Layer-Design issues, Datacompression techniques, cryptography - TCP - Window Management.

UNIT V

Application Layer: Application Layer: File Transfer, Access and Management, Virtual Terminals, Other application. Example Networks - Internet and Public Networks.

Application Layer Protocols: The Web and http: Persistent and Non- persistent connections, http message format, cookies, proxy server, Email: smtp, mail message formats, mail access protocols: pop3, imap, MIME DNS: Service

Text Books:

1.Computer Networks, by Andrew S Tanenbaum, PHI. (2010)
2.Data and Computer Communications , by Walliam Stallings, PHI. (2002)

Reference Books:

1.Data Communications, Computer networking on OSI , by Fred Halsall, Addison Wesley Publishing Co.1998
2.Computer Networking -A Top-Down Approach Featuring the Internet , James F. Kurose and Keith W. Ross , Addison Wesley Publishing Co. 2004
3.Computer Networks: Protocols standards and interfaces , by Uyless Black, Prentice Hall.2002
4.Data communication & Networks , by Behrou A. Forouzan, Tata McGraw Hill. 2002

Formal Languages & Automation Theory

CCSN- 210

L	T	P	Cr
3	1	0	4

Course Outcomes:
At the end of this course, students will demonstrate the ability to:

1. Apply the knowledge of automata theory, grammars & regular expressions for solving the problem.
2. Analyze the give automata, regular expression & grammar to know the language it represents.
3. Design Automata & Grammar for pattern recognition and syntax checking.
4. Distinguish between decidability and un-decidability of problems.
5. Identify limitations of some computational models and possible methods of proving them.

UNIT I:
Introduction; Alphabets, Strings and Languages; Automata and Grammars, Deterministic finite Automata (DFA)-Formal Definition, Simplified notation: State transition graph, Transition table, Language of DFA, Nondeterministic finite Automata (NFA), NFA with epsilon transition, Language of NFA, Equivalence of NFA and DFA, Minimization of Finite Automata, Distinguishing one string from other, Myhill-Nerode Theorem

UNIT II:
Regular expression (RE) , Definition, Operators of regular expression and their precedence, Algebraic laws for Regular expressions, Kleen's Theorem, Regular expression to FA, DFA to Regular expression, Arden Theorem, Non Regular Languages, Pumping Lemma for regular Languages . Application of Pumping Lemma, Closure properties of Regular Languages, Decision properties of Regular Languages, FA with output: Moore and Mealy machine, Equivalence of Moore and Mealy Machine, Applications and Limitation of FA, Chomsky Hierarchy.

UNIT III:
Context Free Languages – Leftmost and rightmost derivation, parsing and ambiguity, ambiguity in grammar and languages, normal forms
Context free grammar (CFG) and Context Free Languages (CFL): Definition, Examples, Derivation Derivation trees, Ambiguity in Grammar, Inherent ambiguity, Ambiguous to Unambiguous CFG, Useless symbols, Simplification of CFGs, Normal forms for CFGs: CNF and GNF.

UNIT IV:
Pushdown Automata – NDPDA, DPDA, context free languages and PDA, comparison of deterministic and non-deterministic versions, closure properties, pumping lemma for CFL, Acceptance by Final state, Acceptance by empty stack, Deterministic PDA, Equivalence of PDA and CFG, CFG to PDA and PDA to CFG, closure properties of CFLs.

UNIT V:
Turing machines (TM): Basic model, definition and representation, Instantaneous Description, Language acceptance by TM, Variants of Turing Machine, TM as Computer of Integer functions, Universal TM, Church's Thesis, Recursive and recursively enumerable languages,

Halting problem, Introduction to Decidability, Undecidable problems about TMs. Post correspondence problem (PCP), Modified PCP, Other Undecidable Problems Introduction to recursive function theory.

Textbooks:

1.An Introduction to Formal Languages and Automata, by Peter Linz, Third Edition, Narosa Publishers (1998)
2. Hopcroft, Ullman, "Introduction to Automata Theory,Languages and Computation", Pearson Education 3. K.L.P. Mishra and N.Chandrasekaran, "Theory of Computer Science : Automata, Languages and Computation", PHI Learning Private Limited, Delhi India.
4.Peter Linz, "An Introduction to Formal Language and Automata", Narosa Publishing house.
5. Y.N.Singh "Mathematical Foundation of Computer Science", New Age International.
6. Papadimitrou, C. and Lewis, C.L., "Elements of the Theory of Computation", PHI Learning Private Limited, Delhi India.
7. K.Krithivasan and R.Rama; Introduction to Formal Languages, Automata Theory and Computation, Pearson Education.
8. Harry R. Lewis and Christos H. Papadimitriou, Elements of the theory of Computation, Second Edition, Prentice-Hall of India Pvt. Ltd.
9. MichealSipser, "Introduction of the Theory and Computation", Thomson Learning.

CCSN 212 **Nano Sciences**

L	T	P	Cr
3	1	0	4

Course Outcomes:
At the end of this course, students will demonstrate the ability to:

1. Understand the fundamental concepts and principles of nanoscience and nanotechnology.
2. Explore the physical, chemical, and biological properties of materials at the nanoscale.
3. Study various synthesis and characterization techniques for nanomaterials.
4. Analyze the applications of nanomaterials in fields like electronics, medicine, and energy.
5. Evaluate the environmental, ethical, and safety issues related to nanotechnology.

UNIT I

Introduction to Nanotechnology: Introduction, definition, history, effects of nanoscience and nanotechnology in different fields.

Properties of nanomaterials: Size and shape and based properties, colour, melting point, density of states, band gap and magnetism.

UNIT II

Nanoparticles synthesis: Top down and bottom-up approach, colloids, emulsions, micelles, polymers, mechanical attrition and high energy ball milling.

UNIT III

Nanomaterials characterization: Scanning electron microscopy, Transmission electron microscopy, Fourier transform infrared spectroscopy, Energy dispersive spectroscopy, Atomic force microscopy, X-ray diffraction, Dynamic light scattering,UV-Vis spectrophotometer.

UNIT IV

Fabrication: Lithography, chemical vapor deposition, physical vapor deposition, sol-gel synthesis, molecular self-assembly, crystal growth, epitaxy, etching, masking.

UNIT V

Applications of nanotechnology in chemical industry: Catalysis, fuel cells, drug delivery and diagnostics, coatings, nanocomposite polymers, fluid inks, dyes, block copolymers, dendrimers, carbon nanotubes applications.

Text Books:

1. Nanoscale materials in Chemistry, K.J. Klabunde, Wiley, 2001.
2. Introduction to Nanotechnology, C.P. Poole Jr. and F.J.Owens, Wiley, 2003.
3. Nanotechnology, M. A. Ratner and D. Ratner, Pearson, 2003.
4. The Chemistry of Nanomaterials: Synthesis, Properties and Applications, C.N.R Rao, Achim Müller, A. K. Cheetham, Wiley, 2004.

References:

1. Hand book of Nanostructured Materials and Nanotechnology, H. Nalwa, Vol. 1 to 5, Academic Press, 1999.
2. Hand book of Nanotechnology, B. Bhusan, Springer, 2004.
3. Nanomaterials, Nanotechnologies and Design: An Introduction for Engineers and Architects, D. Schodek, P. Ferreira, M.F. Ashby, 2009.

Technical English

CBSN-202

L	T	P	Cr
2	0	0	2

Course Outcomes:

At the end of this course, students will demonstrate the ability to:

1. Students will be enabled to understand the nature and objective of Technical Communication relevant for the work place as Engineers.
2. Students will utilize the technical writing for the purposes of Technical Communication and its exposure in various dimensions.
3. Students would imbibe inputs by presentation skills to enhance confidence in face of diverse audience.
4. Technical communication skills will create a vast know-how of the application of the learning to promote their technical competence.
5. It would enable them to evaluate their efficacy as fluent & efficient communicators by learning the voice-dynamics.

Unit -1 Fundamentals of Technical Communication: Technical Communication: Features; Distinction between General and Technical Communication; Language as a tool of Communication; Dimensions of Communication: Reading & comprehension; Technical writing: sentences; Paragraph; Technical style: Definition, types & Methods; The flow of Communication: Downward; upward, Lateral or Horizontal; Barriers to Communication.

Unit - II Forms of Technical Communication: Technical Report: Definition & importance; Thesis/Project writing: structure & importance; synopsis writing: Methods; Technical research Paper writing: Methods & style; Seminar & Conference paper writing; Key-Note Speech: Introduction & Summarization; Expert Technical Lecture: Theme clarity; Analysis & Findings; 7 Cs of effective business writing: concreteness, completeness, clarity, conciseness, courtesy, correctness; consideration.

Unit - III Technical Presentation: Strategies & Techniques Presentation: Forms; interpersonal Communication; Class room presentation; style; method; Individual conferencing: essentials: Public Speaking: method; Techniques: Clarity of substance; emotion; Humour; Modes of Presentation; Overcoming Stage Fear: Confident speaking; Audience Analysis & retention of audience interest; Methods of Presentation: Interpersonal; Impersonal; Audience Participation: Quizzes & Interjections.

Unit - IV Technical Communication Skills: Interview skills; Group Discussion: Objective & Method; Seminar/Conferences Presentation skills: Focus; Content; Style; Argumentation skills: Devices: Analysis; Cohesion & Emphasis; Critical thinking; Nuances: Exposition narration & Description; effective business communication competence: Grammatical; Discourse competence: combination of expression & conclusion; Socio-linguistic competence: Strategic competence: Solution of communication problems with verbal and non verbal means.

Unit - V Kinesics & Voice Dynamics: Kinesics: Definitions; importance; Features of Body Language; Voice Modulation: Quality, Pitch; Rhythm; intonation; Pronunciation; Articulation; stress & accent; Linguistic features of voice control: Vowel & Consonant Sounds. Reference Books

1. Technical Communication – Principles and Practices by Meenakshi Raman &Sangeeta Sharma, Oxford Univ. Press, 2007, New Delhi.

2. Business Correspondence and Report Writing by Prof. R.C. Sharma & Krishna Mohan, Tata McGraw Hill & Co. Ltd., 2001, New Delhi.

3. Practical Communication: Process and Practice by L.U.B. Pandey; A.I.T.B.S. Publications India Ltd.; Krishan Nagar, 2014, Delhi.

4. Modern Technical Writing by Sherman, Theodore A (et.al); Apprentice Hall; New Jersey; U.S.

5. A Text Book of Scientific and Technical Writing by S.D. Sharma; Vikas Publication, Delhi.

6. Skills for Effective Business Communication by Michael Murphy, Harward University, U.S.

7. Business Communication for Managers by PayalMehra, Pearson Publication, Delhi.

Course Outcomes

1. Students will be enabled to understand the nature and objective of Technical Communication relevant for the work place as Engineers.

2. Students will utilize the technical writing for the purposes of Technical Communication and its exposure in various dimensions.

3. Students would imbibe inputs by presentation skills to enhance confidence in face of diverse audience.

4. Technical communication skills will create a vast know-how of the application of the learning to promote their technical competence.

5. It would enable them to evaluate their efficacy as fluent & efficient communicators by learning the voice-dynamics.

Business Communication

CBSN-202 A

L	T	P	Cr
2	0	0	2

Course Outcomes:
At the end of this course, students will demonstrate the ability to:

1. Develop clear and concise written communication skills for business contexts.
2. Enhance verbal communication abilities for meetings, presentations, and negotiations.
3. Understand the role of non-verbal cues and professional etiquette in business interactions.
4. Apply communication strategies suited to different business situations and audiences.
5. Use digital tools and formats for effective business correspondence and reporting.

Unit 1: Nature of Communication:

Process of Communication, Types of Communication (verbal & Non Verbal), Importance of Communication, Different forms of Communication Barriers to Communication Causes, Linguistic Barriers, Psychological Barriers, Interpersonal Barriers, Cultural Barriers, Physical Barriers, Organizational Barriers

Unit 2 Business Correspondence:

Letter Writing, presentation, Inviting quotations, Sending quotations, Placing orders, Inviting tenders, Sales letters, claim & adjustment letters and social correspondence, Memorandum, Inter -office Memo, Notices, Agenda, Minutes, Job application letter, preparing the Resume.

Unit 3 Report Writing:

Business reports, Types, Characteristics, Importance, Elements of structure, Process of writing, Order of writing, the final draft, and check lists for reports.

Unit 4 Vocabulary:

Words often confused, Words often misspelt, common errors in English.

Unit 5 Oral Presentation:

Importance, Characteristics, Presentation Plan, Power point presentation, Visual aids.

Suggested Readings:

1. Bovee, and Thill, Business Communication Today, Pearson Education

2. Lesikar, R.V. &Flatley, M.E. Kathryn Rentz; Business Communication Making Connections in Digital World, 11th ed., McGraw Hill Education.

3. Shirley Taylor, Communication for Business, Pearson Education

4. Locker and Kaczmarek, Business Communication: Building Critical Skills, TMH

5. LeenaSen, Communication Skills, PHI Learning

Technical Writing

CBSN-202 B

L	T	P	Cr
2	0	0	2

Course Outcomes:
At the end of this course, students will demonstrate the ability to:

1. Develop the ability to write clear, concise, and well-structured technical documents.
2. Understand the principles of audience analysis to tailor content for different readers.
3. Use appropriate formatting and styles for manuals, reports, and technical documentation.
4. Apply proper citation and referencing techniques in technical writing.
5. Enhance skills in presenting complex technical information in an easily understandable manner.

Unit 1

What is technical writing? Difference between technical writing and other forms of writing. Qualities and qualifications of technical writers.

Unit 2

End products of technical writing. Professionals involved - project manager/editor, writers, graphic artists; liaison with product engineers/scientists and clients.

Unit 3

Roles and responsibilities of writers, editors/project managers.7 Cs of effective writing: Document formats – hard and soft copy versions designs.

Unit 4

Principles of technical writing; styles in technical writing; clarity, precision, coherence and logical sequence in writing.

Unit 5

Stages of Technical writing. Document development process, Technical documentation, Planning, Tools, architecture, templates, content development, technical reviews, editorial reviews. Quality control.

Books for References

1. Technical writing style by – Dan Jones , Sam Dragga

2. Handbook of Technical writing by- Walter.E.ollu -1976

3. Technical Writing by- Serena Henning

4. Technical writing process by – Kieran Morgan and SanjaSpejic -2015

5. A guide to Technical writing by – T.A. Rickard

Intercultural Communication

CBSN-202 C

L	T	P	Credits
2	0	0	2

Course Outcomes:
At the end of this course, students will demonstrate the ability to:

1. Understand the importance of cultural differences in communication styles and practices.
2. Develop skills to effectively communicate across diverse cultural backgrounds.
3. Recognize and navigate language barriers and non-verbal communication cues in intercultural settings.
4. Foster respect and empathy for cultural diversity to improve collaboration and teamwork.
5. Apply intercultural communication strategies in both professional and personal interactions.

UNIT – I: Language and Culture

Introduces the link between language and culture, covering definitions and approaches to culture, and how communication operates in diverse settings. Highlights intercultural communication, the field's history, and Bennett's DMIS model (Denial, Defense, Minimization).

UNIT – II: Identity

Explores various identity forms including racial, ethnic, cultural, gender, age, spiritual, and national. Discusses cultural identity properties, the plurality of identity, and how stereotypes and diverse perceptions shape intercultural interactions.

UNIT – III: Communication Styles

Covers verbal and nonverbal communication, including conversation styles, politeness, and cultural norms regarding time and space. Introduces high- vs. low-context communication, proxemics, kinesics, and cultural artifacts.

UNIT – IV: Cultural Values and Adaptation

Discusses cultural dimensions like individualism vs. collectivism and power distance. Explores intercultural adaptation through the U-curve and W-curve models, addressing culture shock, adjustment phases, and emotional responses to cultural transitions.

UNIT – V: Intercultural Competence

Focuses on developing intercultural sensitivity and competence using Bennett's DMIS (Acceptance, Adaptation, Integration). Discusses practical applications in business, education, and healthcare settings.

REFERENCES (Key Authors)

- **Milton J. Bennett** – Developmental model of intercultural sensitivity
- **D.P.S. Bhawuk & H.C. Triandis** – Cultural theory in intercultural training
- **Education for the Intercultural Experience** – Edited by R. M. Paige

Object Oriented Programming Using C++ Lab

CCSN-252

L	T	P	Cr
0	0	2	1

Course Outcomes:
At the end of this course, students will demonstrate the ability to:

1. Develop skills in designing and implementing object-oriented programs using C++.
2. Understand the concepts of classes, objects, inheritance, polymorphism, and encapsulation.
3. Apply C++ features like constructors, destructors, and operator overloading in programming tasks.
4. Practice writing modular and reusable code through the use of functions and classes.
5. Debug, compile, and optimize C++ programs for real-world problem-solving applications.

1 Write a program to print HELLO WORLD in C++.
2 Write a program to add two numbers using C++.
3 Write a program to Swap two numbers using C++.
4 Write a program to Find Simple Interest in C++.
5 Write a program to Check Even or Odd Integers using if and else in C++.
6 Write a program to create object and class in C++.
7 Write a program to achieve compile time polymorphism in C++.
8 Write a program to using single inheritance in ++.
9 Write a program to using multiple Inheritances in C++.
10 Write a program to using virtual function in C++.
11 Write a program to create parameterized constructor in C++.
12 Write a program to using friend function in C++.
13 Write a program to create function overriding in C++.
14 Write a program to print matrix in C++.
15 Write a program to print addition of a single dimensional array in C++

Design And Analysis Of Algorithms Lab

CCSN-254

L	T	P	Cr
0	0	2	1

Course Outcomes:
At the end of this course, students will demonstrate the ability to:

1. Understand and implement various algorithms like sorting, searching, and graph traversal.
2. Analyze the time and space complexity of algorithms using Big-O notation.
3. Practice designing efficient algorithms for problem-solving in different contexts.
4. Use data structures such as arrays, linked lists, stacks, and queues in algorithm implementation.
5. Test and debug algorithms to ensure correctness and optimal performance.

LIST OF EXPERIMENTS: (Any 12 experiments from the following list to be performed)

1. Implement Selection sort and find how many steps are required to sort 10 elements.

2. Implement and Analysis factorial of a number program using iterative and recursive methods.

3. Implement Insertion Sort and analyses the time complexity.

4. Given two strings, find the minimum number of edits required to convert one string to another.

5. Write a program to find the Greatest Common Divisor of two numbers using recursion and find how many steps are required to execute it.

6. Sort a given set of elements using the quick sort method and determine the time required to sort the elements. Repeat the experiment for different values of n (the number of elements in the list to be sorted) and plot a graph of the time taken versus n. The elements can be read from a file or can be generated using the random number generator.

7. Write a program to check whether a given graph is connected or not using the DFS method.

8. Apply Greedy method to compress the given data using Huffman encoding.

9. Implement fractional knapsack problem using Greedy Strategy.

10. Implement minimum spanning tree using Prim's algorithm and analyses its time complexity.

11. Apply dynamic programming methodology to implement 0/1 Knapsack problem.

12. Solve the longest common subsequence problem using dynamic programming.

13. Find the length of the longest subsequence in a given array of integers such that all elements of the subsequence are sorted in strictly ascending order.

14. Apply dynamic programming methodology to find all pairs shortest path of a directed graph using Floyd's algorithm.

15. Implement matrix chain multiplication and find the optimal sequence of parentheses.

Internet and Web Technology Lab

CCSN-256

L	T	P	Cr
0	0	2	1

Course Outcomes:
At the end of this course, students will demonstrate the ability to:

1. Develop practical skills in creating and designing websites using HTML, CSS, and JavaScript.
2. Implement dynamic web pages by integrating client-side and server-side technologies.
3. Understand and apply web protocols like HTTP, FTP, and web services.
4. Explore database integration for web applications using SQL and backend technologies.
5. Learn to troubleshoot and optimize websites for performance and usability.

List of Programs

1. Create a web page using <h1> to <h6>, <p>, <b>, <i>, and <u> tags to format text.
2. Write a program to display both ordered (<ol>) and unordered (<ul>) lists with multiple list items.
3. Create a table with rows and columns using <table>, <tr>, <th>, and <td> tags.
4. Design your classroom time-table by using the HTML coding and provide a unique color to every subject.
5. Write a program to display an image using the <img> tag and adjust the width and height attributes.
6. Create a page that includes a video using the <video> tag with controls like play, pause, and volume.
7. Create the front page of your lab file by using the coding.
8. Create the index page of your lab file which must contain the university logo and all other necessary elements.
9. Write a program to link different pages using the <a> tag, including both internal and external links.
10. Create a form with various input types like text, password, email, checkbox, radio buttons, and a submit button.
11. Use the CSS properties in any of your program to make it different and attractive.
12. Write a JavaScript program that displays the current date and time on a web page using Date() object.
13. Create a simple web page with an input field and a button to display the length of the entered string using.
14. Add the different popup boxes with your web page.
15. Create buttons that allow the user to change the background color of the web page dynamically.
16. Write a JavaScript program that displays a countdown timer for a given time duration.

Operations Research

CBSN-204

L	T	P	Cr
2	0	0	2

Course Outcomes:
At the end of this course, students will demonstrate the ability to:

1. Understand the scope and phases of operations research (OR), including linear programming and graphical solutions.
2. Learn the fundamentals of game theory, including zero-sum games, pure and mixed strategies, and saddle point analysis.
3. Explore queuing theory, the dual simplex method, and special cases of linear programming, including duality.
4. Gain knowledge of transportation and assignment problems, and learn the mathematical models and algorithms used to solve them.
5. Study network techniques like shortest path, minimum spanning tree, and max-flow problems, along with project management methods such as CPM and PERT.

UNIT-I

Introduction: Definition and scope of operations research (OR), Necessity of operation research in industry .phases of OR study. Linear Programming: Two variable Linear Programming model and Graphical method of solution

Unit-II

Game Theory: uses of game theory, some applications and examples payoffs, characteristic of game theory, and two person zero-sum game, Pure and Mixed strategies, Saddle point and its existence.

Unit-III

Queuing Theory in operation research, two phase method, Dual Simplex method, special cases of Linear Programming, duality, Dual Simplex algorithm.

UNIT-IV

Transportation Problems: Types of transportation problems, mathematical models, transportation algorithms, Assignment: Allocation and assignment problems and models, processing of job through machines.

UNIT-V

Network Techniques: Shortest path model, minimum spanning Tree Problem, Max-Flow problem and Min-cost problem. Project Management: Phases of project management, guidelines for network construction, CPM and PERT.

Text / Reference Books:

1. Wayne L. Winston,"Operations Research" Thomson Learning, 2003.

Mobile Computing

CCSN-306

L	T	P	Cr
3	1	0	4

Course Outcomes:
At the end of this course, students will demonstrate the ability to:

1. Understand the basics of mobile computing, GSM architecture, and its services, including mobile data and security.
2. Gain knowledge of wireless communication evolution, cellular concepts, and techniques for improving coverage and capacity in cellular systems.
3. Learn about mobile radio propagation models, including free space, diffraction, and small scale multipath fading.
4. Explore medium access control in ad hoc networks, various routing protocols, and quality of service in mobile networks.
5. Study wireless LAN standards like IEEE 802.11, Bluetooth, and mobile IP, along with applications and protocols such as WAP.

UNIT I: Introduction To Mobile Computing
Mobile Communications and Computing, Mobile Computing, novel applications, limitations, and architecture.
GSM : Mobile services, System architecture, Radio interface, Protocols, Localization and calling, Handover, Security, and New data services.

UNIT II: Cellular Concept And System Design Fundamentals
Introduction to wireless communication: Evolution of mobile communications, mobile radio systems- Examples, trends in cellular radio and personal communications. Cellular Concept: Frequency reuse, channel assignment, hand off, Interference and system capacity, tracking and grade of service, Improving Coverage and capacity in Cellular systems. SDMA, FDMA, TDMA, CDMA.

UNIT III: Mobile Radio Propagation
Free space propagation model, reflection, diffraction, scattering, link budget design, Outdoor Propagation models, Indoor propagation models, Small scale Multipath propagation, Impulse model, Small scale Multipath measurements, parameters of Mobile multipath channels, types of small scale fading, statistical models for multipath fading channels.

UNIT IV: Medium Access Control
(Ad Hoc networks, localization, MAC issues, Routing protocols, global state routing (GSR), Destination sequenced distance vector routing (DSDV), Dynamic source routing (DSR), Ad Hoc on demand distance vector routing (AODV), Temporary ordered routing algorithm (TORA), QoS in Ad Hoc Networks, applications.

UNIT V: Wireless Lan Standards

Wireless Networking, Wireless LAN Overview: MAC issues, IEEE 802.11, Blue Tooth, Wireless multiple access protocols, TCP over wireless, Wireless applications, data broadcasting, Mobile IP, WAP: Architecture, protocol stack, application environment, applications

TEXT BOOKS

1. Jochen Schiller,—Mobile Communicationsl,Addison-Wesley. (Chapters 4,7,9,10,11), second edition, 2004.
2. Stojmenovic and Cacute, —Handbook of Wireless Networks and Mobile Computingl, Wiley, 2002. (Chapters 11, 15, 17, 26 and 27)

REFERENCE BOOKS

1. Reza Behravanfar, —Mobile Computing Principles: Designing and Developing Mobile Applications with UML and XMLl, ISBN: 0521817331, Cambridge University Press, October 2004.
2. Adelstein, Frank, Gupta, Sandeep KS, Richard III, Golden , Schwiebert, Loren, —Fundamentals of Mobile and Pervasive Computingl, ISBN: 0071412379, McGraw-Hill Professional, 2005

Knowledge Management & Expert System

CCSN-308

L	T	P	Cr
3	1	0	4

Course Outcomes:
At the end of this course, students will demonstrate the ability to:

1. Understand the concepts of knowledge creation, intellectual capital, and the transition from information management to knowledge management.
2. Learn about tacit and explicit knowledge, knowledge storage, distribution, and the role of KM tools like data warehouses and data mining.
3. Explore the social nature of knowledge, knowledge sharing obstacles, and organizational learning at individual, group, and organizational levels.
4. Gain knowledge of expert systems, their architecture, and the role of technologies like genetic algorithms, fuzzy logic, and intelligent agents in KM.
5. Learn how to develop KM strategies, perform knowledge audits, and use KM tools for knowledge capture, sharing, and application.

Unit - I
Introduction to knowledge Management Distinction between data, information & knowledge. Concept of knowledge creation, Intellectual Capital Creation, Human Capital, Customer Capital and Organizational Capital. History of KM, Importance of KM, Information Management to Knowledge Management, K M Cycle, Industrial Economy to Knowledge Economy

Unit-II
Socio-cultural aspects & organizational aspects Tacit & Explicit knowledge & Knowledge Organization. Knowledge Storage and Distribution, KM tools, Data warehouse, Data mining, knowledge management evaluation & Valuation of Knowledge. Mechanics of Knowledge Management–Tools and Technologies, Communities of Practice and Knowledge conversion, The knowledge Management Matrix.

Unit-III
Social Nature of Knowledge, Social Network Analysis, Obstacles to knowledge sharing, Organizational learning & Social Capital. Knowledge Application – Individual level, Group level & Organization Level.

Unit – IV
Km Team–Roles & Responsibilities, Political issues in KM, Ethics in KM, Strategies issues in Knowledge Management, Future of Knowledge Management. Expert System Existing Expert Systems (DENDRAL, MYCIN), Architecture of expert system, Features of Expert system, Genetic algorithm, Fuzzy logic, Neural Networks, Intelligent Agents, Meta Knowledge, Expertise Transfer, Self-Explaining System, User and expert systems.

Unit-V
KM Strategy, Knowledge audit, GAP Analysis, Road Map, KM Metrics, Balance Score

Card.KM Tools – Knowledge Capture & Creation tools, Knowledge sharing & Dissemination Tools, Knowledge Acquisition & Application tools. K-Initiative, K-Strategic issues in knowledge management, K-Commerce

Reference Books:

1. SudhirWarrier, "Knowledge Management", Vikas publishing House, New Delhi, First edition, 2007.
2. Thotharti Raman, "Knowledge Management", Excel Books ,New Delhi, First Edition,2004.
3. Stuart Barnes "Knowledge Management Systems: Theory & Practice", Thomson Learning Press, New Delhi, First Edition, 2002.
4. Ronald Maier, "Knowledge Management System", Springer, Germany, Second Edition,2002.
5. AmritTiwana, "Knowledge Management Tool Kit", Pearson Education, New Delhi, First Edition, 2002.

Software Project Management

CUCS-342

L	T	P	Cr
3	1	0	4

Course Outcomes:
At the end of this course, students will demonstrate the ability to:

1. Identify the different project contexts and suggest an appropriate management strategy.
2. Practice the role of professional ethics in successful software development.
3. Identify and describe the key phases of project management.
4. Determine an appropriate project management approach through an evaluation of the business context and scope of the project
5. Manage the people and control the defects.

Unit – I

Introduction and Software Project Planning, Fundamentals of Software Project Management (SPM), Need Identification, Vision and Scope document, Project Management Cycle, SPM Objectives, Management Spectrum, SPM Framework, Software Project Planning, Planning Objectives, Project Plan, Types of project plan, Managing Human Resource and Technical Resource, Structure of a Software Project Management Plan, Software project estimation, Estimation methods, Estimation models, Costing and pricing of projects, Decision process.

Unit – II

Project Organization and Scheduling

Project Elements, Work Breakdown Structure (WBS), Types of WBS, Functions, Activities and Tasks, Project Life Cycle and Product Life Cycle, Ways to Organize Personnel, Project schedule, Scheduling Objectives, Building the project schedule, Scheduling terminology and techniques, Network Diagrams: PERT, CPM, Bar Charts: Milestone Charts, Gantt Charts (SPI), Interpretation of Earned Value Indicators, Error Tracking, Software Reviews, Types of Review: Inspections, Deskchecks, Walkthroughs, Code Reviews, Pair Programming.

Unit - III

Project Monitoring and Control

Dimensions of Project Monitoring & Control, Earned Value Analysis, Earned Value Indicators: Budgeted Cost for Work Scheduled (BCWS), Cost Variance (CV),Schedule Variance (SV), Cost Performance Index (CPI), Schedule Performance Index (SPI), Interpretation of Earned Value Indicators, Error Tracking, Software Reviews, Types of Review: Inspections, Desk checks, Walkthroughs, Code Reviews, Pair Programming.

Unit – IV

Software Quality Assurance and Testing

Testing Objectives, Testing Principles, Test Plans, Test Cases, Types of Testing, Levels of Testing, Test Strategies, Program Correctness, Program Verification & validation, Testing Automation & Testing Tools, Concept of Software Quality, Software Quality Attributes, Software Quality Metrics and Indicators, The SEI Capability Maturity Model CMM), SQA

Activities, Formal SQA Approaches: Proof of correctness, Statistical quality assurance, Cleanroom process.

Unit – V

Project Management and Project Management Tools

Software Configuration Management: Software Configuration Items and tasks, Baselines, Plan for Change, Change Control, Change Requests Management, Version Control, Risk Management: Risks and risk types, Risk Breakdown Structure (RBS), Risk Management Process: Risk issues in Software Development and Implementation, Identification of Risks , Resolving and Avoiding risks, Tools and Methods for Identifying Risk Management. Cost Benefit Analysis, Software Project Management Tools: CASE Tools, Planning and Scheduling Tools, MS-Project.

TEXT BOOK(S)

1. Royce and Walker, "Software Project Management", 2nd Edition, Pearson Education, 2002.

REFERENCES

1. Bob Hughes and Mike Cotterell, "Software Project Management", 5th Edition, Tata McGrawHill, 2011.

2. Kelker, S. A, "Software Project Management", 2nd Edition, Prentice Hall, 2003.

3. Gopalaswamy Ramesh, "Managing Global Projects", 1st Reprint Edition, Tata McGraw Hill,2006.

4. Robert K. Wysocki, "Executive's Guide to Project Management", 2nd Edition, John Wiley &Sons, 2011.

5. Teresa and luckey, Joseph Phillips, "Software project Management for dummies", 3rdEdition, Wiley publishing Inc., 2006.

Microwave Engineering

CUCS 344

L	T	P	Cr
3	1	0	4

Course Outcomes:
At the end of this course, students will demonstrate the ability to:

1. Understand the fundamentals of microwave engineering and its applications in telecommunications, radar, and medical devices.
2. Learn about microwave transmission lines, impedance, SWR, and microstrip/stripline technology.
3. Explore microwave components like waveguides, couplers, filters, and active devices such as amplifiers and oscillators.
4. Gain knowledge of microwave measurement techniques and tools such as vector network analyzers and spectrum analyzers.
5. Learn microwave circuit design principles, focusing on amplifiers, oscillators, filters, and simulation software tools.

Unit 1: Introduction to Microwave Engineering

This unit introduces the fundamental concepts of microwave engineering, defining microwaves and their applications in modern technology. Students will explore the characteristics of microwave signals, the frequency range of microwaves, and the importance of microwave engineering in telecommunications, radar, and medical devices.

Unit 2: Microwave Transmission Lines

In this unit, students will study the principles of microwave transmission lines, including their types and characteristics. The unit will cover the concept of impedance, standing wave ratio (SWR), and the analysis of transmission line parameters. Students will also learn about microstrip and stripline technology.

Unit 3: Microwave Components and Devices

This unit focuses on the various components and devices used in microwave engineering. Students will learn about passive components such as waveguides, couplers, and filters, as well as active devices like microwave amplifiers, oscillators, and mixers. The principles of operation and design considerations for these components will be discussed.

Unit 4: Microwave Measurement Techniques

Students will explore microwave measurement techniques in this unit. The unit will cover methods for measuring power, voltage standing wave ratio (VSWR), frequency, and attenuation. Students will learn about the use of vector network analyzers and spectrum analyzers in microwave testing.

Unit 5: Microwave Circuit Design

This unit delves into the principles of microwave circuit design. Students will study design methodologies for amplifiers, oscillators, and filters, focusing on techniques for achieving stability and performance at microwave frequencies. The unit will include design software tools for simulation and analysis.

Supply Chain Management-Planning

CUCS 346

L	T	P	Cr
3	1	0	4

Course Outcomes:
At the end of this course, students will demonstrate the ability to:

1. Understand the fundamental concepts and components of supply chain management.
2. Learn techniques for demand forecasting, including time series analysis and causal models.
3. Gain knowledge of inventory management strategies and the Economic Order Quantity (EOQ) model.
4. Study production planning and scheduling methods to optimize resource utilization.
5. Understand supply chain network design principles and tools for optimization and decision-making.

Unit 1: Introduction to Supply Chain Management

This unit introduces the fundamental concepts of supply chain management, emphasizing its importance in modern business operations. Students will explore the key components of a supply chain, the roles of various stakeholders, and the impact of effective supply chain planning on organizational performance.

Unit 2: Demand Forecasting

In this unit, students will study the techniques and methodologies used for demand forecasting. The unit will cover qualitative and quantitative forecasting methods, including time series analysis and causal models. Students will learn how to analyze historical data and market trends to make informed predictions about future demand.

Unit 3: Inventory Management

This unit focuses on inventory management strategies within the supply chain. Students will learn about different types of inventory, inventory control systems, and the Economic Order Quantity (EOQ) model. The unit will also address the challenges of inventory management, including stockouts, overstocking, and the impact of lead times.

Unit 4: Production Planning and Scheduling

Students will explore the principles of production planning and scheduling in this unit. The unit will cover strategies for capacity planning, master production scheduling, and materials requirements planning (MRP). Students will learn about the importance of aligning production schedules with demand forecasts to optimize resource utilization.

Unit 5: Supply Chain Network Design

In this unit, students will learn about the design and optimization of supply chain networks. The unit will cover factors influencing network design, including facility location, transportation

modes, and distribution strategies. Students will study models and tools used for network optimization and decision-making.

CUCS 348 **Software Testing**

L	T	P	Cr
3	1	0	4

Course Outcomes:
At the end of this course, students will demonstrate the ability to:

1. Understand the purpose and importance of software testing in the development lifecycle.
2. Learn core testing strategies such as black-box, white-box, and grey-box testing.
3. Gain skills in test planning, defining objectives, and designing test cases.
4. Learn test execution techniques, defect reporting, and communication with development teams.
5. Explore automated testing tools and frameworks like Selenium and JUnit for continuous integration.

Unit 1: Introduction to Software Testing

This unit introduces the fundamental concepts of software testing, defining its purpose and importance in the software development lifecycle. Students will explore the goals of testing, the difference between verification and validation, and the various levels of testing from unit to system testing.

Unit 2: Testing Principles and Strategies

In this unit, students will learn about the core principles of software testing. The unit will cover fundamental testing strategies, including black-box testing, white-box testing, and grey-box testing. Students will understand how to select appropriate testing strategies based on project requirements.

Unit 3: Test Planning and Design

This unit focuses on the process of test planning and design. Students will learn how to create effective test plans, define test objectives, and identify test cases. The unit will also cover techniques for test design, including equivalence partitioning, boundary value analysis, and decision table testing.

Unit 4: Test Execution and Defect Reporting

Students will explore the test execution process in this unit. The unit will cover the execution of test cases, the use of test management tools, and the process of logging and reporting defects. Students will learn how to document test results and communicate effectively with development teams.

Unit 5: Automated Testing

In this unit, students will examine automated testing methods and tools. The unit will cover the benefits and challenges of automation, scripting for automated tests, and the use of popular testing frameworks such as Selenium and JUnit. Students will also learn about continuous

integration and its role in automated testing.

Environmental Studies

CBSN-302

L	T	P	Cr
2	0	0	2

Course Outcomes:
At the end of this course, students will demonstrate the ability to:

1. Understand the multidisciplinary nature and importance of environmental studies and sustainability.
2. Learn about ecosystem structure, function, and energy flow in different ecosystems.
3. Gain knowledge on natural resources, their exploitation, and the environmental impacts.
4. Explore biodiversity, its conservation, and the threats to biodiversity in India.
5. Understand environmental pollution, its types, control measures, and environmental laws.

Unit 1: Introduction to Environmental Studies
- Multidisciplinary nature of environmental studies;
- Scope and importance; Concept of sustainability and sustainable development.

Unit 2: Ecosystems
- Ecosystem: Structure & function of ecosystem;
- Forest ecosystem, Aquatic ecosystems, Desert ecosystem
- Energy flow in an ecosystem: food chains, food webs and ecological succession.

Unit 3: Natural Resources: Renewable and Non-renewable Resources
- Land resources; Land degradation, soil erosion and desertification.
- Deforestation: Causes and impacts due to mining, dam building on environment, forests, biodiversity and tribal populations.
- Water: Use and over-exploitation of surface and ground water, floods, droughts, water conflicts.
- Energy resources: Renewable and non-renewable energy sources, use of alternate energy sources, growing energy needs.

Unit 4: Biodiversity and Conservation
- Biodiversity & Levels of biodiversity; Biogeographic zones of India; Biodiversity patterns and global biodiversity hot spots.
- India as a mega-biodiversity nation; Endangered and endemic species of India
- Threats to biodiversity
- Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.
- Importance of biodiversity services

Unit 5: Environmental Pollution

- Environmental pollution: types, causes, effects and controls; Air, water, soil and noise pollution human health risks
- Solid waste management: Control measures of urban and industrial waste.

Unit 6: Environmental Policies & Practices

- Climate change, global warming, ozone layer depletion, acid rain and impacts on human communities and agriculture
- Disaster management: floods, earthquake, cyclones and landslides.
- Environmental movements
- Environment Laws: Environment Protection Act; Air (Prevention & Control of Pollution) Act;
  Water Conservation (Prevention and control of Pollution) Act; Wildlife Protection Act; Forest Conservation, Environmental communication and public awareness.

Suggested Readings:

1) Environment By Shankar IAS Academy- 2024.
2) Gadgil, M., &Guha, R. 1993. This Fissured Land: An Ecological History of India. Univ. of California Press.
3) Ecology And Environment P.D. Sharma (Paperback, P.D Sharma) 2022 Ed.
4) Gleick, P. H. 1993. Water in Crisis. Pacific Institute for Studies in Dev., Environment &Security. Stockholm Env. Institute, Oxford Univ. Press.
5) Groom, Martha J., Gary K. Meffe, and Carl Ronald Carroll. Principles of Conservation Biology. Sunderland: Sinauer Associates, 2006.
6) Grumbine, R. Edward, and Pandit, M.K. 2013. Threats from India's Himalaya dams. Science, 339: 36-37.
7) McCully, P. 1996. Rivers no more:the environmental effects of dams (pp. 29-64). Zed Books.
8) McNeill, John R. 2000. Something New Under the Sun: An Environmental History of the Twentieth Century.
9) Odum, E.P., Odum, H.T. & Andrews, J. 1971. Fundamentals of Ecology. Philadelphia: Saunders.
10) Pepper, I.L., Gerba, C.P. & Brusseau, M.L. 2011.Environmentaland Pollution Science. Academic Press.
11) Rao, M.N. &Datta, A.K. 1987. Waste Water Treatment. Oxford and IBH Publishing Co. Pvt. Ltd.
12) Raven, P.H., Hassenzahl, D.M. & Berg, L.R. 2012. Environment. 8th edition. John Wiley & Sons.

Environmental Science

CBSN-302 A

L	T	P	Cr
2	0	0	2

Course Outcomes:
At the end of this course, students will demonstrate the ability to:

1. Understand the fundamentals of environmental systems and natural resources.
2. Analyze the impact of human activities on ecosystems and biodiversity.
3. Evaluate environmental pollution and its control measures.
4. Apply principles of sustainable development and environmental management.
5. Understand environmental laws and policies for conservation.

Unit I: Concept and scope of Environmental Science; Environmental Science as a multidisciplinary subject; Nature, Man & Society; Introduction to natural resources and its depletion, life support system.

Unit II: Introduction to the Earth Systems: Composition, structure and evolution of lithosphere, hydrosphere and atmosphere; Geological time scale and Past records of life.

Unit III Chemical potential, acid base reaction, solubility of gases in water, the carbonate system, Classification of elements, Chemical speciation, Redox Potential, Concept of pH, Eh and their variations in water.

Unit IV: Fundamental concept of genetics: Concept of nucleic acids, replication, transcription, translation, operon concept; Fundamental concept of microbes: Microbial growth, kinetics, stress response and control; Fundamental concept of statistical hypothesis testing: Mean, mode, median, concept of p- Value, t- test and chi- square test,ANOVA.

References:

1. Botkin, D.B.& Keller, E.A Environmental Science: Earth as a Living Planet, John Weily, NY
2. College Botany, Vol. I, II & III- Gangulee, Kar and Das
3. Cunningham, W.P.& Cunningham, M.A., Environmental Science, Tata McGraw Hill. ND
4. Santra, S.C., Environmental Science
5. Maier, Pepper & Gerba, Environmental Microbiology.Das, N.G., Statistical Methods (Volume 1 and 2)

Natural Resource Management

CBSN-302 B

L	T	P	Cr
2	0	0	2

Course Outcomes:
At the end of this course, students will demonstrate the ability to:

1. Understand types and importance of natural resources.
2. Analyze resource utilization and its environmental impact.
3. Study methods for sustainable resource management.
4. Evaluate conservation practices and policies.
5. Apply management strategies for land, water, and biodiversity.

Unit 1: Introduction to Natural Resource Management

This unit introduces the concept of natural resource management, highlighting its significance in sustainable development. Students will explore different types of natural resources, including renewable and non-renewable resources, and discuss the relationship between natural resources and human well-being.

Unit 2: Ecosystem Services and Biodiversity

In this unit, students will learn about ecosystem services and their role in supporting life on Earth. The unit will cover the importance of biodiversity, the threats it faces, and strategies for conservation. Students will explore how healthy ecosystems contribute to natural resource management.

Unit 3: Water Resource Management

This unit focuses on the management of freshwater resources, including rivers, lakes, and groundwater. Students will examine water conservation techniques, the challenges of water scarcity, and integrated water resource management (IWRM). Topics such as watershed management and water quality assessment will also be covered.

Unit 4: Soil and Land Management

In this unit, students will explore soil conservation and land management practices. The unit will cover soil types, erosion control methods, land use planning, and sustainable agricultural practices. The impact of land degradation and strategies for rehabilitation will also be discussed.

Unit 5: Forest and Wildlife Management

This unit addresses the management of forest resources and wildlife conservation. Students will learn about sustainable forestry practices, the role of forests in carbon sequestration, and the importance of protecting wildlife habitats. Topics such as community-based forest management will also be explored.

Pollution Control

CBSN-302 C

L	T	P	Cr
2	0	0	2

Course Outcomes:
At the end of this course, students will demonstrate the ability to:

1. Understand types and sources of pollution.
2. Analyze effects of pollution on environment and health.
3. Study pollution measurement and monitoring techniques.
4. Learn control methods for air, water, and soil pollution.
5. Understand laws and policies related to pollution control.

Unit 1: Introduction to Pollution

This unit provides an overview of pollution, defining its types and sources. Students will learn about the environmental and health impacts of pollution, as well as the importance of pollution control in achieving sustainable development.

Unit 2: Air Pollution

In this unit, students will explore the sources and types of air pollutants, including particulate matter, nitrogen oxides, and volatile organic compounds. The unit will cover the effects of air pollution on human health and the environment, along with strategies for monitoring and controlling air quality.

Unit 3: Water Pollution

This unit focuses on the causes and effects of water pollution, examining pollutants such as heavy metals, nutrients, and pathogens. Students will study the methods for assessing water quality and the technologies used for water treatment and pollution prevention.

Unit 4: Soil Pollution

Students will learn about soil contamination in this unit, including sources such as industrial waste, agricultural chemicals, and landfill leachate. The unit will cover the impacts of soil pollution on ecosystems and human health, as well as remediation techniques and sustainable land management practices.

Unit 5: Noise Pollution

This unit addresses the sources and effects of noise pollution on communities and wildlife. Students will explore noise measurement methods, regulatory standards, and noise control strategies, including urban planning and sound insulation techniques.

Computer Graphics Lab

CCSN-352

L	T	P	Cr
0	0	2	1

Course Outcomes:
At the end of this course, students will demonstrate the ability to:

1. Understand basic concepts of computer graphics and its applications.
2. Implement algorithms for drawing shapes and curves.
3. Apply 2D and 3D transformations in graphics programming.
4. Develop simple graphical applications using graphics libraries.
5. Explore concepts of clipping, shading, and animation.

List of Programs

1. Program to set and display a single pixel on the screen using basic plotting functions.
2. Implement the Digital Differential Analyzer (DDA) algorithm to draw straight lines between two points.
3. Create a program to draw lines using the efficient Bresenham's line algorithm.
4. Implement a function to draw rectangles by specifying the top-left and bottom-right coordinates.
5. Implement a function to draw a triangle using specified coordinates.
6. Fill a rectangle with a solid color using basic pixel manipulation.
7. Draw a polygon by specifying its vertices.
8. Draw any image by your choice and fill that with solid and different colors.
9. Program to translate shapes like circles, rectangles, or polygons by a given distance along the x and y axes.
10. Rotate a shape (e.g., triangle or square) around a specified point or the origin.
11. Scale a shape (e.g., rectangle or polygon) with respect to a given factor in x and y directions.
12. Animate a single point moving from one side of the window to the other.

Data Warehousing & Data Mining Lab

CCSN-354

L	T	P	Cr
0	0	2	1

Course Outcomes:

At the end of this course, students will demonstrate the ability to:

1. Understand the concepts of data warehousing and data mining.
2. Implement data preprocessing and transformation techniques.
3. Apply association, classification, and clustering algorithms.
4. Use data mining tools for pattern discovery and analysis.
5. Analyze and interpret data mining results for decision-making.

List of Practicals

1. Create a star or snowflake schema for a given business scenario using a database management system.
2. Develop an Extract, Transform, Load (ETL) process to populate a data warehouse from multiple data sources.
3. Implement Online Analytical Processing (OLAP) operations such as slicing, dicing, and drilling down on a data cube.
4. Write a program to clean a dataset by removing duplicates, handling missing values, and standardizing formats.
5. Implement the Apriori algorithm to discover frequent itemsets and generate association rules from transaction data.
6. Develop a program to apply clustering algorithms (e.g., K-means or DBSCAN) on a dataset and visualize the clusters.
7. Create a program that implements a decision tree algorithm for classification tasks and visualizes the tree structure.
8. Write a program to perform linear regression analysis on a dataset and evaluate the model's performance.
9. Develop a program to visualize data mining results using charts, graphs, or dashboards with tools like Matplotlib or Tableau.
10. Implement a predictive model using machine learning techniques to forecast future trends based on historical data.

Mini Project

CCSN-356

L	T	P	Cr
0	0	2	1

Course Outcomes:
At the end of this course, students will demonstrate the ability to:

1. Identify and define real-world problems for project development.
2. Apply programming and engineering concepts to build solutions.
3. Develop project planning and time management skills.
4. Enhance teamwork and communication through collaborative work.
5. Demonstrate the ability to document and present project outcomes.

1. Develop a console or web-based application for managing book inventory, user registrations, and transactions.
2. Create an e-commerce website that allows users to browse products, add to cart, and complete purchases.
3. Implement a system to manage patient records, appointments, and billing within a hospital environment.
4. Develop a program that stores and manages student data, including enrollment, grades, and attendance.
5. Create a personal finance application that allows users to track expenses, categorize them, and generate reports.
6. Build an application that fetches weather data from an API and displays current conditions and forecasts.
7. Implement a real-time chat application using sockets that enables users to send messages to each other.
8. Develop a task management application that allows users to create, update, and prioritize tasks.
9. Create a quiz platform that presents questions to users, records their responses, and provides instant feedback.
10. Build a dashboard that aggregates social media feeds and allows users to interact with their accounts from one interface.

CCSN 310

Embedded Computing Systems

L	T	P	Cr
3	1	0	4

Course Outcomes:
At the end of this course, students will demonstrate the ability to:

1. Understand the core concepts and architecture of embedded computing systems.
2. Develop programming skills in C, C++, and assembly language for embedded systems.
3. Learn how to interface embedded systems with external hardware like sensors, motors, and displays.
4. Apply real-time operating systems (RTOS) principles to manage system tasks efficiently.
5. Analyze the constraints of embedded systems, such as memory limitations, power consumption, and processing speed.

Unit 1: Introduction to Embedded Systems

This unit introduces the fundamental concepts of embedded systems, defining what they are and their significance in modern technology. Students will explore the various types of embedded systems and their applications across different industries, as well as the basic components that make up an embedded system.

Unit 2: Microcontrollers and Microprocessors

In this unit, students will learn about the architecture and functioning of microcontrollers and microprocessors. The unit will cover different types of microcontrollers, their internal components, and how they differ from general-purpose processors. Practical examples of microcontroller applications will be discussed.

Unit 3: Programming Embedded Systems

This unit focuses on programming techniques for embedded systems. Students will learn about programming languages commonly used in embedded development, such as C and C++. The unit will also cover development environments, debugging techniques, and best practices for writing efficient embedded code.

Unit 4: Real-Time Operating Systems (RTOS)

Students will explore the principles of real-time operating systems in this unit. The unit will cover the characteristics of RTOS, task scheduling, inter-process communication, and resource management. Practical examples of RTOS in embedded applications will be provided.

Unit 5: Interfacing and Communication Protocols

This unit examines the various interfacing techniques and communication protocols used in embedded systems. Students will learn about digital and analog interfacing, as well as protocols such as UART, SPI, I2C, and CAN. Hands-on examples will illustrate how to implement these protocols in projects.

Simulation And Modeling

CCSN 312

L	T	P	Cr
3	1	0	4

Course Outcomes:
At the end of this course, students will demonstrate the ability to:

1. Understand the principles and techniques used in simulation and modeling of real-world systems.
2. Develop mathematical models to represent dynamic systems in various domains like engineering, biology, and economics.
3. Apply simulation tools and software to analyze and predict system behavior under different conditions.
4. Use statistical methods to validate and verify simulation results for accuracy and reliability.
5. Analyze and interpret simulation data to optimize system performance and make informed decisions.

Unit 1: Introduction to Simulation and Modeling

This unit introduces the fundamental concepts of simulation and modeling, defining their significance in various fields such as engineering, science, and economics. Students will explore the types of models, the modeling process, and the applications of simulation in problem-solving and decision-making.

Unit 2: Types of Models

In this unit, students will learn about different types of models, including physical, mathematical, and computational models. The unit will cover deterministic versus stochastic models, continuous versus discrete models, and the advantages and limitations of each type.

Unit 3: Simulation Methodologies

This unit focuses on various simulation methodologies, including discrete-event simulation, system dynamics, and agent-based modeling. Students will explore the characteristics of each methodology and how to choose the appropriate one for specific applications.

Unit 4: Statistical Concepts for Simulation

Students will study the statistical concepts essential for simulation in this unit. The unit will cover probability distributions, random number generation, and statistical analysis techniques. Emphasis will be placed on the role of statistics in validating and interpreting simulation results.

Unit 5: Simulation Software Tools

In this unit, students will become familiar with various simulation software tools commonly used in industry and research. The unit will provide hands-on experience with tools such as MATLAB, Simulink, AnyLogic, or Arena, focusing on their features and applications.

Approximation of Algorithms

CCSN 314

L	T	P	Cr
3	1	0	4

Course Outcomes:

At the end of this course, students will demonstrate the ability to:

1. Understand the concept of approximation algorithms for solving complex optimization problems.
2. Analyze the trade-offs between computational efficiency and solution accuracy in approximation algorithms.
3. Implement greedy, local search, and dynamic programming approaches to approximate solutions for NP-hard problems.
4. Evaluate the performance of approximation algorithms using approximation ratios and error bounds.
5. Apply approximation techniques to solve real-world problems, such as the traveling salesman and knapsack problems.

Unit 1: Introduction to Approximation Algorithms

This unit introduces the concepts of approximation algorithms, defining their purpose and significance in solving NP-hard problems. Students will explore the challenges posed by computational complexity and the need for approximate solutions in practical applications.

Unit 2: Complexity Classes and NP-Hard Problems

In this unit, students will learn about complexity classes, particularly focusing on NP, NP-hard, and NP-complete problems. The unit will cover fundamental concepts such as polynomial-time reductions and the implications of these classifications for algorithm design.

Unit 3: Performance Metrics for Approximation Algorithms

This unit focuses on the metrics used to evaluate the performance of approximation algorithms. Students will learn about approximation ratios, worst-case guarantees, and the concept of efficiency in relation to exact solutions. The trade-offs between accuracy and computational efficiency will also be discussed.

Unit 4: Greedy Algorithms

In this unit, students will explore greedy algorithms as a fundamental approach to approximation. The unit will cover classic problems that can be solved using greedy techniques, including the Knapsack problem and Minimum Spanning Tree. Students will analyze the performance of greedy algorithms in these contexts.

Unit 5: Dynamic Programming and Approximation

Students will study how dynamic programming can be leveraged to develop approximation algorithms in this unit. The unit will examine problems like the Subset Sum and Longest Common Subsequence, focusing on how dynamic programming techniques can lead to effective approximations.

Internship and Report Presentation

CCSN-462

L	T	P	Cr
0	0	40	20

Unit 1: Introduction to Internship

This unit introduces the concept of internships, highlighting their importance in bridging the gap between academic learning and practical experience. Students will explore the goals of internships, types of internships available, and the expectations from both interns and organizations.

Unit 2: Preparing for the Internship

In this unit, students will learn how to prepare for their internship experience. Topics will include resume writing, crafting cover letters, interview preparation, and professional networking. The unit will also cover the importance of setting clear learning objectives for the internship.

Unit 3: Workplace Skills and Professionalism

This unit focuses on essential workplace skills and professionalism. Students will learn about effective communication, teamwork, time management, and problem-solving in a professional environment. The unit will emphasize the importance of ethical behavior and adaptability in the workplace.

Unit 4: Intern Responsibilities and Learning Outcomes

Students will explore their responsibilities during the internship in this unit. The unit will cover how to identify key tasks, contribute to team projects, and seek feedback. Students will learn to document their learning experiences and the skills they develop throughout the internship.

Unit 5: Project Development and Implementation

In this unit, students will engage in project development related to their internship roles. They will learn how to define project goals, plan and execute tasks, and assess progress. The unit will also emphasize the importance of collaboration with supervisors and colleagues.

Scheme of Teaching

TEACHING SCHEME OF MCA 1st YEAR (2nd SEMESTER)

Code	Course Title	Cr.	L	T	P
MCA-201	Software Engineering & Project Management	4	3	1	0
MCA-202	ASP .Net	4	3	1	0
MCA-203	Python	4	3	1	0
MCA-204	Artificial Intelligence	4	3	1	0
MCA-231	Distributed Operating System	4	3	1	0
MCA-251	Lab Software Engineering and Project Management	2	0	0	4
MCA-252	Lab ASP. Net	2	0	0	4
MCA-253	Lab Python	2	0	0	4
	Total	26	15	5	6

PROFESSIONAL ELECTIVE-II

1. MCA-231 Distributed Operating System
2. MCA-232 Embedded System
3. MCA-233 Linux/ Unix

OPEN ELECTIVE

1. MCA-241 Cloud Computing
2. MCA-241 A Digital Electronics
3. MCA-241 B Business Communication
4. MCA-241 C Research Methodologies
5. MCA-241 D Cognitive Analytics and social skills for Professional Development

Scheme of Teaching

TEACHING SCHEME OF MCA 2nd YEAR (3rd SEMESTER)

Code	Course Title	Cr.	L	T	P
MCA-301	PHP	4	3	1	0
MCA-302	Data Science	4	3	1	0
MCA-304	Cryptography and Network Security	4	3	1	0
MCA-332	Compiler Design	4	3	1	0
MCA-351	Lab PHP	2	0	0	4
MCA-352	Lab Data Science	2	0	0	4
MCA-353	Lab Cryptography and Network Security	2	0	0	4
MCA-354	Minor Project	2	0	0	4
MCA-355	Seminar Based on Learning	2	0	0	4
	Total	24	9	3	10

PROFESSIONAL ELECTIVE-III

1. MCA-331 Soft Computing
2. MCA-332 Compiler Design

OPEN ELECTIVE

1. MCA-303 Android Programming
2. MCA-304 Cryptography and Network Security
3. MCA-304 A Professional Ethics and Social Responsibility for Sustainability
4. MCA-304 B Enterprise Resource Planning
5. MCA-305 C Software Project Planning and Management
6. MCA-306 D Internet of Everything

Scheme of Teaching

TEACHING SCHEME OF MCA 2nd YEAR (4th SEMESTER)

Code	Course Title	Cr.	L	T	P
MCA-462	Major Project Presentation & Viva	24	-	-	48
	Total	24	0	0	48

SYLLABUS

JAVA

MCA-101

L	T	P	Cr
3	1	0	4

Course Outcomes:
At the end of this course, students will demonstrate the ability to:

1. Understand Java basics: JVM architecture, JDK & JRE, and essential Java components.
2. Apply object-oriented features like classes, inheritance, interfaces, and exception handling.
3. Develop skills in Java I/O operations and understand the applet life cycle.
4. Design graphical user interfaces (GUIs) using AWT components and event handling.
5. Understand Java libraries for common tasks such as data manipulation, file handling, and utilities.

Module I: Introduction to Java

Introduction, Java Virtual Machine and their architecture, JDK & JRE, Environment Variable, Features and differences with C++, Data Types, Identifiers and Variables, Operators and Expressions, Type Conversion, Control flow, arrays, Constants, Methods. Java Class Libraries: java.lang, java.io, java.math, java.text and java.util package.

Module II: Java with Object Orientated Features

Class & Objects: Introducing Classes, A Closer look at Methods and Classes, constructor, static members. **Inheritance**: Types and use of super keyword, Final method and classes. **Interfaces and Packages**: Definition and their implementation, defining class path. **Exception Handling**: Errors and Exceptions, Exception Handling Mechanism, caught and uncaught exceptions, Exception class hierarchy, handling exceptions with try, catch, finally block, defining custom exception. **Multithreading**: Thread life cycle, creating and controlling threads.

Module III: I/O and Applets
Run time input/output operations, io classes and their methods implementation, Applets life cycle, Applets program and their execution, Displaying various geometric shapes using 2D Graphics.
Module IV: GUI components using AWT and Event Handling
AWT: Making Windows, Frames, Panels, and Forms. Working with command buttons, text fields, labels, list boxes, layout manager, menus etc. **Event Handling**: Event Handling, Delegation Model, Event Classes, Event Listener interfaces, Adapter Classes.

Text & References:
Text:

- Patrick Naughtn and Herbert Schildt The Complete Reference, Java 2, TMH
- Douglas E.Cmer, Coimputer Networks & Internet, Pearson.

References:

- The Internet :By- Douglas E.Cmer: TMH

Advanced Database Management System

MCA-102

L	T	P	Cr
3	1	0	4

Course Outcomes:
At the end of this course, students will demonstrate the ability to:

1. Learn PL/SQL basics and control structures for creating database queries.
2. Implement PL/SQL procedures, triggers, and packages for managing data.
3. Understand distributed database systems, including data fragmentation and replication.
4. Learn parallel databases and techniques for optimizing database performance.
5. Understand object-oriented databases and the use of complex data types.

Module -I: Basics of PL/SQL
PL/SQL basics, blocks, architecture, variables, constants, attributes, character set, PL/SQL, data types, control structure, conditional and sequential control statements.

Module -II: PL/SQL
PL/SQL precompiler, cursors, type of cursors, exceptions, Indexing, View, triggers, PL/SQL Stored procedures and packages

Module -III: Distributed Databases
Introduction, Advantages, Architecture, Homogeneous & Heterogeneous DDBMS, Distributed Data Storage (Fragmentation & Replication), Distributed Transactions, Commit protocol, Concurrency Control in Distributed Databases, Availability, Distributed Query Processing

Module-IV: Parallel Databases
Introduction, Architecture, I/O Parallelism and Skew, Inter-query Parallelism, Intra-query Parallelism, Intra-operation Parallelism (Parallel Sort, Parallel Join), Interoperation Parallelism, Design of Parallel Systems.
Module-V: Object Oriented Database Management System
Introduction, Object-Oriented Data Model, Object Oriented Languages, Persistent Programming Languages, Object-Relational Databases: Nested Relations, Complex Types, Inheritance, Reference Types, Querying with Complex Types, Functions and Procedures Storage for Object Databases.

TEXT BOOKS:

1. H. F. Korth and A. Silberschatz: Database System Concepts, McGraw Hill, New Delhi, 1997.
2. Raghu Ramkrishnan, Johannes Gehrke , "Database Management Systems", McGraw Hill International, 2007
3. Abraham Silberschatz, Henry Korth, S, Sudarshan,, "Database System Concepts", McGraw Hill International, 2005
4. C.J.Date, Longman, "An Introduction to Database System", Pearson Education, 2003

REFERENCE BOOKS:

1. R. A. Elmasri and S. B. Navathe: Fundamentals of Database Systems, 3rd ed., Addison-Wesley, 1998.
2. R. Ramakrishnan: Database Management Systems, 2nd ed., McGraw Hill, New York, 1999.

3. Elmasri R and Navathe SB, "Fundamentals of Database Systems", Addison Wesley, 2000.
4. Thomas Connolly, Carolyan Begg,, "Database Systems,: A Practical Approach to Design.
5. Implementation and Management, Addison Wesley, 2014 10
6. Ceri Pelagatti, "Distributed Database: Principles and System" , Addison Wesley, 1999.

Advanced Design & Analysis of Algorithms

MCA-103

L	T	P	Cr
3	1	0	4

Course Outcomes:
At the end of this course, students will demonstrate the ability to:

1. Analyse algorithm complexity and design efficient sorting and searching algorithms.
2. Apply dynamic programming and greedy techniques to solve optimization problems.
3. Implement graph algorithms such as minimum spanning trees and shortest path algorithms.
4. Understand NP-completeness and explore approximation algorithms.
5. Develop the ability to design and analyse complex algorithms and their efficiencies.

Module I: Algorithm Analysis
Introduction Algorithms Complexity measures, best, worst and average-case complexity functions, problem complexity, quick review of basic data structures and algorithm design principles.
Module II: Sorting and searching Order statistics
Sorting by selection, insertion and bubble, Divide & Conquer Strategy, Heap Sort, Quick Sort Data Sorting in Linear time. Other sorting algorithms— radix sort, merge sort, sternsons Matrix Multiplication.
Searching in static table— binary search, path lengths in binary trees and applications, optimality of binary search in worst cast and average-case Binary search trees, construction of optimal weighted binary search trees; Searching in dynamic table -randomly grown binary search trees, AVL and (a, b) trees. Hashing: Basic ingredients, analysis of hashing with chaining and with open addressing.
Module III: Advanced Design and Analysis Techniques
Dynamic programming- Elements of dynamic programming, Chain-matrix multiplication, All pair shortest path (Flayed -algorithm), Optimal Binary Search Tree.
Greedy algorlthms- Elements of the greedy strategy, Huffman codes, Single-source shortest path in a directed graph, Knapsack problem.
Module IV: Graph Algorithms
Elementary graphs Algorithms, Minimum spanning Trees minimum spanning trees— Kruskal's and Prim's algorithms— Johnson's implementation of Prim's algorithm using priority queue data structures, Single source Shortest paths, All Pair Shortest Paths. *String processing* : String searching and Pattern matching, Knuth-Morris-Pratt algorithm and its analysis.
Module V : NP-completeness
Informal concepts of deterministic and nondeterministic algorithms, P and NP , NP-completeness, statement of Cook's theorem, some standard NP-complete problems, approximation algorithms.

Text Books:

- T. H. Cormen, C. E. Leiserson and R. L. Rivest: Introduction to Algorithms, Prentice Hall of India, New Delhi, 1998.
- E. Horowitz and S. Sahani: Fundamental of Computer Algorithms, Galgotia Pub. /Pitman, New Delhi/London, 1987/1978.

References Books:

- Aho, J. Hopcroft and J. Ullman; The Design and Analysis of Computer Algorithms, A. W. L, International Student Edition, Singapore, 1998

- S. Baase: Computer Algorithms: Introduction to Design and Analysis, 2nd ed., Addison-Wesley, California, 1988.
- K. Mehlhom: Data Structures and Algorithms, Vol. 1 and Vol. 2, Springer-Verlag, Berlin, 1984.
- Borodin and I. Munro: The Computational Complexity of Algebraic and Numeric Problems, American Elsevier, New York, 1975.
- S. Winograd: The Arithmetic Complexity of Computation, SIAM, New York, 1980.

Network Fundamentals

MCA-104

L	T	P	Cr
3	1	0	4

Course Outcomes:
At the end of this course, students will demonstrate the ability to:

1. Understand computer networks, their components, and data communication fundamentals.
2. Learn the duties of physical, data link, and network layers in network protocols.
3. Explore the transport layer's role in managing data flow and network congestion.
4. Study wireless technologies and their impact on modern networks.
5. Analyze the functionality of various application layer protocols, including DNS and HTTP.

Introduction to Computer Networks
Need to share resources, Concepts of Layering, Distributed System and Networks, Prerequisites, Definition, Categories and Components, Connections, Layers and Services, Applications of Computer Networks, Data Communication Fundamentals- Introduction, Frequency and Band, Analog and Digital Signals and Transmission, Coding Mechanism, Modulation, Multiplexing and De-multiplexing, TDM, FDM, Switching and Routing, Transmission and Errors
Physical Layer
Introduction, Duties of Physical Layer, Infrared and Millimeter Waves, ISM Bands, Optical Lights and Free Space Optics, Wired Physical Layer, Wireless Physical Layer
The Data Link Layer Duties of Data Link Layer, The Error, The Protocols
The Medium Access Sub layer
Introduction, Wired MAC Layer, The LLC Layer, Wireless MAC, The MAC Layer, The Generic Frame Structure, Connecting Device at Data Link Layer, Virtual LAN.
The Network Layer
Introduction, Duties of Network Layer, Connection Oriented Forwarding using Virtual Circuits, Connection Less Forwarding using Datagram, Connection Oriented Vs Connectionless Forwarding, Forwarding Examples, Routing Algorithms, Congestion, Network Layer Switching
The Transport Layer
Introduction, Duties of Transport Layer Connection Management at Transport Layer, Congestion Control, Comparison with Data Link Layer
The Application Layer
Introduction, Domain Name System: Name Space, Registration Process, Name Servers, Resource Records, Types of Resource Records, Dynamic DNS, WWW and HTTP, Bluetooth
Text:
1. Bhushan H Trivedi ,"Computer Networks", Oxford University Press
Reference:
1. Behrouz A. Forouzan, "Data Communications and Networking", Tata McGraw-Hill, Fourth Edition
2. Andrew S. Tanenbaum, "Computer Networking", Prentice Hall, Fourth Edition

Mobile Computing

MCA-131

L	T	P	Cr
3	1	0	4

Course Outcomes:
At the end of this course, students will demonstrate the ability to:

1. Understand GSM architecture and the basic principles of mobile communication systems.
2. Learn wireless medium access control techniques like TDMA, FDMA, and CDMA.
3. Explore mobile IP and mobile data communication technologies.
4. Understand mobile transport layer protocols, including TCP optimizations for mobility.
5. Study global mobile satellite systems and 3G technologies in mobile computing.

Course Contents:

Module I:
Global System for Mobile Communication (GSM) system overview: GSM Architecture, Mobility management, Network signalling. GSM Additional services: Teletext, Facsimile, Videotext services.

Module II: (Wireless) Medium Access Control
Motivation for a specialized
MAC (Hidden and exposed terminals, Near and far terminals), SDMA, FDMA, TDMA, CDMA.
Mobile Network Layer: Mobile IP (Goals, assumptions, entities and terminology, IP packet delivery, agent advertisement and discovery, registration, tunneling and encapsulation, optimizations), Dynamic Host Configuration Protocol (DHCP).

Module III: Mobile Transport Layer: Traditional TCP, Indirect TCP, Snooping TCP, Mobile TCP, Fast retransmit/fast recovery, Transmission /time-out freezing, Selective retransmission, Transaction oriented TCP.

Module IV: Mobile Data Communication
W LANs (Wireless LANs) IEEE 802.11 standard, Mobile IP.
Third Generation (3G) Mobile Services: Introduction to International Mobile Telecommunications 2000 (IMT 2000) vision, Wideband Code Division Multiple Access (W-CDMA), and CDMA 2000, Quality of services in 3G.

Module V: Global Mobile Satellite Systems
Mobile Satellite Systems (GEO, MEO and LEO), case studies of the IRIDIUM and GLOBALSTAR systems.

Text & References:

Text:

- "Mobile Communications", 2nd Edition, Jochen Schiller,2003

References:

- "Wireless and Mobile Networks Architectures", by Yi-Bing Lin &ImrichChlamtac, John Wiley & Sons, 2001.

- "Mobile and Personal Communication systems and services", by Raj Pandya, Prentice Hall of India, 2001.
- "Third Generation Mobile Telecommunication systems", by P. Stavronlakis, Springer Publishers, 2001.

Theory of Computation

MCA-132

L	T	P	Cr
3	1	0	4

Course Outcomes:
At the end of this course, students will demonstrate the ability to:

1. Understand finite automata and their properties, including DFA, NDFA, and minimization techniques.
2. Learn about formal languages, regular sets, and regular expressions.
3. Explore context-free languages, pushdown automata, and grammar simplifications.
4. Study Turing machines, halting problems, and computational theory.
5. Learn the basics of NP-completeness and its implications for computational complexity.

UNIT-I
Theory of Automata: Definition of an Automaton, Description of a Finite Automation, Transition Systems, Properties of Transition Functions, Acceptability of a String by a Finite ,Automation, Nondeterministic Finite State Machines, The Equivalence of DFA and NDFA, Mealy and Moore Models, Minimization of Finite Automata Exercises

UNIT-II
Formal Language: Basic Definitions and Examples, Chomsky Classification of Languages, Languages and Their Relation, Recursive and Recursively Enumerable Sets, Operations on Languages, Languages and Automata

UNIT-III
Regular Sets and Regular Grammars: Regular Expressions ,Finite Automata and Regular Expressions, Pumping Lemma for Regular Sets, Application of Pumping lemma, Closure Properties of Regular Sets, Regular Sets and Regular Grammars

UNIT-IV
Context-Free languages and Pushdown Automata: Context-free languages and Derivation Trees, Ambiguity in Context free Grammars, Simplification of Context-free Grammars, Normal Forms, Pumping Lemma and Decision Algorithms for context free languages, Basic Definitions of Pushdown Automata, Acceptance by pda , Pushdown Automata and Context free Languages, Parsing and Pushdown Automata

UNIT-IV
Turing Machines and Linear Bounded Automata: Turing Machine Model, Representation of Turing Machines, Language Acceptability by Turing Machines, Design of Turing Machines, Universal Turing Machines and Other modifications, The Model of Linear Bounded Automaton, Turing Machines and Type 0 Grammars, Linear Bounded Automata and languages, Halting Problem of Turing Machines, NP-Completeness.

Text Books:

- Mishra K.L.P. and N. Chandrasekaran : Theory of Computer Science (Automata, Languages and Computation), Prentice Hall of India, New Delhi, 2005.
- John C Martin, "Introduction to Languages and the Theory of Computaiton", Third Edition, Tata McGraw Hill Publishing Company, New Delhi, 2007. (UNIT 4, 5)
- Hop croft J.E. Motwani R. and Ullman J.D. "Introduction to Automata Theory, Languages and Computations", Second Edition, Pearson Education, 2008. (UNIT 1, 2, 3)

References Books:

- Mishra K L P and Chandrasekaran N, "Theory of computer Science-Automata, Languages and Computation", Third Edition, Prentice Hall of India, 2004.
- Harry R Lewis and Christos H Papadimitriou, "Elements of the Theory of Computation", Second Edition, Prentice Hall of India, Pearson Education, New Delhi, 2003.
- Peter Linz, "An introduction to Formal Language and Automata", Third Edition, Narosa Publications, New Delhi, 2002.
- Kamla Krithivasan and Rama. R, "introduction to Formal languages, Automata Theory and Computation", Pearson Education 2009.

Optimisation Techniques

MCA-133

L	T	P	Cr
3	1	0	4

Course Outcomes:
At the end of this course, students will demonstrate the ability to:

1. Understand linear programming and methods for solving LPPs.
2. Learn the Simplex method and its application to both maximization and minimization problems.
3. Study duality in linear programming and its practical implications.
4. Explore transportation problems and their solution methods.
5. Apply queueing theory and game theory in optimization problems.

Module I: Introduction of OR and Linear Programming
Basic Deification, Nature and Significance of OR, feature of OR Approach Application and Scope of OR, General Methods for Solving Or Models. General Structure of Linear Programming, Advantages and Limitations of Linear Programming, Application Areas of Linear Programming.
Linear Programming Solutions: Mathematical formulation of LPP, Standard form of LPP, Multiple Solution, Unbounded Solutions, Infeasible Solution of LPP.

Module II: Simplex Method
Maximization and Minimization Problem, Solution of LPP using Graphical method, Simplex Method, two Phase Method, Big M Method.

Module III: Duality in LPP
Dual Linear Programming Problem, Rules for Constructing the Dual from Primal, Feature of Duality

Module IV: Transportation Problem
Mathematical Model of Transportation Problem, Transportation Method, North West Corner Method, Linear Cost Method, Vogel's Approximation Method, Unbalanced Supply and Demand, Degeneracy Problem, Alternative Optional Solution, Maximization Transportation Problem..

Module V: Queueing Models
Markovian queues – Birth and Death processes – Single and multiple server queueing models (M/M/1 & M/M/S) – Little"s formula – Queues with finite waiting rooms – Queues with impatient customers: Balking and reneging.

Module VI: Theory of Games
Two Person Zero-Sum Games, Pure Strategies, Game with Saddle Point, Games without Saddle Point, Rule of Dominance, Methods for Solving Problems without Saddle Point.

Module VII: Project Management
Basic Idea of PERT & CRM, Difference between PERT & CPM, PERT/CPM Network Components and Precedence Relationship Critical Path Analysis, Project Scheduling, Project Time-Cost, Trade-Off, Resource Allocation.

Text & References:

Text:

- Operations Research, J K Sharma, Macmillan Publication

References:

- Operations Research, H. A. Taha
- Operations Research, Kanti Swaroop, Macmillan Publication

Elements of Statistics

MCA-133 A

L	T	P	Cr
3	1	0	4

Course Outcomes:
At the end of this course, students will demonstrate the ability to:

1. Understand basic statistics concepts and index numbers.
2. Learn about census, sampling, and sampling errors in statistical analysis.
3. Study the collection, tabulation, and presentation of data.
4. Analyze measures of central tendency and dispersion in data.
5. Learn diagrammatic and graphical techniques to represent statistical data.

Unit 1
BASIC STATISTICS AND INDEX NUMBERS: Definition - Nature - Scope - Role and Importance of Statistics, Index Numbers: Definition - Uses - Problems in Construction - Methods - Simple and Weighted, Index Numbers in Economics: Laspeyer's and Paache's Index Numbers - Fishers Ideal Index Number - Marshall and Edgeworths Index Numbers.

Unit 2
CENSUS AND SAMPLING: Census and Sampling: Meaning - Features - Population and Sample. Sampling: Meaning - Types of Sampling, Sampling Design: Meaning - Types – Challenges, Design of Questionnaire, Sampling Errors.

Unit 3
COLLECTION AND TABULATION OF DATA: Collection of Data: Meaning - Types of Data: Primary and Secondary - Qualitative and Quantitative, Tabulation of Data: Meaning - Objectives - Classification of Tabulation - Types of Tables - Presentation of Tables.

Unit 4
MEASURES OF CENTRAL TENDENCY, DISPERSION AND DIAGRAMMATICS: Measures of Central Tendency: Characteristics - Median - Mode - Harmonic Mean - Geometric Mean - Simple Problems, Measures of Dispersion-I: Features - Quartile Deviation - Mean Deviation - Standard Deviation - Its usefulness.

Unit 5
Measures of Dispersion-II: Range - Quartiles - Deciles - Percentiles - Characteristics - Simple Problems, Diagrammatic and Graphic Representation - Bar Diagrams - Pie Diagrams - Histograms - Pictograms - Cartograms - Frequency Graphs - Ogives – LorenzCurve.

Reference Books:
1. Goon A.M., Gupta M.K. and Dasgupta B. (2002): Fundamentals of Statistics, Vol. I & II, 8th Edn. The World Press, Kolkata.
2. Gupta, S. C. and Kapoor, V.K. (2008): Fundamentals Of Mathematical Statistics, 4 thEdition (Reprint), Sultan Chand &Sons.
3. Miller, Irwin and Miller, Marylees(2006): John E.Freund's Mathematical Statistics with Applications, (7th Edn.), Pearson Education, Asia

Combinatorial Optimization

MCA-133 B

L	T	P	Cr
3	1	0	4

Course Outcomes:
At the end of this course, students will demonstrate the ability to:

1. Formulate real-world problems as linear and integer programs.
2. Study the geometry of polyhedral and solutions to linear programming problems.
3. Understand duality and its applications in optimization.
4. Apply primal-dual methods to combinatorial optimization problems.
5. Explore various optimization techniques like dynamic programming and genetic algorithms.

Unit 1
Linear and Integer Programs, Formulating real world problems as linear and integer linear programs, formulating combinatorial optimization problems as integer linear programs, recap of important concepts in linear algebra

Unit 2
Geometry of Polyhedra: Feasible region of LPs and polyhedra, Convexity, Extreme points, Faces and facetsIII. Solving linear programs: Possible outcomes (infeasibility, unboundedness, and optimality) and their certificates, bases and canonical forms, the Simplex method and its geometric interpretation, the ellipsoid method and separation oracles.

Unit 3
Duality Weak duality, strong duality, complementary slackness, Farkasâ LemmaV. Combinatorial Optimization Primal-dual method for exact and approximation algorithms, Shortest paths, Minimum cost perfect matchings, Max-Flow Min-Cut Theorem, Totally Unimodular Matrices

Unit 4
Additional topics (if time permits)Interior-point methods, Randomized/Online algorithms for LPs, Integer Programs, Convex Optimization, Matroids, T-joins, Applications to Game Theory.

Unit 5
Range of optimization techniques, including divide and conquer, local optimization, dynamic programming, branch and bound, simulated annealing, genetic algorithms, approximation algorithms, integer and linear programming, and greedy algorithms.

Reference Books:
1. Cook, Cunningham, Pulleyblank and Schrijver. Combinatorial Optimization. Wiley-Interscience, 1998
2. Schrijver. Combinatorial Optimization. Springer, 2003.
3. Grotschel, Lovasz and Schrijver. Geometric Algorithms and Combinatorial Optimization. Springer, 1993

Multi-Objectives Optimization

MCA-133 C

L	T	P	Cr
3	1	0	4

Course Outcomes:
At the end of this course, students will demonstrate the ability to:

1. Understand fundamentals of multi-objective optimization techniques
2. Apply mathematical models to solve multi-objective problems
3. Analyze trade-offs among conflicting objectives
4. Implement optimization algorithms using computational tools
5. Evaluate performance of solutions using appropriate metrics

Unit 1
Methods for multi-objective optimization and their combination with multi-criteria decision-making techniques, classical methods for treating multi-objective problems will be presented, and their deficiencies will be clarified

Unit 2
Advanced methods, which are based on Pareto-optimality, will be presented. The major part of the course will be based on evolutionary techniques for optimization problems with and without constraints.

Unit 3
Leading algorithms will be presented and compared, such as: NSGA-II, SPEA-2, and MO-CMA-ES. Methods to compare algorithms will be detailed including test functions and measures to analyze the obtained approximated Pareto-optimal set and front. The numerical limitations of the presented algorithms will be clarified.

Unit 4
Methods to cope with such limitations will be described and in particular how to handle the course of dimensionality of the Pareto-front.

Unit 5
Multi-criteria decision-making approaches will be presented, and their combination with multi-objective optimization

Reference Books:
1. Multi-Objective Optimization in Theory and Practice I: Classical Methods, Andre A. Keller
2. Schrijver. Combinatorial Optimization. Springer, 2003.
3. Extended Multi-Objective Optimization Problems, Andre A. Keller

Biostatistics

MCA-133 D

L	T	P	Cr
3	1	0	4

Course Outcomes:
At the end of this course, students will demonstrate the ability to:

1. Understand basic concepts of biostatistics and data types
2. Apply statistical methods to analyse biological data
3. Use probability distributions and hypothesis testing in research
4. Interpret results using statistical software tools
5. Evaluate and validate data-driven conclusions in life sciences

Unit 1
Introduction: Statistics, Biostatistics, Frequency distribution, Measures of central tendency: Mean, Median, Mode- Pharmaceutical examples, Measures of dispersion: Dispersion, Range, standard deviation, Pharmaceutical problems, Correlation: Definition, Karl Pearson's coefficient of correlation, Multiple correlation.

Unit 2
Regression: Curve fitting by the method of least squares, fitting the lines y= a + bx and x = a + by, Multiple regression, standard error of regression– Pharmaceutical Examples Probability:Definition of probability, Binomial distribution, Normal distribution, Poisson's distribution, properties – problems Sample, Population, large sample, small sample, Null hypothesis, alternative hypothesis, sampling, essence of sampling, types of sampling, Error-I type, Error-II type, Standard error of mean (SEM) - Pharmaceutical examples Parametric test: t-test(Sample, Pooled or Unpaired and Paired) , ANOVA, (One way and Two way), Least Significance difference

Unit 3
Non Parametric tests: Wilcoxon Rank Sum Test, Mann-Whitney U test, KruskalWallis test, Friedman Test, Introduction to Research: Need for research, Need for design of Experiments, Experiential Design Technique, plagiarism Graphs: Histogram, Pie Chart, Cubic Graph, response surface plot, Counter Plot graph Designing the methodology: Sample size determination and Power of a study, Report writing and presentation of data, Protocol, Cohorts studies, Observational studies, Experimental studies, Designing clinical trial, various phases.

Unit 4
Blocking and confounding system for Two-level factorials Regression modeling: Hypothesis testing in Simple and Multiple regression models Introduction to Practical components of Industrial and Clinical Trials Problems: Statistical Analysis Using Excel, SPSS, MINITAB, DESIGN OF EXPERIMENTS, R - Online Statistical Software's to Industrial and Clinical trial approach

Unit 5
Design and Analysis of experiments: Factorial Design: Definition, 22, 23 design. Advantage of factorial design Response Surface methodology: Central composite design, Historical design, Optimization Techniques

Reference Books:

1. Pharmaceutical statistics- Practical and clinical applications, Sanford Bolton, publisher Marcel Dekker Inc. NewYork.
2. Fundamental of Statistics – Himalaya Publishing House-. S.C.Guptha Design and Analysis of Experiments –PHI Learning Private Limited, R. Pannerselvam,
3. Design and Analysis of Experiments – Wiley Students Edition, Douglas and C.Montgomery

Data Warehousing and Data Mining

MCA-134

L	T	P	Cr
3	1	0	4

Course Outcomes:
At the end of this course, students will demonstrate the ability to:

1. Understand concepts of data warehousing and its architecture
2. Apply data mining techniques to extract useful patterns from large datasets
3. Implement and evaluate clustering, classification, and association algorithms
4. Use data warehousing tools for effective data storage and retrieval
5. Analyze real-world data for decision-making and business intelligence

Module I: Data Warehousing
Introduction to Data Warehouse, its competitive advantage, Data warehouse vs Operational Data, Things to consider while building Data Warehouse

Module II: Implementation
Building Data warehousing team, Defining data warehousing project, data warehousing project management, Project estimation for data warehousing, Data warehousing project implementation

Module III: Techniques
Bitmapped indexes, Star queries, Read only tablespaces, Parallel Processing, Partition views, Optimizing extraction process

Module IV: Data Mining
From Data ware housing to Data Mining, Objectives of Data Mining, the Business context for Data mining, Process improvement, marketing and Customer Relationship Management (CRM), the Technical context for Data Mining, machine learning, decision support and computer technology.

Module V: Data Mining Techniques and Algorithms
Process of data mining, Algorithms, Data base segmentation or clustering, predictive Modeling, Link Analysis, Data Mining Techniques, Automatic Cluster Detection, Decision trees and Neural Networks.

Module VI: Data Mining Environment
Case studies in building business environment, Application of data ware housing and Data mining in Government, National Data ware houses and case studies.

Text & References:

Text:

- Data Warehousing, Data Mining & OLAP, Alex Berson, Stephen J. Smith, Tata McGraw-Hill Edition 2004.
- Data Mining: Concepts and Techniques, J. Han, M. Kamber, Academic Press, Morgan Kanf man Publishers, 2001
- Data Ware housing: Concepts, Techniques, Products and Applications, C.S.R. Prabhu, Prentice Hall of India, 2001.

References:

- Mastering Data Mining: The Art and Science of Customer Relationship Management, Berry and Lin off, John Wiley and Sons, 2001.
- Data Mining", Pieter Adrians, Dolf Zantinge, Addison Wesley, 2000.
- Data Mining with Microsoft SQL Server, Seidman, Prentice Hall of India, 2001.

Lab JAVA

MCA-151

L	T	P	Cr
0	0	4	2

Course Outcomes:
At the end of this course, students will demonstrate the ability to:

1. Develop Java applications using object-oriented programming principles
2. Implement Java data structures and algorithms in practical scenarios
3. Apply exception handling and multi-threading concepts in Java
4. Design and build user interfaces using Java Swing or JavaFX
5. Integrate Java with databases using JDBC for real-world applications

S.No	List of programs
1.	Print "Hello, World!" to the console.
2.	Take two integers as input and print their sum.
3.	Check if a given number is even or odd.
4.	Compute the factorial of a non-negative integer.
5.	Generate the Fibonacci series up to a specified number.
6.	Determine if a given number is prime.
7.	Reverse and print a given string.
8.	Convert Celsius to Fahrenheit and vice versa.
9.	Perform addition, subtraction, multiplication, and division.
10.	Count the number of vowels and consonants in a string.
11.	Check if a given string is a palindrome.
12.	Calculate simple interest given principal, rate, and time.
13.	Sort an array of integers in ascending order.
14.	Find the maximum and minimum values in an array.
15.	Implement linear search to find an element in an array.

MCA-152 **Advanced Database Management System lab**

L	T	P	Cr
0	0	4	2

Course Outcomes:
At the end of this course, students will demonstrate the ability to:

1. Implement advanced database models and architectures
2. Design and optimize complex queries using SQL and NoSQL
3. Apply database normalization and indexing techniques
4. Develop and manage transactions and concurrency control
5. Integrate database systems with applications using APIs and tools

S.No	List of programs
1.	Write a program to create table insert sample records, update a record, delete a record, and retrieve records from the table.
2.	Write a Program that defines two variables and a constant, then calculates the sum and area of a circle.
3.	Write a Program to find the greatest of three numbers using IF-THEN-ELSE
4.	Write a Program to calculate the factorial of a number using a FOR loop.
5.	Write a Program to handle an arithmetic exception for division by zero.
6.	Write a Program using an explicit cursor to fetch and display employee names.
7.	Write a Program to inserts a record and counts the total rows using an implicit cursor.
8.	Write a Program to create a trigger that automatically updates stock when a sale is made,
9.	Write a Program that creates a stored procedure to retrieve employee details by ID.
10.	Write a Program to create a package that includes a function to calculate factorial.
11.	Write a Program that simulates horizontal fragmentation by creating department-specific employee tables.

12.	Write a Program to perform a distributed transaction across two employee tables.
13.	Write a Program to simulate parallel query execution by splitting a large dataset into parts.
14.	Write a Program that simulates a parallel sort operation on a dataset.
15.	Write a Program that demonstrates various types of joins: Inner Join, Left Join, Right Join, and Full Outer Join.

Lab Design and analysis of Algorithm

MCA-153

L	T	P	Cr
0	0	4	2

Course Outcomes:
At the end of this course, students will demonstrate the ability to:

1. Implement and test various algorithm design techniques
2. Analyze time and space complexity of algorithms
3. Apply divide-and-conquer, dynamic programming, and greedy algorithms
4. Solve computational problems using efficient algorithms
5. Evaluate and compare algorithmic solutions for optimization

List of Practical

1. Implement Bubble Sort to sort an array of integers.
2. Implement Selection Sort to sort an array of integers.
3. Implement Insertion Sort to sort an array of integers.
4. Implement Merge Sort to sort an array using the divide-and-conquer approach.
5. Implement Quick Sort to sort an array using the partitioning method.
6. Implement Binary Search to find an element in a sorted array.
7. Implement Linear Search to find an element in an unsorted array.
8. Calculate the time complexity of different sorting algorithms.
9. Find the longest common subsequence between two strings.
10. Solve the Knapsack problem using dynamic programming.
11. Implement Dijkstra's algorithm for shortest path in a weighted graph.
12. Implement Breadth-First Search (BFS) for traversing a graph.
13. Implement Depth-First Search (DFS) for traversing a graph.
14. Solve the N-Queens problem using backtracking.
15. Implement Prim's algorithm for minimum spanning tree.
16. Implement Kruskal's algorithm for minimum spanning tree.

17. Software Engineering & Project Management

MCA-201

L	T	P	Cr
3	1	0	4

Course Outcomes:
At the end of this course, students will demonstrate the ability to:

1. Understanding software engineering principles and the importance of project management.
2. Familiarity with different software development life cycle models and their applications.
3. Skills to conduct software requirement analysis and estimation techniques like Function Point and COCOMO.
4. Ability to create project plans, manage scope, and break down work into manageable structures.
5. Knowledge of quality management techniques, risk management, and software maintenance.

Module I: Introduction to Software Engineering and Project Management

Introduction to Software Engineering: Software, Evolving role of software, Three "R"-Reuse, Reengineering and Retooling, An Overview of IT Project Management: Define project, project management framework, the role of project Manager, Systems View of Project Management, Stakeholder management, Project phases and the project life cycle.

Module II: Software Development Life Cycle Models

Overview of Software Development Life Cycle, Process Models: Waterfall Model, Evolutionary Process Model: Prototype and Spiral Model, Incremental Process model: Iterative approach, RAD, JAD model, Concurrent Development Model, Agile Development: Extreme programming, Scrum.

Module III: Software Requirement Analysis and Specification

Types of Requirement, Feasibility Study, Requirement Analysis and Design: DFD, Data Dictionary, Requirement Elicitation: Interviews, Questionnaire, Brainstorming, Facilitated Application Specification Technique (FAST), Use Case Approach. SRS Case study, Software Estimation: Size Estimation: Function Point (Numerical). Cost Estimation: COCOMO (Numerical), COCOMO-II (Numerical), Earned Value Management.

Module IV: Software Project Planning

Business Case, Project selection and Approval, Project charter, Project Scope management: Scope definition and Project Scope management, Creating the Work Breakdown Structures, Scope Verification, Scope Control.

Module V: Project Scheduling and Human Resource management

Relationship between people and Effort: Staffing Level Estimation, Effect of schedule Change on Cost, Degree of Rigor & Task set selector, Project Schedule, Schedule Control, CPM (Numerical), Human Resource Planning, Acquiring the Project Team, Resource Assignment, Loading, Leveling, Developing the Project Team: Team Structures, Managing the Project Team.

Module VI: Software Quality and Risk Management

Software quality, software reliability models, Overview of ISO 9001, SEI Capability Maturity Model, McCalls Quality Model, Six Sigma, Formal Technical Reviews, Tools and Techniques for Quality Control, Quality Control Charts, Modern Quality Management, Risk Management: Identify IT Project Risk, Risk Analysis and Assessment, Risk Strategies, Risk Monitoring and Control, Risk Response and Evaluation.

Module VII: Software Maintenance
Maintenance Process, Maintenance Model, Estimation of maintenance cost, Regression Testing, Reverse Engineering, Software Re-engineering, Configuration Management and Documentation.

Text & References:

Text

- Software Engineering, 5th and 7th edititon, by Roger S Pressman, McGraw Hill publication
- Software Engineering Project Management by Richard H. Thayer Wiley India Publication.

References: https://www.rgpvnotes.in/2018/01/cs-6003-software-engineering-project.html

ASP .NET

MCA-202

L	T	P	Cr
3	1	0	4

Course Outcomes:
At the end of this course, students will demonstrate the ability to:

1. Proficiency in building dynamic web applications using ASP.NET and understanding its architecture.
2. Understanding of ADO.NET and XML for database interaction and data handling.
3. Ability to create and manage ASP.NET applications with features like error handling and security.
4. Knowledge of web services and various state management techniques.
5. Mastery in creating custom controls and validating forms within ASP.NET applications.

Module I: Introduction to .NET technologies
Features of .NET, .NET Framework, CLR, MSIL, .NET class library, .NET Languages, CTS, assemblies, manifest, and metadata, What is ASP.NET?, Difference between ASP and ASP.NET.

Module II: Controls in ASP.NET
Overview of Dynamic Web page, Understanding ASP.NET Controls, Applications, Web servers, Installation of IIS.Web forms, web form controls -server controls, client controls. Adding controls to a web form, Buttons, Text Box, Labels, Checkbox, Radio Buttons, List Box. Adding controls at runtime. Running a web Application, creating a multiform web project. Form Validation: Client side validation, server Side validation, validation Controls: Required Field Comparison Range. Calendarcontrol, Ad rotator Control, Internet Explorer Control.

Module III: Overview of ADO.NET and XML
What is ADO.NET, from ADO to ADO.NET. ADO.NET architecture, Accessing Data using Data Adapters and Datasets , using Command & Data Reader, binding data to data bind Controls, displaying data in data grid, XML basics, attributes, fundamental XML classes: Document, text writer, text reader. XML validations, XML in ADO.NET, The XML Data Document.

Module IV: ASP.NET Applications
Creating, tracking, caching, error handling, Securing ASP.NET applications- form based applications, window based application.

Module V: Web services
Introduction, State management- View state, Session state, Application state, Building ASP.NET web services, working with ASP.NET applications, creating custom controls.

Text & References:

Text:

- ASP.NET Unleashed by Stephen Walther, SAMS publications

References:

- ASP.NET, Wrox Publications
- ASP.NET and VB.NET, Wrox Publication
- ASP.NET and C#.NET, Wrox publication.

Python

MCA-203

L	T	P	Cr
3	1	0	4

Course Outcomes:
At the end of this course, students will demonstrate the ability to:

1. Mastery of Python syntax, operators, and control flow structures.
2. Ability to define and manage functions, modules, and arguments efficiently.
3. Strong grasp of Python data structures like lists, dictionaries, and tuples, along with exception handling.
4. In-depth knowledge of object-oriented programming (OOP) concepts in Python.
5. Skills in data science and visualization using Python, including operations on Data Frames and plotting graphs.

UNIT – I:
Introduction: History of Python, Need of Python Programming, Applications Basics of Python Programming Using the REPL(Shell), Running Python Scripts, Variables, Assignment, Keywords, Input-Output, Indentation.

UNIT – II:
Operators and Expressions: Types - Integers, Strings, Booleans; Operators- Arithmetic Operators, Comparison (Relational) Operators, Assignment Operators, Logical Operators, Bitwise Operators, Membership Operators, Identity Operators, Expressions and order of evaluations Control Flow- if, if-elif-else, for, while, break, continue, pass

UNIT – III:
Functions: Defining Functions, Calling Functions, Passing Arguments, Keyword Arguments, Default Arguments, Variable-length arguments, Anonymous Functions, Fruitful Functions (Function Returning Values), Scope of the Variables in a Function - Global and Local Variables,
Modules: Creating modules, import statement, from. Import statement, name spacing, Python Packages

UNIT – IV:
Data Structures: Lists- Operations, Slicing, Methods, Tuples, Sets, Dictionaries, Sequences, Comprehensions. **Exceptions:** Errors in a Python Program (Compile-Time Errors, Runtime Errors, Logical Errors), Exceptions, Exception Handling, Types of Exceptions, The Except Block, the assert Statement, User- Defined Exceptions, Logging the Exceptions. **Files:** Files, Types of Files in Python, Opening a File, Closing a File, Working with Text Files Containing Strings, Knowing Whether a File Exists or Not, Working with Binary Files, The with Statement, Pickle in Python, The seek() and tell() Methods

UNIT – V:
Object Oriented Programming OOP in Python: Classes, 'self variable', Methods, Constructor Method, Inheritance, Overriding Methods **Regular Expressions:** Regular Expressions, Sequence Characters in Regular Expressions, Quantifiers in Regular Expressions, Special Characters in Regular Expressions, Using Regular Expressions on Files, Retrieving Information from a HTML File

Data Science and Data Visualization using Python

Data Science Using Python: Data Frame (Creating Data Frame from an Excel Spreadsheet, Creating Data Frame from .csv Files, Creating Data Frame from a Python Dictionary, Creating Data from Python List of Tuples, Operations on Data Frames) **Data Visualization:** Bar Graph, Histogram, creating a Pie Chart, Creating Line Graph, **Plotting:** Plotting using PyLab, Plotting mortgages and extended examples

Text books

1. Python Programming: A Modern Approach, Vamsi Kurama, Pearson
2. Learning Python, Mark Lutz, Orielly

Reference Books:

1. Think Python, Allen Downey, Green Tea Press
2. Core Python Programming, W.Chun, Pearson
3. Introduction to Python, Kenneth A. Lambert, Cengage

Artificial Intelligence

MCA-204

L	T	P	Cr
3	1	0	4

Course Outcomes:
At the end of this course, students will demonstrate the ability to:

1. Understanding the fundamentals of AI problems, intelligent behavior, and philosophical issues in AI.
2. Ability to apply basic and advanced search strategies for problem-solving in AI.
3. Knowledge of knowledge representation techniques such as logic, semantic networks, and frames.
4. Ability to reason under uncertainty using probability, Bayesian networks, and decision theory.
5. Proficiency in working with intelligent agents, including game theory and expert systems.

Module I:
Fundamental Issues: Overview of AI problems, Examples of successful recent AI applications, Intelligent behaviour, The Turing test, Rational versus non-rational reasoning, Problem characteristics: Fully versus partially observable, Single versus multi-agent, Deterministic versus stochastic, Static versus dynamic, Discrete versus continuous, Nature of agents: Autonomous versus semi-autonomous, Reflexive, Goal-based, and Utility-based, Importance of perception and environmental interactions, Philosophical and ethical issues.

Module II:
Basic Search Strategies: Problem spaces (states, goals and operators), Problem solving by search, Factored representation (factoring state into variables), Uninformed search (breadth-first, depth-first, depth-first with iterative deepening), Heuristics and informed search (hill-climbing, generic best-first, A*), Space and time efficiency of search, Constraint satisfaction (backtracking and local search methods).

Module III:
Advanced Search: Constructing search trees, Dynamic search space, Combinatorial explosion of search space, Stochastic search: Simulated annealing, Genetic algorithms, Monte-Carlo tree search, Implementation of A* search, Beam search, Minimax Search, Alpha-beta pruning, Expectimax search (MDP-solving) and chance nodes.

Knowledge Representation: Propositional and predicate logic, Resolution in predicate logic, Question answering, Theorem proving, Semantic networks, Frames and scripts, conceptual graphs, conceptual dependencies.

Module IV:
Reasoning under Uncertainty: Review of basic probability, Random variables and probability distributions: Axioms of probability, Probabilistic inference, Bayes' Rule,
Conditional Independence, Knowledge representations using Bayesian Networks, Exact inference and its complexity, Randomized sampling (Monte Carlo) methods (e.g. Gibbs sampling), Markov Networks, Relational probability models, Hidden Markov Models, Decision Theory Preferences and utility functions, Maximizing expected utility.

Module V:

Agents: Definitions of agents, Agent architectures (e.g., reactive, layered, cognitive), Agent theory, Rationality, Game Theory Decision-theoretic agents, Markov decision processes (MDP), Software agents, Personal assistants, and Information access Collaborative agents, Information-gathering agents, Believable agents (synthetic characters, modelling emotions in agents), Learning agents, Multi-agent systems Collaborating agents, Agent teams, Competitive agents (e.g., auctions, voting), Swarm systems and Biologically inspired models.

Expert Systems: Architecture of an expert system, existing expert systems: MYCIN, RI. Expert system shells.

Text & References:

Text:

- Artificial Intelligence – II Edition, Elaine Rich, Kevin Knight TMH.

References:

- Foundations of Artificial Intelligence and Expert Systems, V S Janakiraman, K Sarukesi, P Gopalakrishan, Macmillan India Ltd.
- Introduction to AI and Expert System, Dan W. Patterson, PHI.

MCA-231

L	T	P	Cr
3	1	0	4

Course Outcomes:

At the end of this course, students will demonstrate the ability to:

1. Understanding the concepts and evolution of distributed computing and operating systems.
2. Proficiency in message passing and remote procedure calls (RPC) in distributed systems.
3. Knowledge of Distributed Shared Memory (DSM) systems and synchronization techniques.
4. Ability to design and manage resources using global scheduling algorithms and load balancing.
5. Familiarity with distributed file systems, including file access, replication, and fault tolerance.

Module I

Fundamentals: What is Distributed Computing Systems? Evolution of Distributed Computing System; Distributed Computing System Models; What is Distributed Operating System? Issues in Designing a Distributed Operating System; Introduction to Distributed Computing Environment (DCE).

Message Passing: Introduction, Desirable features of a Good Message Passing System, Issues in PC by Message Passing, Synchronization, Buffering, Multi-datagram Messages, Encoding and Decoding of Message Data, Process Addressing, Failure Handling, Group Communication.

Module II:

Remote Procedure Calls: Introduction, The RPC Model, Transparency of RPC, Implementing RPC Mechanism, Stub Generation, RPC Messages, Marshaling Arguments and Results, Server Management, Parameter-Passing Semantics, Call Semantics, Communication Protocols for RPCs, Complicated RPCs, Client-Server Binding, Exception Handling, Security, Some Special Types of RPCs, RPC in Heterogeneous Environments, Lightweight RPC, Optimization for Better Performance, Case Studies: Sun RPC.

Module III

Distributed Shared Memory: Introduction, General Architecture of DSM systems, Design and Implementation Issues of DSM, Granularity, Structure of Shared Memory Space, Consistency Models, Replacement Strategy, Thrashing, Other approaches to DSM, Heterogeneous DSM, Advantages of DSM. Synchronization: Introduction, Clock Synchronization, Event Ordering, Mutual Exclusion, Dead Lock, Election Algorithms

Module IV

Resource Management: Introduction, Desirable Features of a Good Global Scheduling Algorithm, Task Assignment Approach, Load – Balancing Approach, Load – Sharing Approach Process Management: Introduction, Process Migration, Threads.

Module V

Distributed File Systems: Introduction, Desirable Features of a Good Distributed File System, File models, File–Accessing Models, File – Sharing Semantics, File – Caching Schemes, File Replication, Fault Tolerance, Atomic Transactions and Design Principles.

Text & References:

- Distributed Operating Systems 1st Edition by Andrew S. Tanenbaum

- Distributed Systems: Principles and Paradigms (2nd Edition) 2nd Edition, by Andrew S. Tanenbaum, Maarten Van Steen

Cloud Computing

MCA-241

L	T	P	Cr
3	1	0	4

Course Outcomes:

At the end of this course, students will demonstrate the ability to:

1. Understanding cloud architecture, models, and the NIST Cloud Computing Reference Architecture.
2. Mastery of virtualization techniques and their implementation in cloud systems.
3. Ability to design and manage cloud infrastructure for computing and storage resources.
4. Knowledge of programming models and cloud platforms like MapReduce, Hadoop, and Google App Engine.
5. Proficiency in managing cloud security, including identity management, data security, and access control.

MODULE I: CLOUD ARCHITECTURE AND MODEL

Technologies for Network-Based System – System Models for Distributed and Cloud Computing – NIST Cloud Computing Reference Architecture. Cloud Models:- Characteristics – Cloud Services – Cloud models (IaaS, PaaS, SaaS) – Public vs Private Cloud –Cloud Solutions - Cloud ecosystem – Service management – Computing on demand.

MODULE II: VIRTUALIZATION

Basics of Virtualization - Types of Virtualization - Implementation Levels of Virtualization - Virtualization Structures - Tools and Mechanisms - Virtualization of CPU, Memory, I/O Devices - Virtual Clusters and Resource management – Virtualization for Data-center Automation.

MODULE III: CLOUD INFRASTRUCTURE

Architectural Design of Compute and Storage Clouds – Layered Cloud Architecture Development – Design Challenges - Inter Cloud Resource Management – Resource Provisioning and Platform Deployment – Global Exchange of Cloud Resources.

MODULE IV: PROGRAMMING MODEL

Parallel and Distributed Programming Paradigms – MapReduce , Twister and Iterative MapReduce – Hadoop Library from Apache – Mapping Applications - Programming Support - Google App Engine, Amazon AWS - Cloud Software Environments -Eucalyptus, Open Nebula, OpenStack, Aneka, CloudSim

MODULE V: SECURITY IN THE CLOUD

Security Overview – Cloud Security Challenges and Risks – Software-as-a-Service Security – Security Governance – Risk Management – Security Monitoring – Security Architecture Design – Data Security – Application Security – Virtual Machine Security - Identity Management and Access Control – Autonomic Security.

Text & References:

- John W.Rittinghouse and James F.Ransome, "Cloud Computing: Implementation, Management, and Security", CRC Press, 2010.

- Toby Velte, Anthony Velte, Robert Elsenpeter, "Cloud Computing, A Practical Approach", TMH, 2009.
- Kumar Saurabh, "Cloud Computing – insights into New-Era Infrastructure", Wiley India,2011.
- James E. Smith, Ravi Nair, "Virtual Machines: Versatile Platforms for Systems and Processes", Elsevier/Morgan Kaufmann, 2005.
- Ronald L. Krutz, Russell Dean Vines, "Cloud Security – A comprehensive Guide to Secure Cloud Computing", Wiley – India, 2010.

Digital Electronics

Subject Code- MCA- 241 A

L	T	P	Cr
3	1	0	4

Course Outcomes:

At the end of this course, students will demonstrate the ability to:

1. Understand binary, octal, decimal, and hexadecimal number systems and their conversions.
2. Learn binary codes (BCD, Excess-3, Gray, ASCII, EBCDIC) and their advantages / disadvantages.
3. Master binary arithmetic, including addition, subtraction, and multiplication/division using complements.
4. Gain skills in Boolean algebra and simplification of logic expressions using Karnaugh maps.
5. Understand the architecture of the 8086 microprocessor, its instruction set, and addressing modes.

UNIT-1:

Number System and Data Representation
Number System: Binary, Octal, Decimal and Hexadecimal Number System and Their Interconversion. Binary Codes: Bcd, Excess 3,Parity , Gray, Ascii And Ebcdic Codes , Their Advantages And Disadvantages. Data Representation: (Related To 8 Bit Number), Real Number Representation, Underflow, Overflow, Range and Accuracy of Numbers.

UNIT-2:
Binary Arithmetic
Binary Addition, Decimal Subtraction Using 9's And 10's Complement, Binary Subtraction Using 1's And 2'nd Compliment, Multiplication And Division .Logic Gates: Truth Table, Properties And Symbolic Representation Of NOT, AND ,OR,NOR,NAND ,EX-OR ,EX – NOR GATES, NOR and NAND GATES As A Universal Gates.

UNIT-3
Boolean algebra
Laws And Identities Of Boolean Algebra, Demorgan's Theorem, Use Of Boolean Algebra For Simplification Of Logic Expression, Karnaugh Map For 2,3,4 Variable, Simplification Of Sop And Pos Logic Expression Using K-Map.

UNIT-4:
Combinational / Sequential Circuits
Half Adder , Full Adder, Parallel Adder, Half Substractor, Full Substractor, 4 Bit Binary Adder/ Substractor, Multiplexer , demultiplexer, Decoder , Encoder ,Parity Detector.

UNIT-5:
Architecture Of 8086
Block Diagram Of 8086, Pin Diagram 0f 8086, Minimum And Maximum Mode,
Addressing Modes, Instruction Set: Data Transfer, Arithmetic, Logical , String Manipulation, Control Transfer, Unconditional Branch, Conditional Branch, Flag, Processor Control.

Business Communication

Subject Code- MCA- 241 B

L	T	P	Cr
3	1	0	4

Course Outcomes:

At the end of this course, students will demonstrate the ability to:

1. Develop business vocabulary and practice writing notices, agendas, and minutes.
2. Improve writing skills in business memos, reports, proposals, and letters.
3. Enhance communication in cross-cultural contexts and through negotiation/persuasion techniques.
4. Master formal letter writing, including types like enquiry, complaint, and apology letters.
5. Learn the structure and writing styles for different types of reports (analytical, informational, and project).

Unit 1

Business Vocabulary – Writing: Drafting Notices, Agenda, and Minutes – Reading: Business news, Business articles.

Unit 2

Writing: Style and vocabulary – Business Memorandum, letters, Press Releases, reports – proposals – Speaking: Conversational practice, telephonic conversations, addressing a gathering, conducting meetings.

Unit 3

Active Listening: Pronunciation – information gathering and reporting – Speaking: Cross-Cultural Issues, Group Dynamics, and negotiation & persuasion techniques.

Unit 4

PROFESSIONAL WRITING: Letter writing – Types, Parts and Styles of Formal Letters – Language to be used in Formal Letters – Letters of Enquiry, Complaint, and Apology with Replies – Letter of Application -Resume – E-mail – Active and Passive Voice.

Unit 5

REPORT WRITING: Types of Reports – Formats of Reports – Memo Format – Letter Format and Manuscript Format- Parts of Technical Report – Informational, Analytical and Project Reports – Idioms and Phrases.

Research Methodologies

Subject Code- MCA- 241 C

L	T	P	Cr
3	1	0	4

Course Outcomes:

At the end of this course, students will demonstrate the ability to:

1. Learn the fundamentals of research, including problem identification, hypothesis formulation, and the research process.
2. Understand different research designs and their applications, such as exploratory, descriptive, and experimental.
3. Get familiar with qualitative and quantitative research methods and their integration.
4. Focus on measurement validity and reliability across different levels (nominal, ordinal, interval, ratio).
5. Apply hypothesis testing and develop the skills to write effective research findings.

Unit 1.

Foundations of Research: Meaning, Objectives, Motivation, Utility. Concept of theory, empiricism, deductive and inductive theory. Characteristics of scientific method - Understanding the language of Research - Concept, Construct, Definition, Variable. Research Process.

Unit 2.

Problem Identification & Formulation - Research Question - Investigation Question - Measurement Issues - Hypothesis - Qualities of a good Hypothesis Null Hypothesis & Alternative Hypothesis. Hypothesis Testing - Logic & Importance.

Unit 3.

Research Design: Concept and Importance in Research - Features of a good research design - Exploratory Research Design - concept, types and uses, Descriptive Research Designs - concept, types and uses. Experimental Design: Concept of Independent & Dependent variables.

Unit 4.

Qualitative and Quantitative Research: Qualitative research - Quantitative research - Concept of measurement, causality, generalization, and replication. Merging the two approaches.

Unit 5.

Measurement: Concept of measurement- what is measured? Problems in measurement in research- Validity and Reliability. Levels of measurement Nominal, Ordinal, Interval, and Ratio.

Cognitive Analytics and Social Skills for Professional Development

Subject Code- MCA- 241 D

L	T	P	Cr
3	1	0	4

Course Outcomes:

At the end of this course, students will demonstrate the ability to:

1. Develop self-awareness and communication skills (assertiveness, creativity, and problem-solving).
2. Understand emotional intelligence and its relevance to workplace relationships and team dynamics.
3. Learn leadership styles and team management techniques, including time management and work-life balance.
4. Study conflict resolution and negotiation techniques to manage workplace challenges.
5. Explore values and ethics in professional development, focusing on personal and social responsibility.

Unit I:

Cognitive Analytics and Social Cognition Understanding the self-preliminaries, Models of Understanding Self- T-E-A Model, Johari Window, PE Scale, Meaning and Importance of Self Esteem, Self-Efficacy, Self-Respect, Behavioral Communication- Assertive Skills, Technology adoption, Social Media Etiquettes, Creativity (ICEDIP Model), Visualization, Problem sensitivity, Problem Solving (Six Thinking Hats), Cognitive Flexibility, Cognitive Errors, Introduction to Social Cognition, Attribution Processes (Perceptual Errors), Social Inference, Stereotyping, Prejudice, Accepting Criticism.

Unit II:

Attitudes & Emotional Intelligence Understanding Attitudes , Characteristics of Attitude (valence, multiplicity, relation to needs, centrality, pervasiveness, invisible, acquired), Components of Attitudes (Affective, Cognitive, Behavioral), What are Emotions, Healthy and Unhealthy expression of emotions, Relevance of EI at workplace, Emotional Intelligence and Competence, Components of Interpersonal & Intrapersonal Intelligence, Relevance of EI at workplace

Unit III:

Leadership and Managing Excellence Team Design Features, Life Cycle of a Teams, Types and Development of Team Building, Issues in Team Performance , Types of leaders, Leadership styles in organizations, Situational Leadership , Strategic Leadership and Change Management- Mentoring, Building Trust, Building a Culture of Inclusion, Sociometry (Sociometry Criteria, Applications of Sociometry, Construction of sociogram), Personal Branding, Time Management, Work Life Integration, Relationship Management (Personal & Professional)

Unit IV:

Conflict Resolution and Negotiation Meaning, nature, sources, stages & types of conflicts, Factors affecting conflict, Impact of Conflict, Ethical Dilemmas in Conflict, Conflict Resolution Strategies, Comparison of conflict management styles, Matching conflict management approach with group conditions, Third Party Intervention- Mediation, mediation process, function of the mediator, preconditions for mediation, Intercultural communication and conflict resolution, Negotiation - Types, purpose, stages, Four pillars of negotiation, Strategies, Persuasion, Behavior and conduct during negotiation, closing the negotiation

Unit V:

Values & Ethics Meaning & its type, Difference between values and Ethics, Relationship between Values and Ethics, Significance of moral values, Practical Applications of Values & Ethics, Significance of moral values, Moral Icons, Its role in personality development , Character building- "New Self-awareness", Personal values-Empathy, honesty, courage, commitment, Core Values - Respect, Responsibility, Integrity, Care, & Harmony, Resilience and Agility in Uncertainty, Overview of Resilience , Locus of control, Paradox of choice, Overcoming negative thinking- ABC technique (Adversity, believes and consequences), Personality & cognitive variables that promote resilience, Role of family and social networks, Models, Symptoms and consequences of stress.

Embedded Systems

MCA-232

L	T	P	Cr
3	1	0	4

Course Outcomes:
At the end of this course, students will demonstrate the ability to:

1. Understand the evolution of computers and basics of processor types (Microcontroller, ASSPs).
2. Learn interrupt handling and embedded software development, including RTOS usage.
3. Gain knowledge in embedded hardware units, interfacing, and platform design.
4. Study real-time operating systems (RTOS) and process synchronization techniques.
5. Master semaphore usage, message queues, and inter-process communication for embedded systems.

Unit 1: INTRODUCTION
Introduction: Evolution of Computers, Technological Trends, Measuring performance Speed up, Computer organization: von Neumann Machine Architecture, Functional units and components, Program development tools. Instruction pipelining and parallel processing: Instruction pipeline, hazards, Data forwarding paths, RISC vs. CISC processors.

Unit 2: INTRODUCTION of EMBEDDED SYSTEM
Introduction of embeddes system, Processor: Embedded Processors in a System, Microprocessor,Microcontroller, Single Purpose Processors and Application specific system processors (ASSPs) inembedded systems. Embedded hardware units and devices

Unit 3: INTERRUPTS HANDLER, EMBEDDED SOFTWARE
Interrupts handler, Embedded software, Final Machine Implement-able Software for a System, Coding of Software in Machine Codes, software in Processor Specific Assembly Language, Software in High Level Language, Program Models for Software Designing, Software for Concurrent Processing and Scheduling of Multiple Tasks and ISRs Using an RTOS, Software for the Device Drivers and Device Management using an Operating System, Software tools in designing of an Embedded System, Needed Software Tools in the Exemplary cases. Examples of Embedded System

Unit 4: The Embedded Computing Platform
Embedded Computing Platform ,CPU Bus, Memory Devices, I/O Devices, Component Interfacing

Unit 5: Real-Time Operating Systems
Inter Process Communication & Synchronization of Processes, task and threads, multiple processes in an application, multiple threads in an application, task and states, task and data clear cut distinction between functions, ISRs and Tasks by their Characteristics.

Unit 6: CONCEPT OF SEMAPHORES
Concept of semaphores,Use of a Single Semaphore as an event signaling variable or notifying variable (event flag), Use of a Single Semaphore as resource key and in critical Section, Mutex, Use of Multiple Semaphores, Use of Mutex, Counting Semaphores, P and V semaphores shared data: Problem of Sharing Data by Multiple Tasks and Routines, Shared Data,Deadlock Situations ,inter

process Communication semaphores, Message Queues, Mailboxes, Pipes, Sockets, Remote Procedure Calls (RPCs).

Linux / Unix

MCA-233

L	T	P	Cr
3	1	0	4

Course Outcomes:
At the end of this course, students will demonstrate the ability to:

1. Learn the history, architecture, and basic commands for navigating the Unix environment.
2. Understand file system structure, file permissions, and security attributes.
3. Use simple filters like pr, sort, grep, and sed for text processing.
4. Master advanced shell programming concepts, such as AWK, shell functions, and parameter substitution.
5. Gain knowledge of process management, system administration, and environment customization in Unix/Linux.

Unit-1 Introduction of UNIX and Shell:
Introduction, History, Architecture, Experience the Unix environment, Basiccommand sls, cat, cal, date, calendar, who, printf, tty, sty, uname, passwd, echo, tput, bc, script, spell and ispell, Introduction to Shell Scripting, Shell Scripts, read, Command Line Arguments, Exit Status of a Command, The Logical Operators && and||, exit, if, and case conditions, expr, sleep and wait, while, until, for,$,@, redirection, set and shift, trap.

Unit-2 UNIX File System:

The file, what's in a filename? The parent-child relationship, pwd, the Home directory, absolute path names, using absolute pathnames for a command, cd, mkdir, rmdir, Relative path names, The UNIX file system. Basic File Attributes: Is – l, the –d option, File Permissions, chmod, Security and File Permission, users and groups, security level, changing permission, changing ownership and group, File Attributes, More file attributes: hard link, symbolic link, umask, find.

Unit-3 Simple Filters:

Pr, head, tail, cut, paste, sort, uniq, tr commands, Filters using Regular Expression: grep, Regular Expression, egrep, fgrep, sed instruction, Line Addressing, Inserting and Changing Text, Context addressing, writing selected lines to a file, the– f option, Substitution, Properties of Regular Expressions.

Unit-4 Awk and Advanced Shell Programming:

Awk-Advanced Filters: Simple awk Filtering, Splitting a Line into Fields, printf, the Logical and Relational Operators, Number Processing, Variables, The –f option, BEGIN and END positional Parameters, getline, Built-invariables, Arrays, Functions, Interface with the Shell, Control Flow. The sh command, export, the Command, Conditional Parameter Substitution, Merging Streams, Shell Functions, eval, Exec Statement and Examples

Unit-5 Process and System Administration:

Process basics, PS, internal and external commands, running jobs in background, nice, at and batch, cron, time commands, Essential System Administration root, administrator's privileges, startup &

shutdown, managing disk space, cpio, tar, Customizing the Environment : System Variables, profile, sty, Aliases, Command History, On-line Command Editing.

Software Engineering and Project Management lab

MCA-251

L	T	P	Cr
0	0	4	2

Course Outcomes:
At the end of this course, students will demonstrate the ability to:

1. Apply software development methodologies in real-world projects
2. Manage project timelines, resources, and risks effectively
3. Design and implement software solutions using best engineering practices
4. Use project management tools for tracking and collaboration
5. Evaluate software quality through testing and validation techniques

S.No	List of programs
1.	Write a program to take task names as input and display them.
2.	Write a program to updates a task's status (Pending/Done) and shows the result.
3.	Write a program to counts how many tasks have been inputted.
4.	Write a program to multiplies the number of hours by a fixed hourly rate to calculate the cost.
5.	Write a program that assigns a priority (High, Medium, Low) to a task and displays it.
6.	Write a program to checks if a task's due date has passed and displays a reminder.
7.	Write a program to marks specific tasks as milestones based on user input.
8.	Write a program to calculates how many tasks are completed out of the total.
9.	Write a program to assigns a person to a task and displays the assignment.
10.	Write a program to log defects with a status (Open/Closed).
11.	Write a program to multiplies the number of tasks by the estimated hours to give a total project effort.
12.	Write a program to input and display project risks.

13.	Write a program to prints task names with start and end dates in a simple list format.
14.	Write a program to simple First-Come-First-Serve (FCFS) scheduler that orders tasks by input time.
15.	Write a program to program that sums up task durations to calculate total project time.

Lab ASP. NET

MCA-252

L	T	P	Cr
0	0	4	2

Course Outcomes:
At the end of this course, students will demonstrate the ability to:

1. Develop web applications using ASP.NET framework
2. Implement server-side scripting and data handling in ASP.NET
3. Design user interfaces using ASP.NET Web Forms and MVC
4. Integrate databases with ASP.NET applications using ADO.NET
5. Apply security features and best practices in web development

List of Practical

1. Create a simple ASP.NET Web Form that displays "Hello, World!".
2. Build a contact form that captures user input and sends an email.
3. Develop a login page with user authentication using session management.
4. Create a registration form that saves user data to a SQL database.
5. Implement a product catalog page displaying data from a database.
6. Build a shopping cart application with add, remove, and checkout functionalities.
7. Create a CRUD (Create, Read, Update, Delete) application for managing a list of books.
8. Develop an employee management system with role-based access.
9. Implement a search feature for a blog with pagination.
10. Create a dashboard that visualizes data using charts (e.g., using Chart.js).
11. Build a simple API that returns JSON data for a list of users.
12. Implement file upload functionality with size and type validation.
13. Create a multi-language support page using resource files.
14. Develop a URL shortening service using ASP.NET MVC.
15. Implement session state management and demonstrate session tracking.
16. Build a survey application that saves responses to a database.
17. Create a forum page allowing users to post and comment on threads.
18. Develop a booking system for appointments with calendar integration.
19. Implement a real-time chat application using SignalR.
20. Create a blog platform with user roles for authors and admins.

Lab Python

MCA-253

L	T	P	Cr
0	0	4	2

Course Outcomes:
At the end of this course, students will demonstrate the ability to:

1. Develop applications using Python programming language
2. Implement data structures and algorithms in Python
3. Use Python libraries for data analysis and visualization
4. Design and build web applications using Python frameworks
5. Apply Python for automation and scripting tasks

1. Print "Hello, World!" to the console.
2. Calculate the sum of two numbers entered by the user.
3. Check if a given number is even or odd.
4. Compute the factorial of a non-negative integer.
5. Generate the Fibonacci series up to a specified number.
6. Determine if a given number is prime.
7. Reverse a string provided by the user.
8. Convert Celsius to Fahrenheit and vice versa.
9. Implement a basic calculator for addition, subtraction, multiplication, and division.
10. Count the number of vowels and consonants in a given string.
11. Check if a given string is a palindrome.
12. Calculate the area of a rectangle given width and height.
13. Sort a list of integers in ascending order.
14. Find the maximum and minimum values in a list.
15. Implement linear search to find an element in a list.
16. Create a program to read and write to a text file.
17. Generate a random number and create a guessing game.
18. Count the number of words in a sentence provided by the user.
19. Create a simple to-do list application using lists.
20. Implement a basic quiz application that asks questions and evaluates answers.

Soft Computing

MCA-331

L	T	P	Cr
3	1	0	4

Course Outcomes:
At the end of this course, students will demonstrate the ability to:

1. Understand the core concepts of fuzzy computing, neural networks, and genetic algorithms.
2. Gain knowledge of neural network architectures, learning methods, and their applications.
3. Learn the back-propagation algorithm and its use in training neural networks.
4. Understand associative memory systems and their practical uses in computing.
5. Apply swarm intelligence techniques, including ACO, ABC, and Cuckoo search algorithms.

Introduction to Soft Computing

Introduction, Fuzzy Computing, Neural Computing, Genetic Algorithms, Associative Memory, Adaptive Resonance Theory, Applications.

Fundamentals of Neural Network

Introduction, Model of Artificial Neuron, Architectures, Learning Methods, Taxonomy of NN Systems, Single-Layer NN System, Applications.

Back Propagation Network

Background, Back-Propagation Learning, Back-Propagation Algorithm.

Associative Memory

Description, Auto-associative Memory, Bi-directional Hetero associative

Fundamentals of Genetic Algorithms

Introduction, Encoding, Operators of Genetic Algorithm, Basic Genetic Algorithm.

Swarm Intelligent System

Introduction to swarm intelligence, Background, ACO, ABC, Cuckoo search algorithms.

Text & References:

- Neural Networks, Fuzzy Logic and Genetic Algorithms: Synthesis & Applications, S. Rajasekaran, G. A. Vijayalakshami, PHI.
- Chin Teng Lin, C. S. George Lee, Neuro-Fuzzy Systems, PHI
- Tomthy Ross,Fuzzy Logic and Engineering Application, TMH
- Kishan Mehrotra,Elements of Artificial Neural Network, MIT Press
- E. Goldberg,Genetic Algorithms: Search and Optimization, Addision-Wesley
- Recent Articles and Research papers

PHP

MCA-301

L	T	P	Cr
3	1	0	4

Course Outcomes:
At the end of this course, students will demonstrate the ability to:

1. Understand and work with PHP syntax, variables, arrays, and control structures.
2. Master file and directory handling, including uploading files and managing file systems.
3. Gain proficiency in connecting PHP with MySQL databases and performing CRUD operations.
4. Learn object-oriented programming concepts like classes, objects, and methods in PHP.
5. Implement a Content Management System (CMS) using WordPress and Drupal.

Module I: Introduction to PHP Servers : Introducing Apache, PHP, MySql, Installing XAMPP, PHP, MySql, Configuring Apache for PHP, Introduction to PHP, Syntax, Common PHP Script Elements, Variables, String, Operators, If...Else, Switch, Arrays, Looping, Functions, Forms, $_GET, $_POST, Date, Include, Error, Exception, Filter, PHP ODBC, Working With Forms, Processing Forms, Form Validation, Addressing the Stateless Nature of HTTP, Hidden Form Fields.

Module II: File Handling :File and Directory Handling, Including Files, File Access, Displaying directory files, Coping and renaming files, Deleting files, Opening and closing files, Reading files, Writing files, Logging visitor details, Enabling file uploads, Creating and upload form, Creating an upload script, Uploading a file

Module III: PHP and My SQL:Introducing databases Connect MySQL, Creating new database MySQL Create, Creating database table MySQL Insert, SQL data types, Inserting table data, Altering an existing table, Updating records, Deleting data, tables and databases, SQL Queries MySQL Select, MySQL Where, MySQL Order By, MySQL Update, MySQL Delete,, Creating Mysql user and password, Connecting a user to Mysql, Listing databases, Listing table names, Creating a database, Deleting a database, Creating a database table, Inserting table data, Altering tables, Retrieving data from a table

Module IV: Advance PHP : Declaring a class and Objects, The new keyword and constructor, Destructor, Access method and properties using $this variable, Public ,private, protected properties and methods, Static properties and method, Class constant, Introducing cookies, Set a cookie, Access limitation, Introducing sessions, Starting session, Session without cookies, Setting session persistence, Cookies or session, Sending plain text E-mail, Sending html E-mail, Creating an attachment form, Sending attachment with E-mail

Module – V: Content Management System
Introduction of Content Management System, Introduction about WordPress, WordPress.org vs. WordPress.com Introduction about drupal, Drupal installation, Maintenance mode, Working with plugins, Working with themes, Updation and deletion plugins, Upgrade the drupal versions, Forum Social media buttons, Slide show, Comments, Audio and video file in drupe, You tube in your drupal site

Text & References:

Text:

Atkinson, Leon. *Core PHP Programming. 2nd Edition.* New York: Prentice Hall

References:

- http://www.zend.com
- http://www.php.net
- http://www.mysql.com
- http://www.phpbuilder.com
- http://www.useit.com
- http://www.devshed.com
- http://www.webmonkey.com

Compiler Design

MCA-332

L	T	P	Cr
3	1	0	4

Course Outcomes:
At the end of this course, students will demonstrate the ability to:

1. Understand the structure and functioning of compilers and the classification of grammars.
2. Learn the concepts of syntax analysis, including different parsing techniques and error handling.
3. Develop skills in symbol table creation and management for both non-block and block structured languages.
4. Master the generation of intermediate code and semantic analysis.
5. Apply code optimization techniques, including redundant code elimination and loop optimizations.

Module I: Introduction
Introduction to Compliers, Classification of grammars, Context free grammars, Regular grammars, Deterministic finite State Automata (DFA) & Non-DFA.

Module II: Syntax Analysis
Scanners, Top down parsing, LL grammars, Bottom up parsing, Polish expression Operator Precedence grammar, IR grammars, Comparison of parsing methods, Error handling.

Module III: Symbol Table
Symbol table handling techniques, Organization for non-block and block structured languages.

Module IV: Code Generation/Intermediate Code Generation
Run time storage administration, Static and dynamic allocation, Intermediate forms of source program, Polish N-tuple and syntax trees, Semantic analysis and code generation.

Module V: Code Optimization
Code optimization, Folding, redundant sub-expression evaluation, Optimization within iterative loops.

Text & References:

Text:

- Principles of Compiler Design, Alfred V. Aho, Jeffrey D. Ullman, Narosa Publishing House
- Compilers Principles, Techniques & Tools, Alfred V. Aho, Ravi Sethi, Jeffrey D. Ullman, Pearson Education (Singapore)

References:

- The Theory and Practice of Compiler Writing, Tremblay, et. al., McGraw Hill, New York, 1985.

Android Programming

MCA-303

L	T	P	Cr
3	1	0	4

Course Outcomes:

1. At the end of this course, students will demonstrate the ability to:
2. Get an introduction to Android development, setup environments, and basic app structures.
3. Understand how to use various Android UI widgets such as buttons, text inputs, and dialogs.
4. Learn Android activity lifecycle management, intents, and fragments for dynamic content.
5. Master Android menu handling and layout management using different layout types.
6. Develop complex UI components like ArrayAdapters, GridViews, and ListViews in Android.

Module –I: Basics of Android

What is Android, History and Version, Installing softwares , Setup Eclipse, Hello Android example,Internal Details, Dalvik VM , Software Stack , Android Core Building Blocks , Android Emulator , AndroidManifest.xml , R.java file , Hide Title Bar , Screen Orientation

Module –II: UI Widgets

Working with Button, Toast, Custom Toast, Button, Toggle Button, Switch Button, Image Button, CheckBox, AlertDialog, Spinner, AutoCompleteTextView, RatingBar, DatePicker, TimePicker, ProgressBar, Quick Contact Budge, Analog Clock and Digital Clock, Working with hardware Button, File Download

Module –III: Activity, Intent & Fragment

Activity Lifecycle, Activity Example, Implicit Intent, Explicit Intent, Fragment Lifecycle, Fragment Example, Dynamic Fragment

Module –IV: Android Menu & Layout Manager

Option Menu, Context Menu, Popup Menu , Relative Layout, Linear Layout, Table Layout, Grid Layout

Module –V: Adaptor & Views

Array Adaptor, ArrayList Adaptor, Base Adaptor, GridView , WebView , ScrollView , SearchView , TabHost , DynamicListView , ExpandedListView

Text & Reference:

- Android Programming: The Big Nerd Ranch Guide (Big Nerd Ranch Guides) (By: Bill Philips & Brian Hardy
- Android Recipes: A Problem-Solution Approach, Dave Smith & Jeff Friesen

Data Science

MCA-302

L	T	P	Cr
3	1	0	4

Course Outcomes:
At the end of this course, students will demonstrate the ability to:

1. Understand the fundamentals of Big Data, statistics, and key statistical concepts in data analysis.
2. Learn how to apply inferential statistics for population generalization and hypothesis testing.
3. Gain proficiency in Python for data manipulation using libraries like NumPy, Pandas, and Matplotlib.
4. Master exploratory data analysis techniques including data visualization and missing value analysis.
5. Develop skills in supervised machine learning models such as SVM, logistic regression, and decision trees.

Module 1: Big Data & Statistics

Overview of Big Data; Characteristics of Big Data.

- Important statistical concepts used in data science
- Difference between population and sample
- Types of variables
- Measures of central tendency
- Measures of variability
- Coefficient of variance
- Skewness and Kurtosis

Module 2: Inferential statistics

Inferential statistics is used to generalize of populations, from which samples are drawn. This is a new branch of statistics, which helps you learn to analyze representative samples of large data sets. In this module, you will learn –

- Normal distribution
- Test hypotheses
- Central limit theorem
- Confidence interval
- T-test
- Type I and II errors
- Student's T distribution

Module 3: Python

Python is the most important and necessary topic that every data scientist should have knowledge about. In this section, our instructors will take you through the basics of Python and areas where it can be used. You will learn how to use some of the current tools such as Numpy, Pandas, and Matplotlib. Therefore, module 1 includes –

- Environment set-up

- Jupyter overview
- Python Numpy
- Python Pandas
- Python Matplotlib

Module 4: Exploratory data analysis

- Data visualization
- Missing value analysis
- The correction matrix
- R programming language

Module 5: Supervised machine learning

This is a comprehensive module to help you understand how to make machines or computers interpret human language. You will learn –

- Python Scikit tool
- Neural networks
- Support vector machine
- Logistic and linear regression
- Decision tree classifier

Cryptography and Network Security

MCA-304

L	T	P	Cr
3	1	0	4

Course Outcomes:
At the end of this course, students will demonstrate the ability to:

1. Gain a solid understanding of cryptographic principles, terminology, and classical ciphers.
2. Learn symmetric key cryptography techniques, including block ciphers (DES, AES) and stream ciphers.
3. Understand asymmetric key cryptography and RSA, along with key exchange and digital signatures.
4. Master the use of hash functions, MACs, and the role of message integrity in cryptography.
5. Understand network security protocols such as SSL, TLS, IPsec, VPNs, and firewalls.

Unit 1: Introduction to Cryptography

Overview of cryptography, historical background, and applications. Basic terminology such as plaintext, ciphertext, and key. Exploration of types of cryptography including symmetric and asymmetric methods. Introduction to classical ciphers like the Caesar cipher and Vigenère cipher, along with modern cryptographic algorithms.

Unit 2: Symmetric Key Cryptography

Focus on block ciphers including DES and AES, as well as their modes of operation. Discussion of stream ciphers such as RC4 and their applications. Key management and distribution strategies will be covered, along with cryptographic protocols that utilize symmetric key cryptography. Examination of potential attacks on symmetric key systems.

Unit 3: Asymmetric Key Cryptography

Principles of asymmetric cryptography, including the RSA algorithm for key generation, encryption, and decryption. Study of the Diffie-Hellman key exchange method and the concepts of digital signatures and certificates. Analysis of applications related to asymmetric cryptography.

Unit 4: Hash Functions and Message Integrity

Introduction to hash functions and their importance in cryptography. Exploration of the properties of cryptographic hash functions, with a focus on common examples like MD5, SHA-1, and SHA-256. Discussion on message authentication codes (MACs) and the applications and security implications of hash functions.

Unit 5: Network Security Protocols

Overview of network security concepts and practices. Detailed examination of Secure Sockets Layer (SSL) and Transport Layer Security (TLS), as well as Internet Protocol Security (IPsec). Insights into virtual private networks (VPNs), firewalls, and intrusion detection systems.

Compiler Design

MCA-332

L	T	P	Cr
3	1	0	4

Course Outcomes:

At the end of this course, students will demonstrate the ability to:

1. Understand the structure and functioning of compilers and the classification of grammars.
2. Learn the concepts of syntax analysis, including different parsing techniques and error handling.
3. Develop skills in symbol table creation and management for both non-block and block structured languages.
4. Master the generation of intermediate code and semantic analysis.
5. Apply code optimization techniques, including redundant code elimination and loop optimizations.

Unit 1: Introduction to Compiler Design

Overview of compiler design and its phases. The role of compilers in programming languages. Lexical analysis, syntax analysis, and semantic analysis. Introduction to different types of translators, including interpreters.

Unit 2: Lexical Analysis

Detailed study of lexical analysis and its importance. Design and implementation of finite automata. Use of regular expressions in token specification. Construction of lexical analyzers and tools like Lex.

Unit 3: Syntax Analysis

Introduction to context-free grammars and parsing techniques. Overview of parsing algorithms, including top-down and bottom-up parsing. Study of predictive parsing, recursive descent parsing, and LR parsing. Construction of parse trees and syntax trees.

Unit 4: Semantic Analysis

Understanding semantic analysis and its role in compiler design. Techniques for type checking and symbol table management. Implementation of semantic actions and the use of attribute grammars. Error detection and handling during semantic analysis.

Unit 5: Intermediate Code Generation

Overview of intermediate representations used in compilers. Techniques for generating intermediate code from syntax trees. Three-address code, quadruples, and other forms of intermediate code. Optimization techniques at the intermediate level.

Professional Ethics and Social Responsibility for Sustainability

MCA-304 A

L	T	P	Cr
3	1	0	4

Course Outcomes:
At the end of this course, students will demonstrate the ability to:

1. Understand the significance of professional ethics and the role of values and morals in decision-making.
2. Learn ethical decision-making models and strategies for resolving conflicts in professional settings.
3. Gain insight into the concept of social responsibility and its importance in business and sustainability.
4. Explore sustainable practices in professional ethics and the role of professionals in environmental responsibility.
5. Study global perspectives on ethics, challenges of maintaining standards in a globalized world.

Unit 1: Introduction to Professional Ethics

Overview of professional ethics and its significance in various fields. Examination of ethical theories and frameworks. Discussion on the role of values and morals in professional conduct. Case studies highlighting ethical dilemmas in professional settings.

Unit 2: Ethical Decision-Making

Analysis of decision-making processes in ethical contexts. Models of ethical decision-making and their applications. Factors influencing ethical decisions in professional practice. Strategies for resolving ethical conflicts and dilemmas.

Unit 3: Social Responsibility

Definition and importance of social responsibility in business and professional environments. Examination of corporate social responsibility (CSR) initiatives. The relationship between social responsibility and sustainability. Impact of social responsibility on stakeholder engagement.

Unit 4: Sustainability and Ethical Practices

Understanding sustainability in the context of professional ethics. Exploration of environmental ethics and sustainable practices. Discussion on the role of professionals in promoting sustainable development. Case studies of organizations implementing sustainable practices.

Unit 5: Global Perspectives on Ethics and Responsibility

Examination of ethical standards across different cultures and societies. Challenges of maintaining ethical standards in a globalized world. The impact of globalization on professional ethics and social responsibility. Comparative analysis of ethical practices in various countries.

Enterprise Resource Planning

MCA-304 B

L	T	P	Cr
3	1	0	4

Course Outcomes:
At the end of this course, students will demonstrate the ability to:

1. Understand the components, architecture, and evolution of Enterprise Resource Planning (ERP) systems.
2. Learn the functionality and interconnectivity of various ERP modules such as finance, HR, and supply chain.
3. Master ERP implementation strategies, including project planning, resource allocation, and change management.
4. Gain knowledge of ERP customization, integration with legacy systems, and successful integration case studies.
5. Understand data management, migration processes, and reporting tools for ERP systems.

Unit 1: Introduction to Enterprise Resource Planning

Overview of Enterprise Resource Planning (ERP) systems and their significance in organizations. Examination of the evolution of ERP and its integration with business processes. Discussion on the components and architecture of ERP systems.

Unit 2: ERP Modules and Functionality

Detailed exploration of various ERP modules, including finance, human resources, supply chain management, manufacturing, and customer relationship management. Understanding the functionality and interconnectivity of these modules within an ERP system.

Unit 3: ERP Implementation Strategies

Analysis of ERP implementation methodologies and best practices. Overview of project planning, resource allocation, and change management during implementation. Discussion on the challenges and risks associated with ERP implementation.

Unit 4: ERP Customization and Integration

Examination of customization options within ERP systems. Strategies for integrating ERP with existing legacy systems and other software applications. Case studies of successful ERP integration projects.

Unit 5: Data Management and Reporting in ERP

Understanding the importance of data management within ERP systems. Overview of data migration processes and data quality management. Discussion on reporting tools and techniques for data analysis in ERP environments.

Software Project Planning and Management

MCA-304 C

L	T	P	Cr
3	1	0	4

Course Outcomes:
At the end of this course, students will demonstrate the ability to:

1. Learn the principles and practices of software project management and the phases of the software development lifecycle.
2. Master project planning and estimation techniques, including expert judgment, analogy-based, and parametric models.
3. Identify and analyze project risks, and develop strategies to mitigate and monitor these risks.
4. Gain insight into resource management, team dynamics, communication, and conflict resolution in software projects.
5. Understand quality assurance and control techniques for ensuring software quality throughout the project lifecycle.

Unit 1: Introduction to Software Project Management

Overview of software project management principles and practices. Examination of the software development lifecycle and its phases. Discussion on the roles and responsibilities of a project manager in software projects.

Unit 2: Project Planning and Estimation

Introduction to project planning concepts and methodologies. Techniques for project estimation, including expert judgment, analogy-based estimation, and parametric models. Discussion on work breakdown structure (WBS) and project scheduling.

Unit 3: Risk Management in Software Projects

Identification and analysis of risks in software projects. Development of risk management plans and strategies for mitigating risks. Tools and techniques for monitoring and controlling project risks.

Unit 4: Resource Management and Team Dynamics

Overview of resource management in software projects, including human, financial, and material resources. Discussion on team dynamics, communication, and conflict resolution. Strategies for building and leading effective project teams.

Unit 5: Quality Assurance and Control

Introduction to quality management in software projects. Examination of quality assurance and quality control processes. Techniques for measuring and ensuring software quality throughout the project lifecycle.

Internet of Everything

MCA-304 D

L	T	P	Cr
3	1	0	4

Course Outcomes:
At the end of this course, students will demonstrate the ability to:

1. Understand the concept of the Internet of Everything (IoE) and its components: people, processes, data, and things.
2. Learn the architectural framework and enabling technologies of IoE systems, such as sensors and cloud computing.
3. Explore communication models in IoE, including device-to-device, device-to-cloud, and cloud-to-cloud.
4. Master data management techniques and analytics tools to handle large IoE data and derive insights.
5. Understand the security challenges in IoE systems and strategies for securing devices, networks, and ensuring privacy.

Unit 1: Introduction to the Internet of Everything

Overview of the Internet of Everything (IoE) and its significance. Examination of the components of IoE: people, processes, data, and things. Discussion on the evolution of IoE from the Internet of Things (IoT) and its implications.

Unit 2: Architecture and Technologies of IoE

Understanding the architectural framework of IoE systems. Overview of enabling technologies such as sensors, connectivity protocols, and cloud computing. Examination of data processing and analytics in IoE environments.

Unit 3: IoE Communication Models

Analysis of communication models used in IoE. Discussion on device-to-device, device-to-cloud, and cloud-to-cloud communication. Exploration of protocols and standards that facilitate communication in IoE.

Unit 4: Data Management and Analytics

Introduction to data management challenges in IoE. Techniques for collecting, storing, and processing large volumes of data. Discussion on data analytics and visualization tools to derive insights from IoE data.

Unit 5: Security and Privacy in IoE

Examination of security challenges and vulnerabilities in IoE systems. Strategies for securing IoE devices and networks. Discussion on privacy concerns and regulations affecting IoE applications.

Cryptography and Network Security Lab

MCA-353

L	T	P	Cr
0	0	2	2

Course Outcomes:
At the end of this course, students will demonstrate the ability to:

1. Implement cryptographic algorithms for secure communication
2. Apply encryption and decryption techniques in real-world scenarios
3. Analyze network security protocols and their vulnerabilities
4. Design and implement secure authentication mechanisms
5. Evaluate security risks and develop countermeasures in networks

S.No	List of programs
1.	Write a program to implement the Caesar cipher for encryption and decryption of a given plaintext.
2.	Create a program that implements a substitution cipher by mapping each letter of the alphabet to another letter.
3.	Write a Program to Implement a transposition cipher for rearranging letters.
4.	Write a basic version of the DES encryption and decryption.
5.	Write a Program to Demonstrate Triple DES encryption and decryption.
6.	Write a Program to Implement one block cipher mode (e.g., CBC).
7.	Write a Program to Create a calculator for modular arithmetic operations.
8.	Write a Program to Generate RSA keys using two prime numbers.
9.	Write a Program to Implement Euclid's algorithm for finding GCD.
10.	Write a Program to Compute MD5 hash for a given string.

11.	Write a Program to Implement SHA-256 hash function for messages
12.	Write a Program to Generate a MAC using HMAC.
13.	Write a Program to Simulate a basic Kerberos authentication process.
14.	Write a Program to Demonstrate PGP encryption and decryption.
15.	Write a Program to Simulate a simple firewall rule for access control.

Lab PHP

MCA-351

L	T	P	Cr
0	0	4	2

Course Outcomes:
At the end of this course, students will demonstrate the ability to:

1. Develop dynamic web applications using PHP
2. Implement server-side scripting and database integration with PHP
3. Design user interfaces using HTML, CSS, and PHP
4. Utilize PHP for form handling and session management
5. Apply security practices for PHP-based web applications

List of Practicals

1. Create a simple PHP script that prints "Hello, World!".
2. Build a form that takes user input and displays the submitted data.
3. Implement a user registration system that stores data in a MySQL database.
4. Create a login system with session management to authenticate users.
5. Develop a contact form that sends an email with user details.
6. Build a CRUD application to manage a list of books in a database.
7. Create a simple calculator that performs basic arithmetic operations.
8. Implement a file upload feature with validation for file types.
9. Develop a program that generates a random password.
10. Create a page that displays data from an API using cURL.
11. Implement pagination for displaying a list of products from a database.
12. Build a blog platform with post creation and commenting features.
13. Create a program to read and display contents of a text file.
14. Develop a shopping cart system that tracks selected items.
15. Implement user roles (admin and user) with access control.
16. Create a program that generates and displays a QR code.
17. Build a survey application that collects and displays user responses.
18. Create a simple image gallery that displays images from a folder.

Lab Data Science

MCA-352

L	T	P	Cr
0	0	4	2

Course Outcomes:
At the end of this course, students will demonstrate the ability to:

1. Implement data pre-processing and cleaning techniques
2. Apply machine learning algorithms for data analysis
3. Use data visualization tools to interpret and present results
4. Develop predictive models using statistical and computational methods
5. Analyse and interpret large datasets to extract meaningful insights

List of practical's

1) Load a CSV file and display basic statistics using pandas.
2) Clean a dataset by handling missing values and duplicates.
3) Visualize data distributions using histograms and box plots with Matplotlib.
4) Implement a linear regression model to predict housing prices.
5) Perform exploratory data analysis (EDA) on a dataset with seaborn.
6) Create a scatter plot to visualize the relationship between two variables.
7) Build a decision tree classifier for a classification problem.
8) Implement k-means clustering on a dataset and visualize clusters.
9) Generate a word cloud from a text document.
10) Use Natural Language Processing (NLP) to tokenize and analyze text data.
11) Perform sentiment analysis on tweets using a pre-trained model.
12) Create a dashboard using Plotly Dash to visualize key metrics.
13) Implement feature scaling (standardization and normalization) on a dataset.
14) Build and evaluate a random forest classifier for a binary classification problem.
15) Create a time series analysis and forecasting model using ARIMA.
16) Use PCA (Principal Component Analysis) to reduce dimensionality of a dataset.
17) Implement a recommendation system using collaborative filtering.
18) Analyze geographical data and create maps using Folium.

Minor Project

MCA-354

L	T	P	Cr
0	0	4	2

Course Outcomes:

At the end of this course, students will demonstrate the ability to:

1. Design and develop a functional prototype for a selected problem
2. Apply software engineering principles in project development
3. Integrate theoretical concepts into practical applications
4. Demonstrate effective problem-solving and project management skills
5. Present project outcomes with detailed documentation and analysis

List of Practical

1. Build a personal expense tracker application with user authentication.
2. Develop a simple blogging platform that allows users to create and manage posts.
3. Create a task management tool with features for adding, updating, and deleting tasks.
4. Implement a movie recommendation system using a collaborative filtering algorithm.
5. Build a weather dashboard that fetches real-time data from a weather API.
6. Develop a quiz application that scores user responses and provides feedback.
7. Create an online library management system for borrowing and returning books.
8. Implement a chat application using Web Sockets for real-time communication.
9. Build a recipe sharing platform with user-generated content and ratings.
10. Develop a fitness tracking app that logs workouts and progress over time.
11. Create a simple e-commerce website with product listings and a shopping cart.
12. Implement a travel itinerary planner that helps users organize trips.
13. Build a note-taking application with features for tagging and searching notes.
14. Create a polling application for gathering opinions on various topics.
15. Develop an online resume builder that allows users to create and download resumes.
16. Implement a simple forum for discussions with user registration and threads.
17. Create a personal blog with customizable themes and comment functionality.
18. Build a language learning app that quizzes users on vocabulary and grammar.
19. Develop a digital art gallery to showcase user-uploaded artworks.
20. Create a simple game (e.g., Tic-Tac-Toe) that can be played against a computer or another user.

Seminar Based on Learning

MCA-355

L	T	P	Cr
0	0	4	2

Course Outcomes:
At the end of this course, students will demonstrate the ability to:

1. Research and analyze recent advancements in computer science
2. Present and discuss technical topics with clarity and confidence
3. Develop critical thinking through peer-reviewed discussions
4. Enhance academic writing and documentation skills
5. Apply learning outcomes to propose innovative solutions or projects

List of practical

1) Create a program that tracks learning progress over time using visualizations.
2) Develop a quiz application that adapts questions based on user performance.
3) Build a flashcard app for studying vocabulary or concepts with spaced repetition.
4) Implement a study group platform that connects learners with similar interests.
5) Create a resource-sharing tool for educational materials and links.
6) Develop a personalized learning path generator based on user goals.
7) Implement a gamified learning experience that rewards users for completing tasks.
8) Create a journal application for users to reflect on their learning experiences.
9) Build a web scraper to gather educational content from various websites.
10) Develop an interactive tutorial platform for teaching coding skills.
11) Create a language learning app with pronunciation feedback using speech recognition.
12) Implement a project-based learning platform that connects projects with relevant resources.
13) Build a mentorship matching system that pairs learners with experienced mentors.
14) Create a community forum for discussing learning strategies and sharing tips.
15) Develop a visualization tool to map out concepts and their relationships.
16) Implement a time management tool specifically designed for students.
17) Create a podcast aggregator focused on educational content.
18) Build an AI-powered chatbot to answer common learning-related questions.
19) Develop a survey tool for gathering feedback on learning experiences.
20) Create a platform for hosting and attending webinars on various topics.

Major Project Presentation & Viva

MCA-462

L	T	P	Cr
0	0	48	24

Unit 1: Introduction to the Internet of Everything

Overview of the Internet of Everything (IoE) and its significance. Examination of the components of IoE: people, processes, data, and things. Discussion on the evolution of IoE from the Internet of Things (IoT) and its implications.

Unit 2: Architecture and Technologies of IoE

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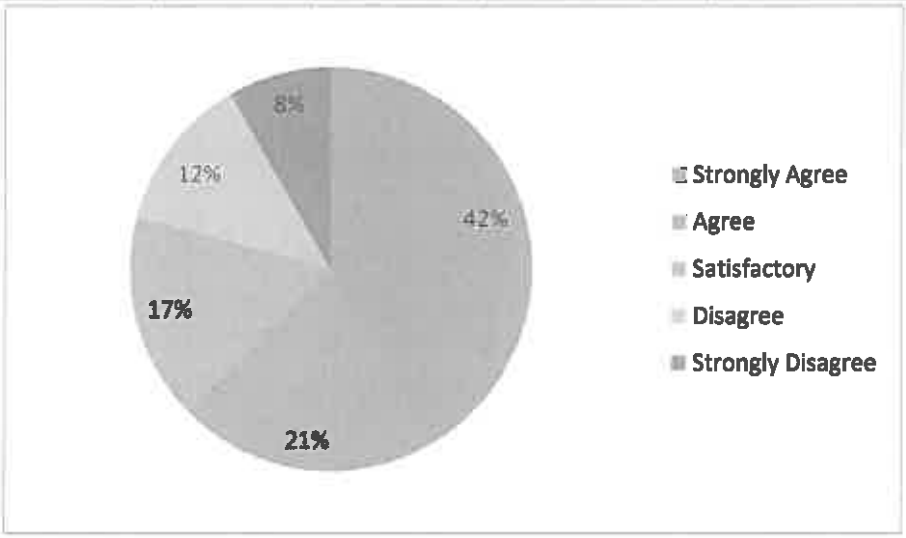
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Babu Vijendra Marg, Adarsh Institutional
Area Gangoh, Distt. Saharanpur (U.P.)
247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

18th Meeting of BOS (Item No. 3 Annexure -3)

Analysis of Alumni' Feedback of School of Engineering and Technology through Table and Pie Chart

Q.1 The courses based on state of art trends and recent developments?

The courses based on state of art trends and recent developments	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	41.67	20.83	16.67	12.50	8.33

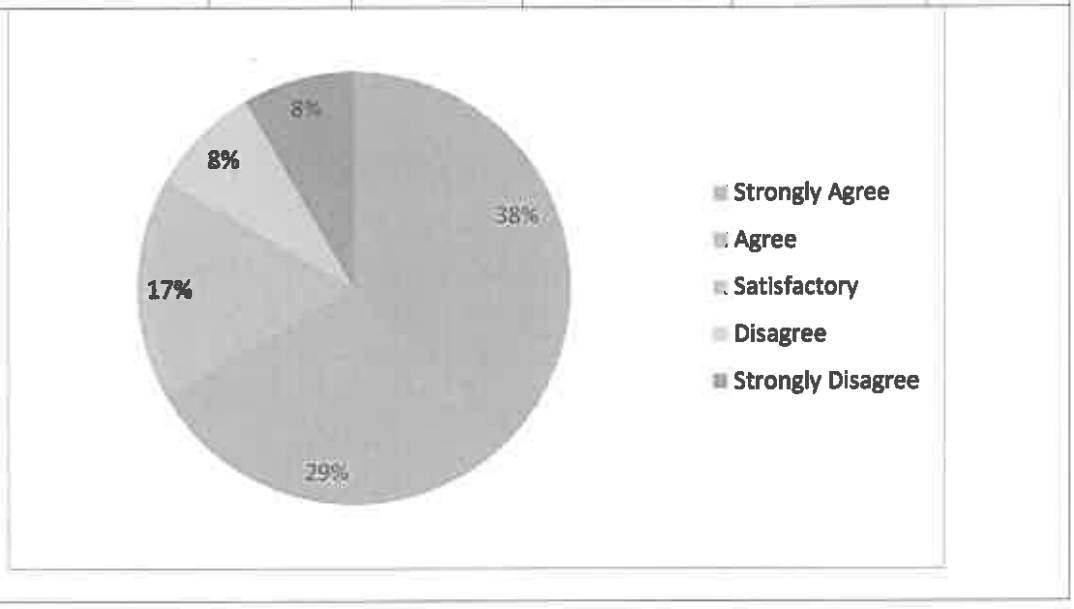


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Q.2 The courses found to be helpful in developing skills and knowledge in respective domain?

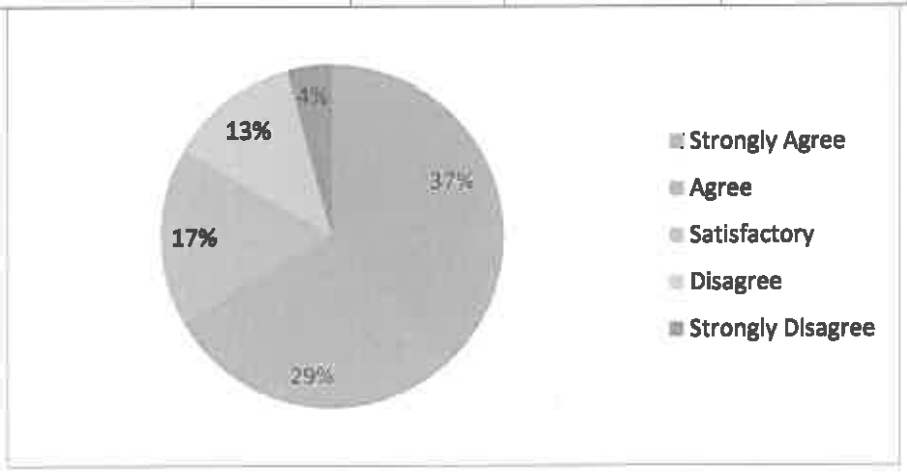
The courses found to be helpful in developing skills and knowledge in respective domain	Strongly Agree	Agree	satisfactory	Disagree	Strongly Disagree
Response (%)	37.50	29.17	16.67	8.33	8.33



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Q.3 The courses found to be productive in competing professionally at national/international level?

The courses found to be productive in competing professionally at national/international level	Strongly Agree	Agree	satisfactory	Disagree	Strongly Disagree
Response (%)	37.50	29.17	16.67	12.50	4.17

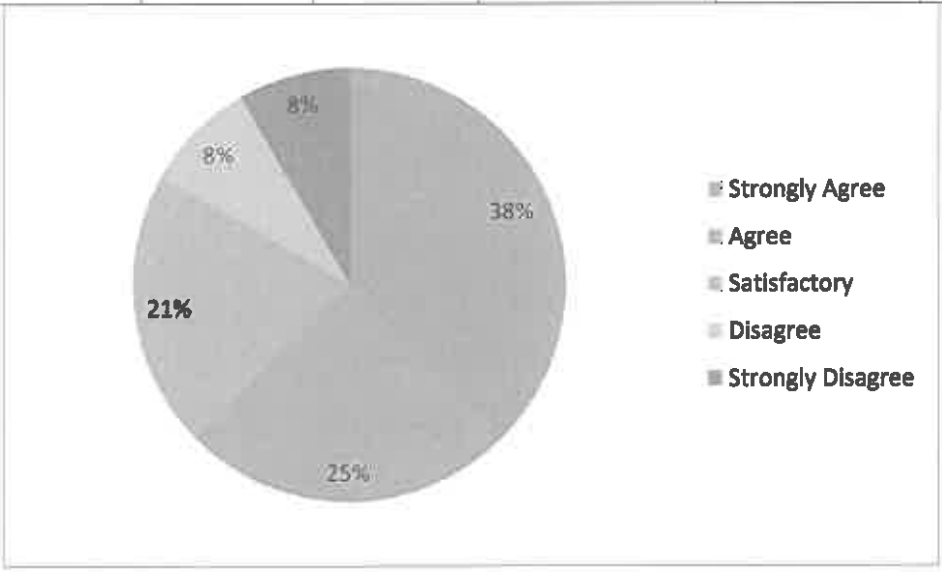


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Q.4 The courses found to be appropriate in motivating students towards nation building by inculcating ethical and professional values?

The courses found to be appropriate in motivating students towards nation building by inculcating ethical and professional values	Strongly Agree	Agree	satisfactory	Disagree	Strongly Disagree
Response (%)	37.50	25.00	20.83	8.33	8.33

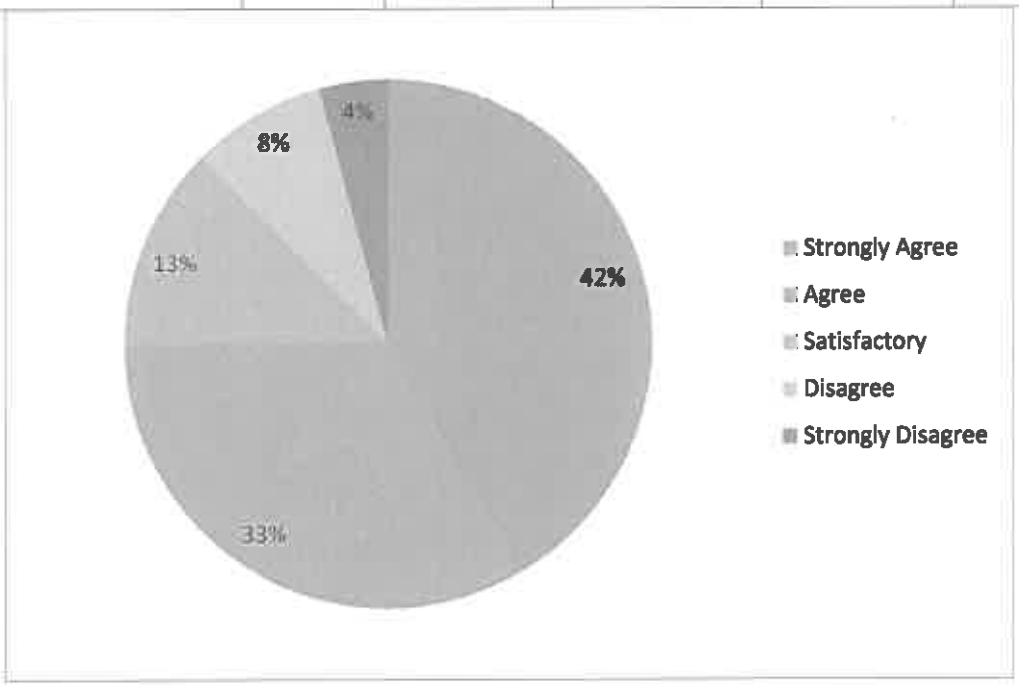


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Q.5 Theprogramme helped to understand the impact of domain knowledge in social and global context?

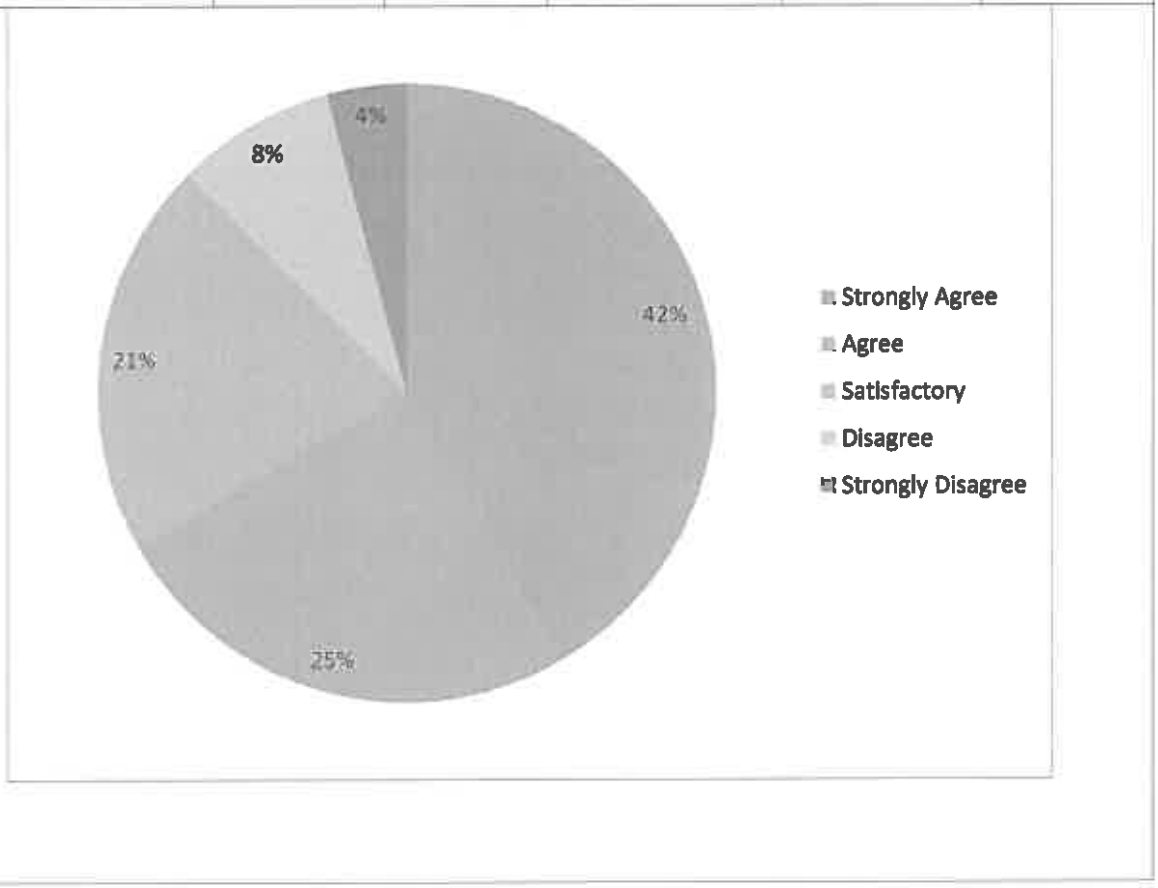
The programme helped to understand the impact of domain knowledge in social and global context	Strongly Agree	Agree	satisfactory	Disagree	Strongly Disagree
Response (%)	41.67	33.33	12.50	8.33	4.17



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Q.6 Theprogramme provided awareness on recent advancements and innovations?

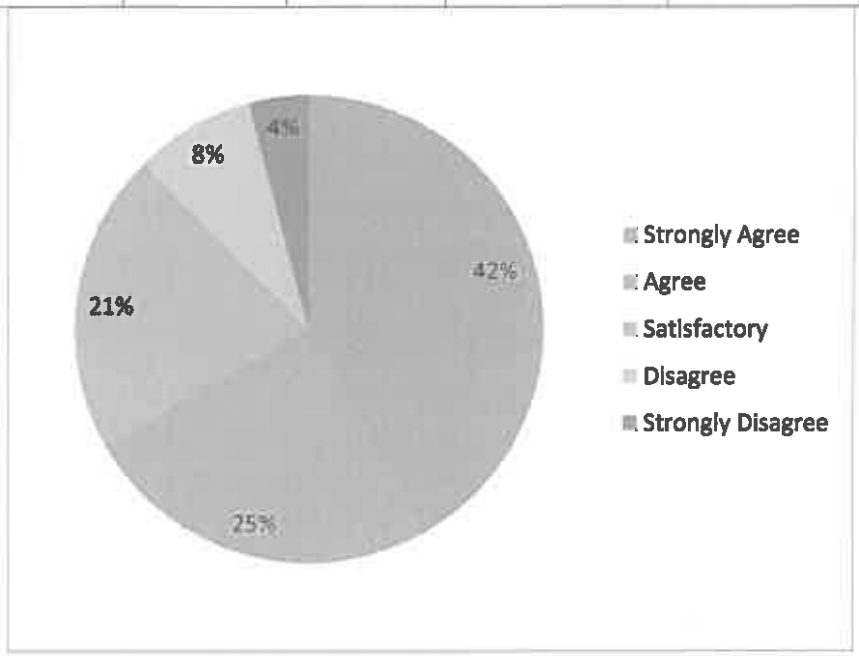
The programme provided awareness on recent advancements and innovations	Strongly Agree	Agree	satisfactory	Disagree	Strongly Disagree
Response (%)	41.67	25.00	20.83	8.33	4.17



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Q.7 Theprogramme improved critical thinking ability and problem-solving aptitude.

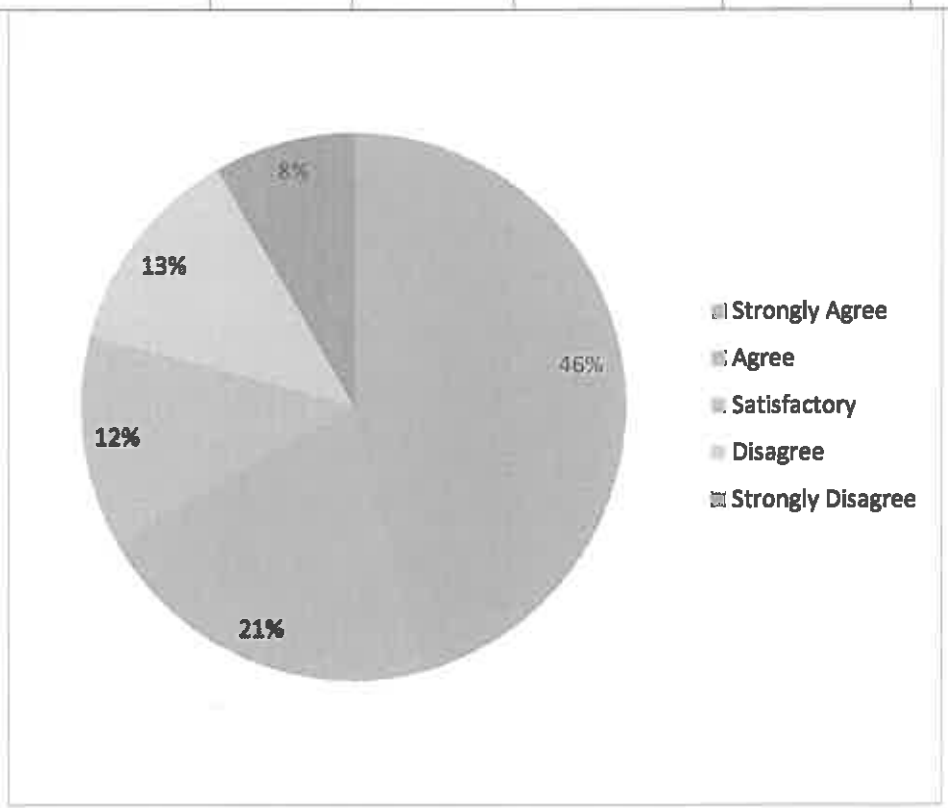
The programme improved critical thinking ability and problem-solving aptitude.	Strongly Agree	Agree	satisfactory	Disagree	Strongly Disagree
Response (%)	41.67	25.00	20.83	8.33	4.17



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Q.8 Theprogramme helped to take independent decisions and perform managerial &administerial functions diligently?

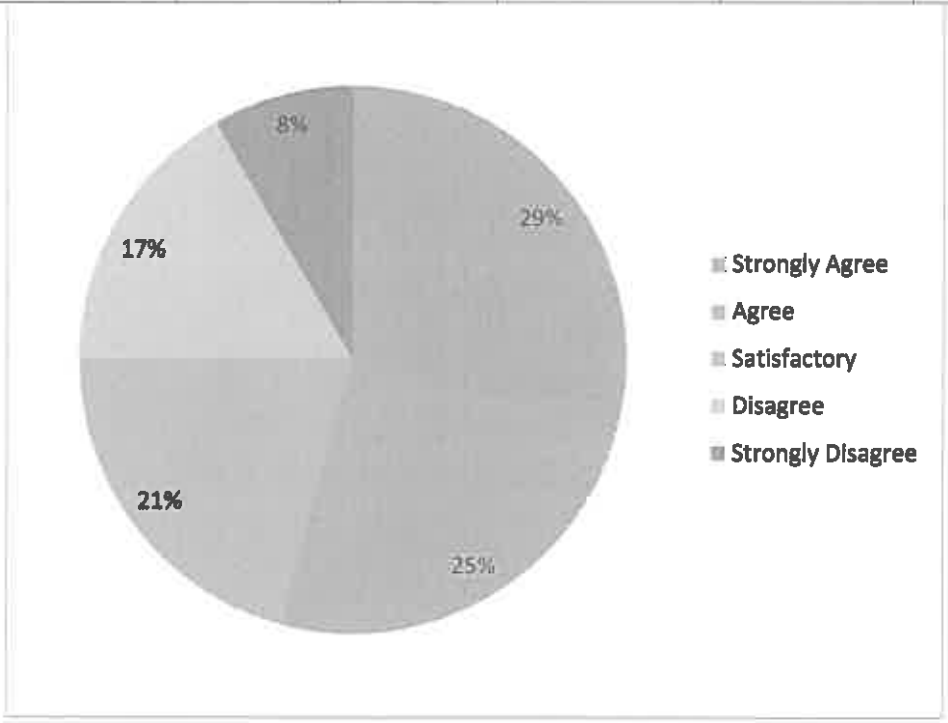
The programme helped to take independent decisions and perform managerial &administerial functions diligently.	Strongly Agree	Agree	satisfactory	Disagree	Strongly Disagree
Response (%)	45.83	20.83	12.50	12.50	8.33



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Q.9 The curriculum was helpful in acquiring advance level knowledge to pursue research and higher studies?

The curriculum was helpful in acquiring advance level knowledge to pursue research and higher studies	Strongly Agree	Agree	satisfactory	Disagree	Strongly Disagree
Response (%)	29.17	25.00	20.83	16.67	8.33



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School of Engineering & Technology (24)							
Sr No	**Questions**	**Details**	**Strongly Agree**	**Agree**	**Satisfactory**	**Disagree**	**Strongly Disagree**
1	The courses based on state of art trends and recent developments?	No of Alumni	10	5	4	3	2
		Percentage	41.67	20.83	16.67	12.50	8.33
2	The courses found to be helpful in developing skills and knowledge in respective domain?	No of Alumni	9	7	4	2	2
		Percentage	37.50	29.17	16.67	8.33	8.33
3	The courses found to be productive in competing professionally at national/international level?	No of Alumni	9	7	4	3	1
		Percentage	37.50	29.17	16.67	12.50	4.17
4	The courses found to be appropriate in motivating students towards nation building by inculcating ethical and professional values?	No of Alumni	9	6	5	2	2
		Percentage	37.50	25.00	20.83	8.33	8.33
5	The programme helped to understand the impact of domain knowledge in social and global context?	No of Alumni	10	8	3	2	1
		Percentage	41.67	33.33	12.50	8.33	4.17
6	The programme provided awareness on recent advancements and innovations?	No of Alumni	10	6	5	2	1
		Percentage	41.67	25.00	20.83	8.33	4.17
7	The programme improved critical thinking ability and problem-solving aptitude.	No of Alumni	10	6	5	2	1
		Percentage	41.67	25.00	20.83	8.33	4.17
8	The programme helped to take independent decisions and perform managerial &administerial functions diligently?	No of Alumni	11	5	3	3	2
		Percentage	45.83	20.83	12.50	12.50	8.33

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9	The curriculum was helpful in acquiring advance level knowledge to pursue research and higher studies?	No of Alumni	7	6	5	4	2
		Percentage	29.17	25.00	20.83	16.67	8.33

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Analysis of the Feedback

The alumni feedback on the curriculum presents a clear contrast between its strengths in foundational development and ethics, and its shortcomings in modern relevance and academic advancement. A strong majority of alumni positively rated the curriculum's ability to develop domain-specific skills (79.17%), foster ethical and professional values linked to nation-building (83.33%), raise awareness of recent innovations (83.33%), and support managerial and administrative skill-building (83.33%). These results suggest that the curriculum is effective in instilling core professional competencies and values. However, very low ratings were given for its alignment with state-of-the-art trends (19%), its role in preparing students for national or international competition (20%), and in fostering understanding of global and social impacts (20%). Similarly, only 20% felt it improved critical thinking and problem-solving skills, and just 21% found it helpful for pursuing advanced research or higher studies. This indicates a pressing need for curriculum modernization—particularly in integrating contemporary developments, promoting analytical capabilities, and enhancing academic rigor—to ensure graduates are fully prepared for the evolving demands of global professional and academic environments.

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Action Taken Report

(School of Engineering & Technology)

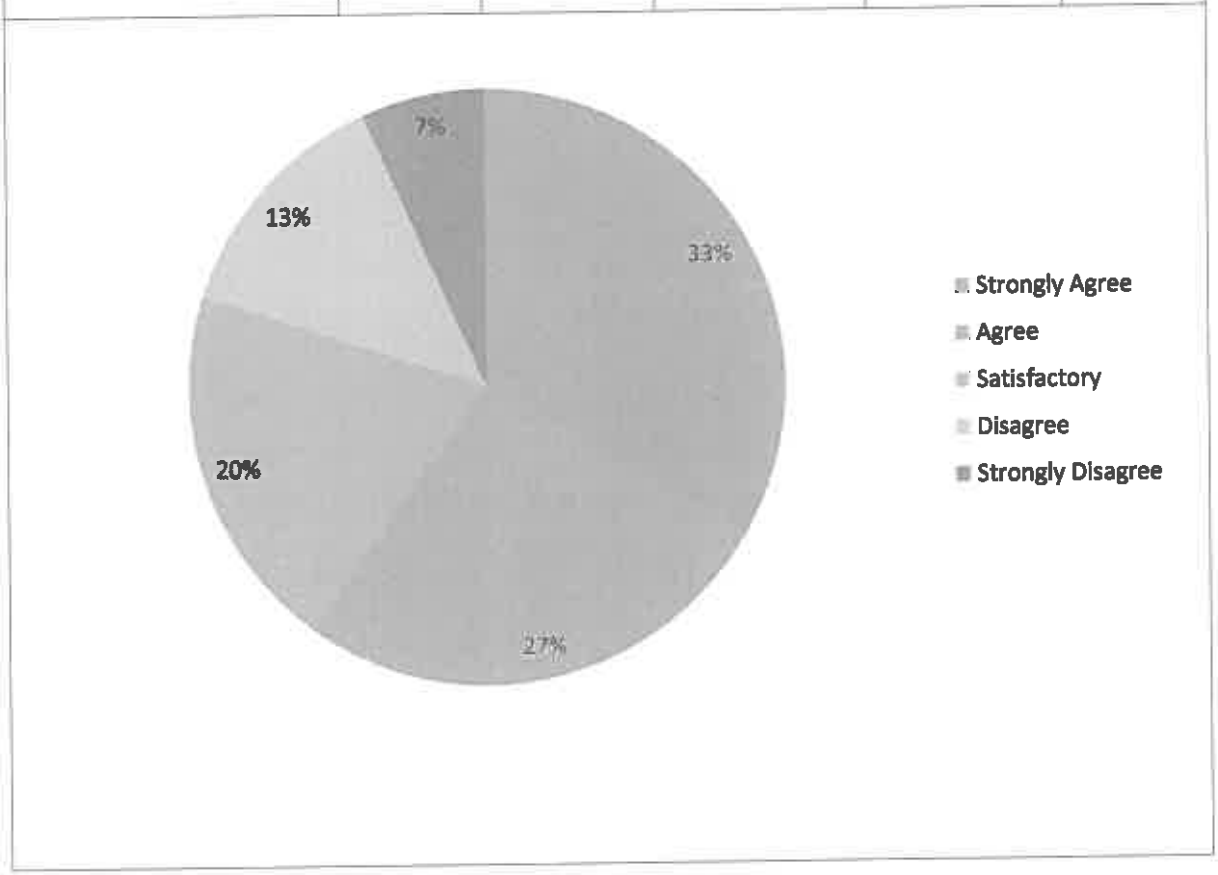
Sr. No.	Suggestions	Action Taken	Outcome
1	Update curriculum to reflect state-of-the-art technologies and industry trends	Introduced new electives in emerging fields such as AI/ML, IoT, Data Science, Cybersecurity, and Green Technologies	Improved industry alignment; increase in internship placements with tech firms and better project innovation
2	Improve global readiness and national/international competitiveness	Launched soft-skills and global certification prep courses (e.g., TOEFL, GRE, GATE); hosted international guest lectures and virtual exchanges	Greater student interest in global opportunities; some students enrolled in international MS/PhD programs
3	Strengthen critical thinking and problem-solving capabilities	Adopted project-based learning, real-world simulations, coding challenges, and interdisciplinary hackathons	Higher student participation in national tech competitions and improved problem-solving scores in assessments
4	Enhance support for research and higher studies	Integrated research projects into final-year curriculum; provided workshops on technical writing, publishing, and research funding awareness	30% rise in students submitting research papers; increased applications to postgraduate engineering programs

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Analysis of Employer's Feedback of School of Engineering and Technology through Table and Pie Chart

Q.1 The curriculum assists the students to acquire necessary entry level skills in industrial sector.

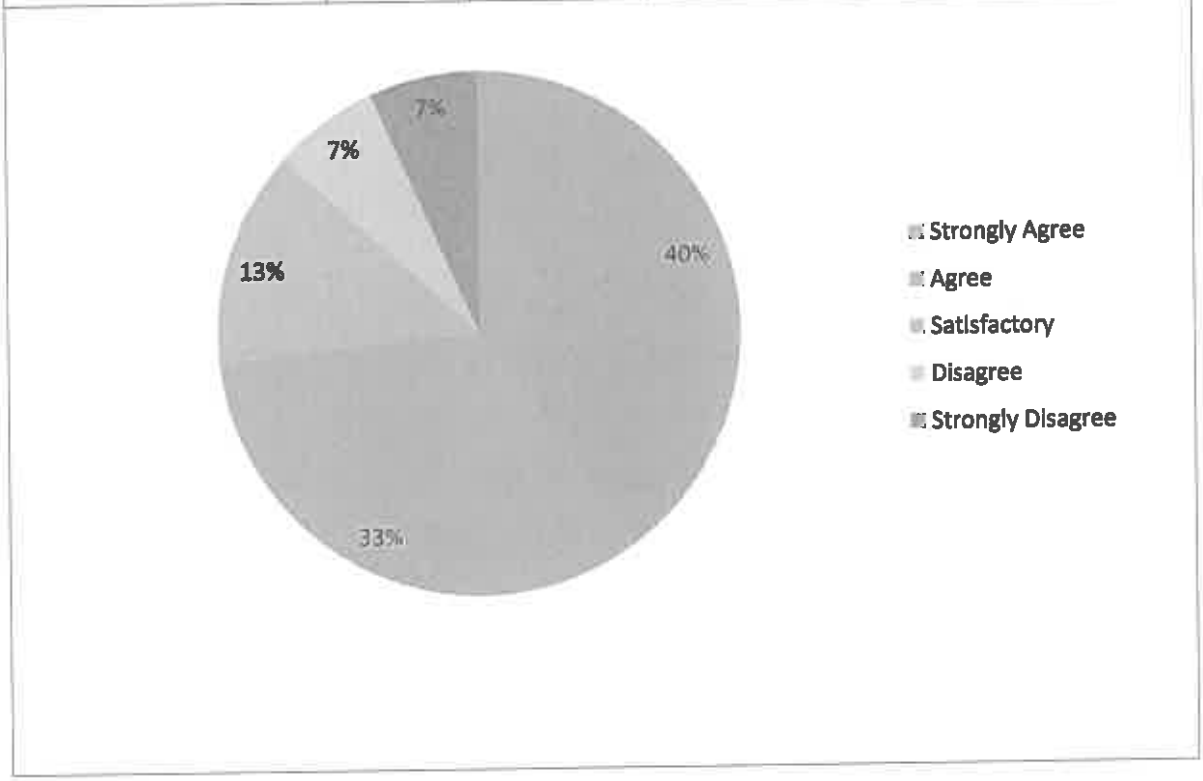
The curriculum assists the students to acquire necessary entry level skills in industrial sector.	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	33.33	26.67	20	13.33	6.67



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Q.2 The curriculum offers adequate scope for life-long learning and higher-level aptitude for new technology/tools.

The curriculum offers adequate scope for life-long learning and higher-level aptitude for new technology/tools.	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	40	33.33	13.33	6.67	6.67

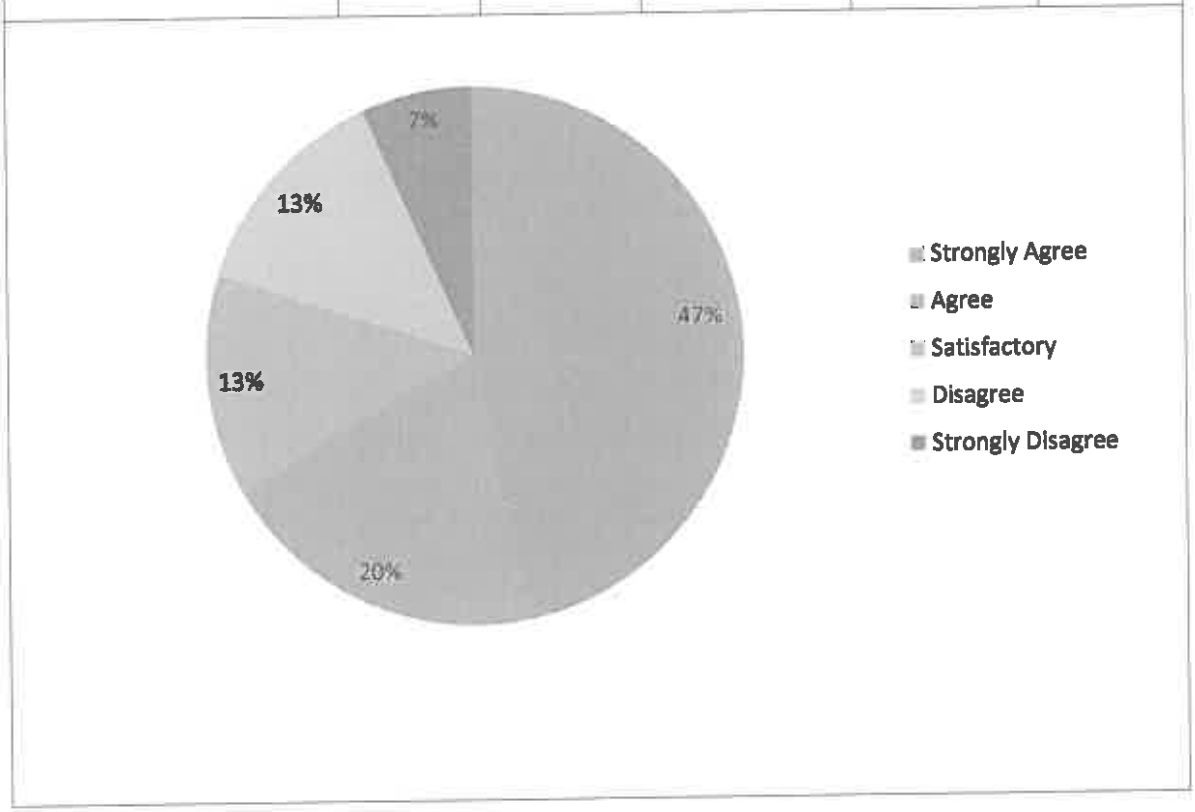


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Q.3 The curriculum has adequate scope for multidisciplinary knowledge and sufficient number of elective courses.

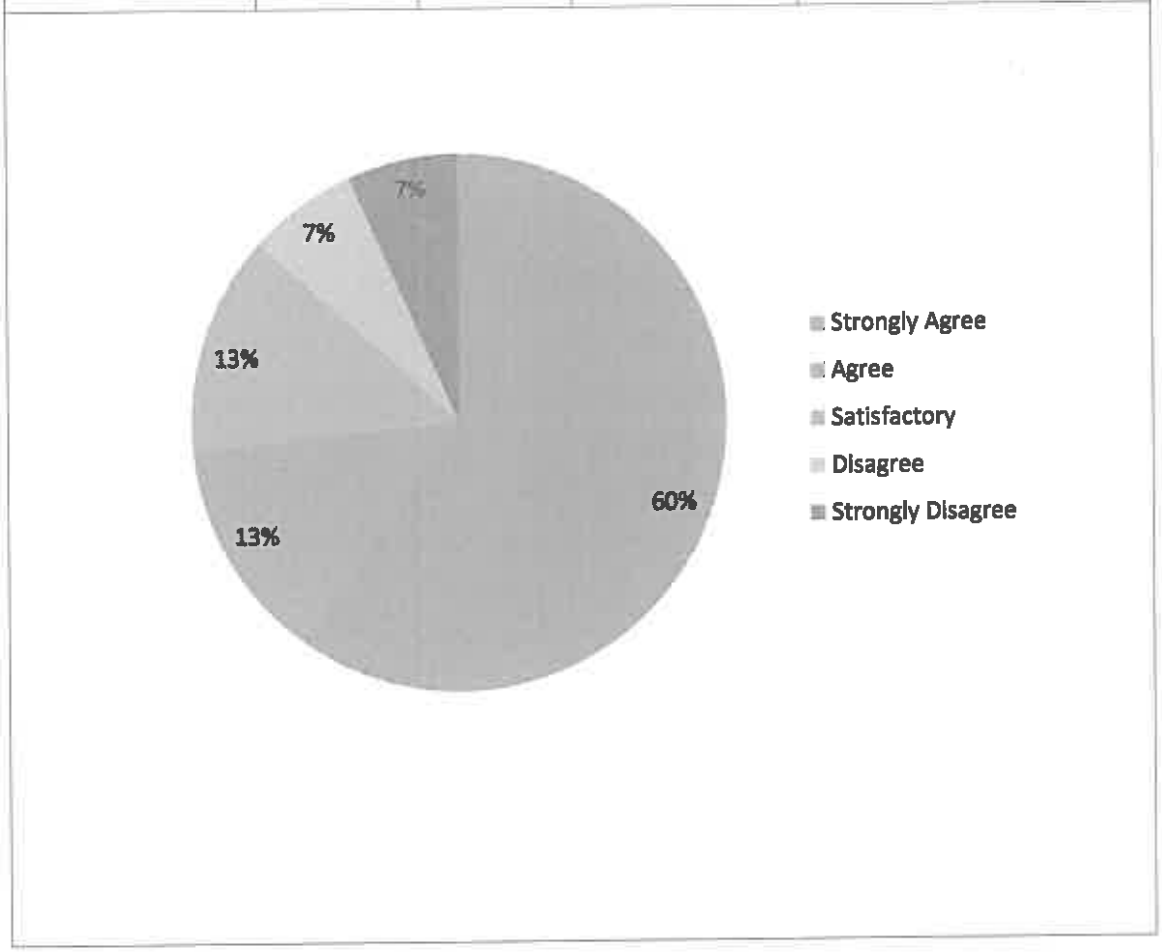
The curriculum has adequate scope for multidisciplinary knowledge and sufficient number of elective courses.	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	46.67	20	13.33	13.33	6.67



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Q.4 The curriculum has relevant content to assist students to work independently as well in a team with high level of adaptability.

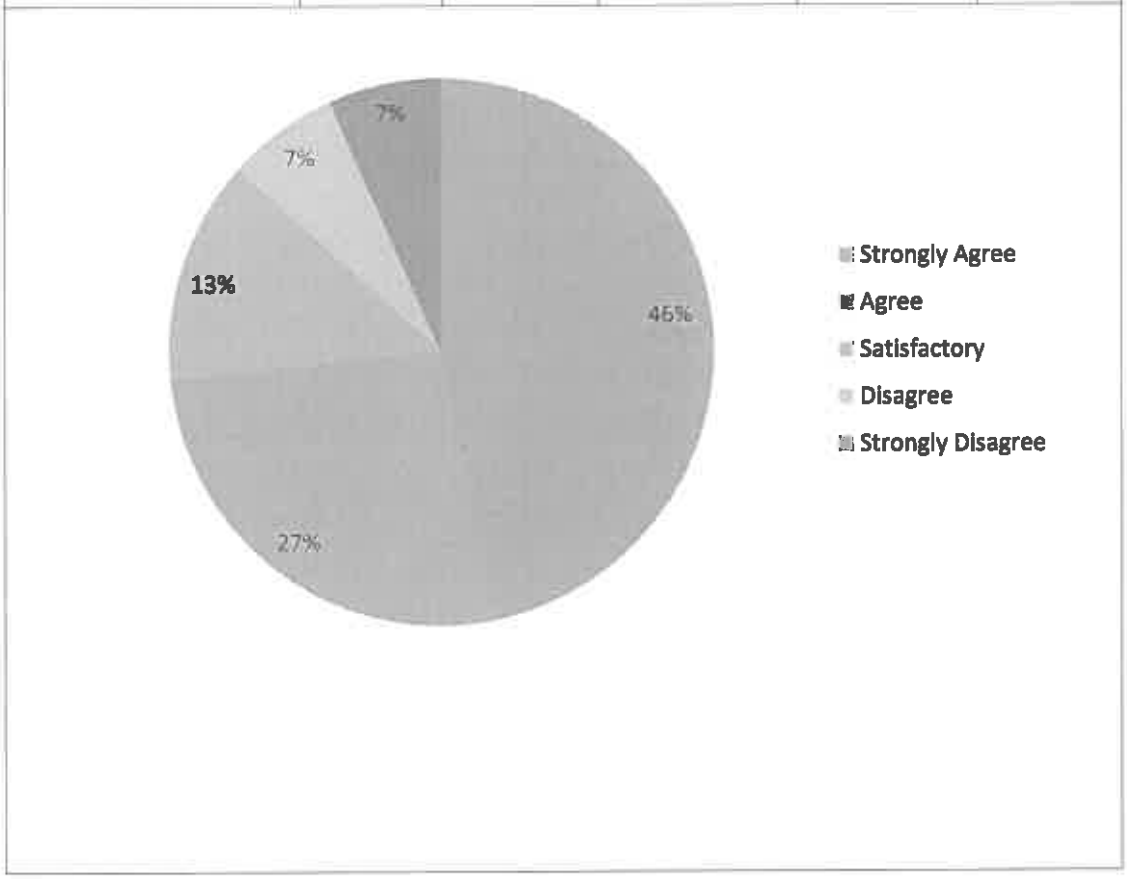
The curriculum has relevant content to assist students to work independently as well In a team with high level of adaptabilty.	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	60	13.33	13.33	6.67	6.67



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Q.5 The curriculum provides enough scope for improving entrepreneurial skill as well as industry readiness.

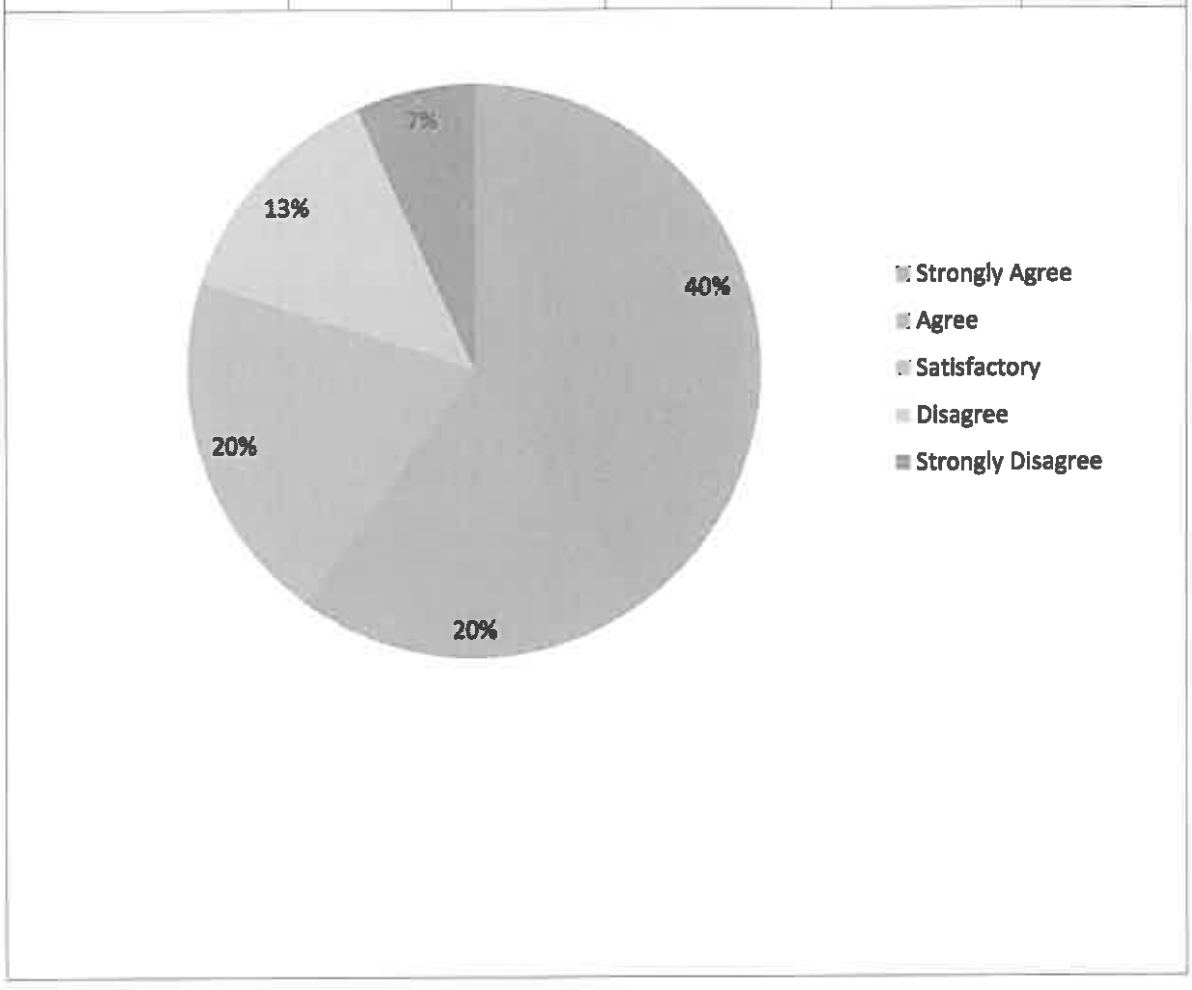
The curriculum provides enough scope for improving entrepreneurial skill as well as industry readiness.	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	46.67	26.67	13.33	6.67	6.67



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Q.6 The curriculum provides ample knowledge for increased employability and to promote students for higher education.

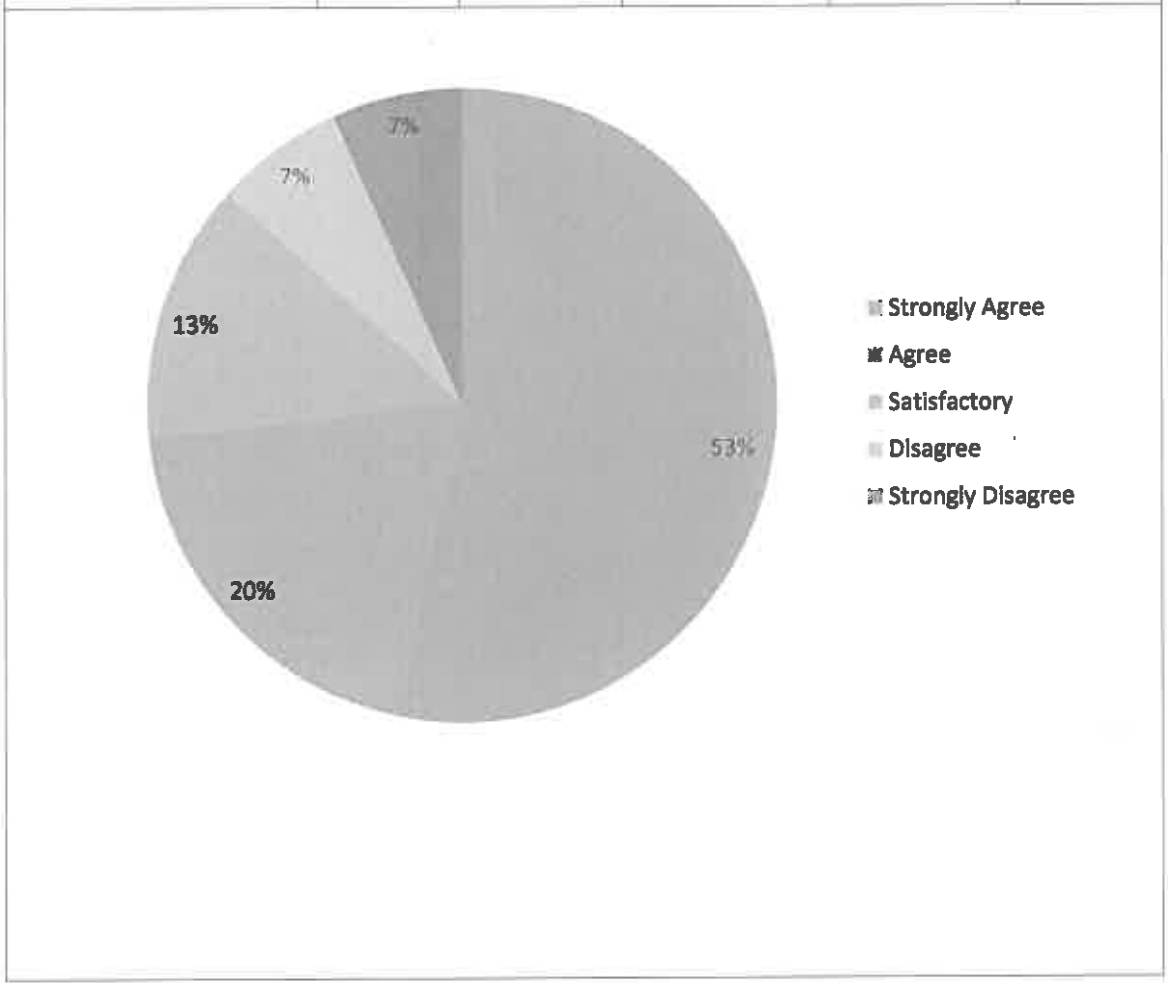
The curriculum provides ample knowledge for increased employability and to promote students for higher education.	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	40	20	20	13.33	6.67



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Q.7 The curriculum has focus on personality development by presence of courses on human values and professional ethics

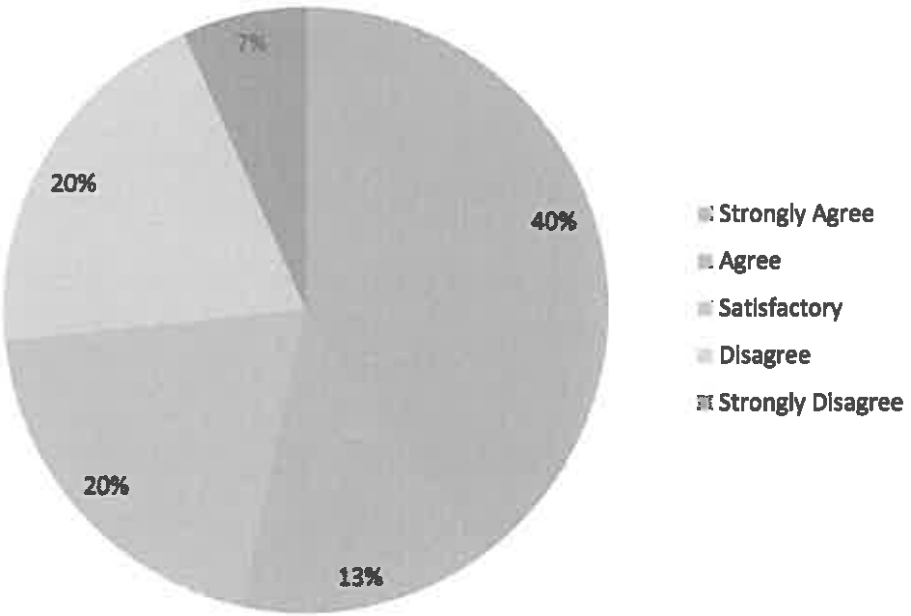
The curriculum has focus on personality development by presence of courses on human values and professional ethics	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	53.33	20	13.33	6.67	6.67



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Q.8 The curriculum is well organized and balanced for the programme with proper credit allocation.

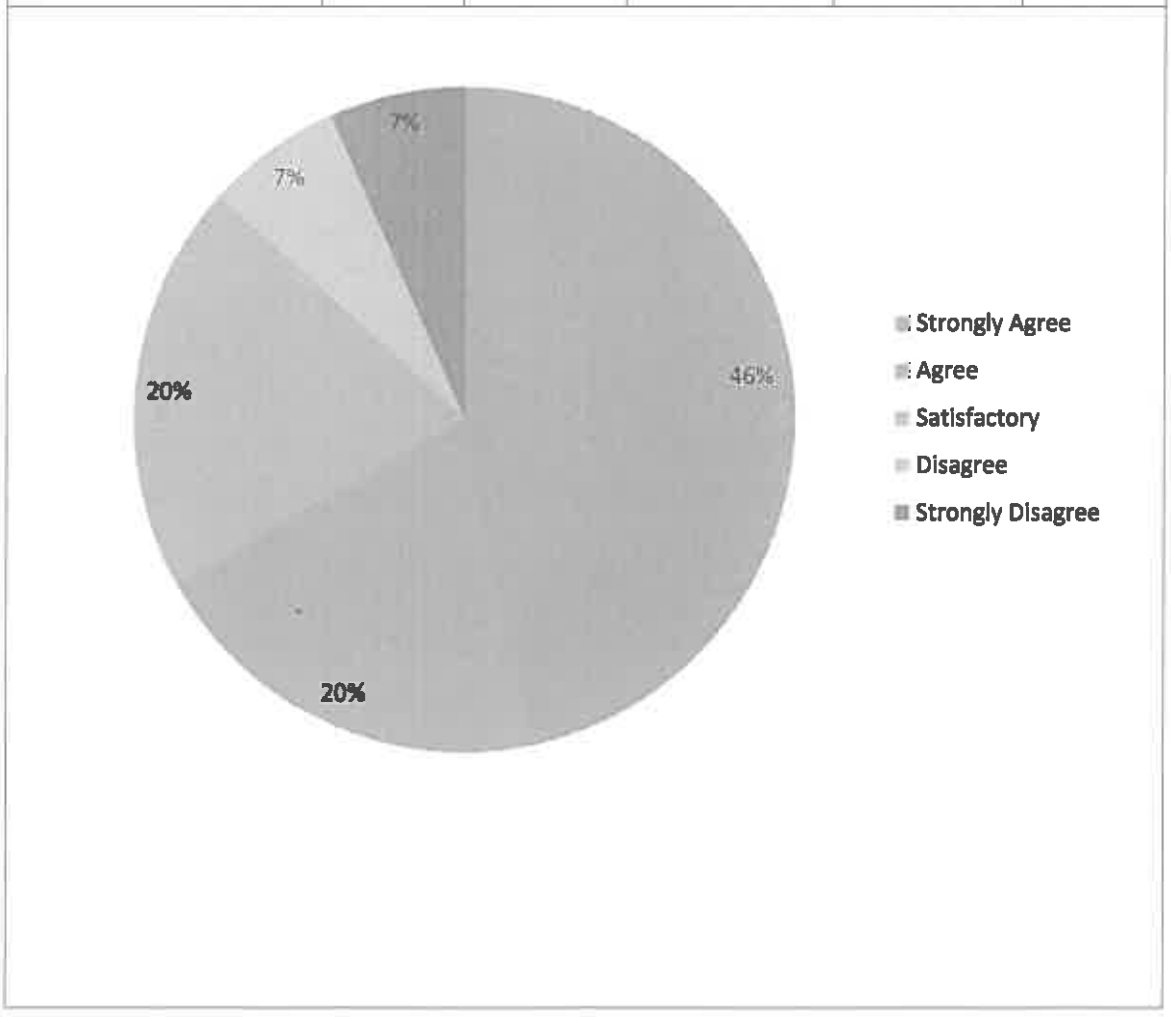
The curriculum is well organized and balanced for the programme with proper credit allocation.	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	40	13.33	20	20	6.67



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Q.9 The courses have adequate balance between theory and application for a student's holistic development.

The courses have adequate balance between theory and application for a student's holistic development.	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	46.67	20	20	6.67	6.67



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School of Engineering & Technology (15)						
Total no. of Employer: 15		Strongly Agree	Agree	Satisfied	Disagree	Strongly Disagree
The curriculum assists the students to acquire necessary entry level skills in industrial sector.	No. of Employer	5	4	3	2	1
	Percentage	33.33	26.67	20.00	13.33	6.67
The curriculum offers adequate scope for life-long learning and higher-level aptitude for new technology/tools.	No. of Employer	6	5	2	1	1
	Percentage	40.00	33.33	13.33	6.67	6.67
The curriculum has adequate scope for multidisciplinary knowledge and sufficient number of elective courses.	No. of Employer	7	3	2	2	1
	Percentage	46.67	20.00	13.33	13.33	6.67
The curriculum has relevant content to assist students to work independently as well in a team with high level of adaptability	No. of Employer	9	2	2	1	1
	Percentage	60.00	13.33	13.33	6.67	6.67
The curriculum provides enough scope for improving entrepreneurial skill as well as industry readiness.	No. of Employer	7	4	2	1	1
	Percentage	46.67	26.67	13.33	6.67	6.67
The curriculum provides	No. of	6	3	3	2	1

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ample knowledge for increased employability and to promote students for higher education.	Employer					
	Percentage	**40.00**	**20.00**	**20.00**	**13.33**	**6.67**
The curriculum has focus on personality development by presence of courses on human values and professional ethics	No. of Employer	**8**	**3**	**2**	**1**	**1**
	Percentage	**53.33**	**20.00**	**13.33**	**6.67**	**6.67**
The curriculum is well organized and balanced for the programme with proper credit allocation.	No. of Employer	**6**	**2**	**3**	**3**	**1**
	Percentage	**40.00**	**13.33**	**20.00**	**20.00**	**6.67**
The courses have adequate balance between theory and application for student's holistic development	No. of Employer	**7**	**3**	**3**	**1**	**1**
	Percentage	**46.67**	**20.00**	**20.00**	**6.67**	**6.67**

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Analysis of Feedback:

The employer feedback analysis on the curriculum indicates that it is largely effective in preparing students for the industrial sector, with a focus on developing essential entry-level skills (80%). The curriculum is also seen as promoting lifelong learning and adaptability to new technologies, achieving a strong rating of 86.66%. Additionally, it provides sufficient scope for multidisciplinary knowledge and offers a good selection of elective courses (80%), while also helping students work both independently and as part of a team with a high degree of adaptability (86.66%). Employers appreciate the emphasis on entrepreneurial skills and industry readiness, with an 86.67% rating. The curriculum is also seen as enhancing employability and supporting further education (80%), and the inclusion of human values and professional ethics courses contributes to personality development (86.66%). However, there is room for improvement in the organization and credit allocation of the program, as indicated by the relatively lower score of 73.33%. Overall, the curriculum is well-balanced and integrates both theoretical and practical knowledge effectively (86.67%).

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Action Taken Report

(School of Engineering and Technology)

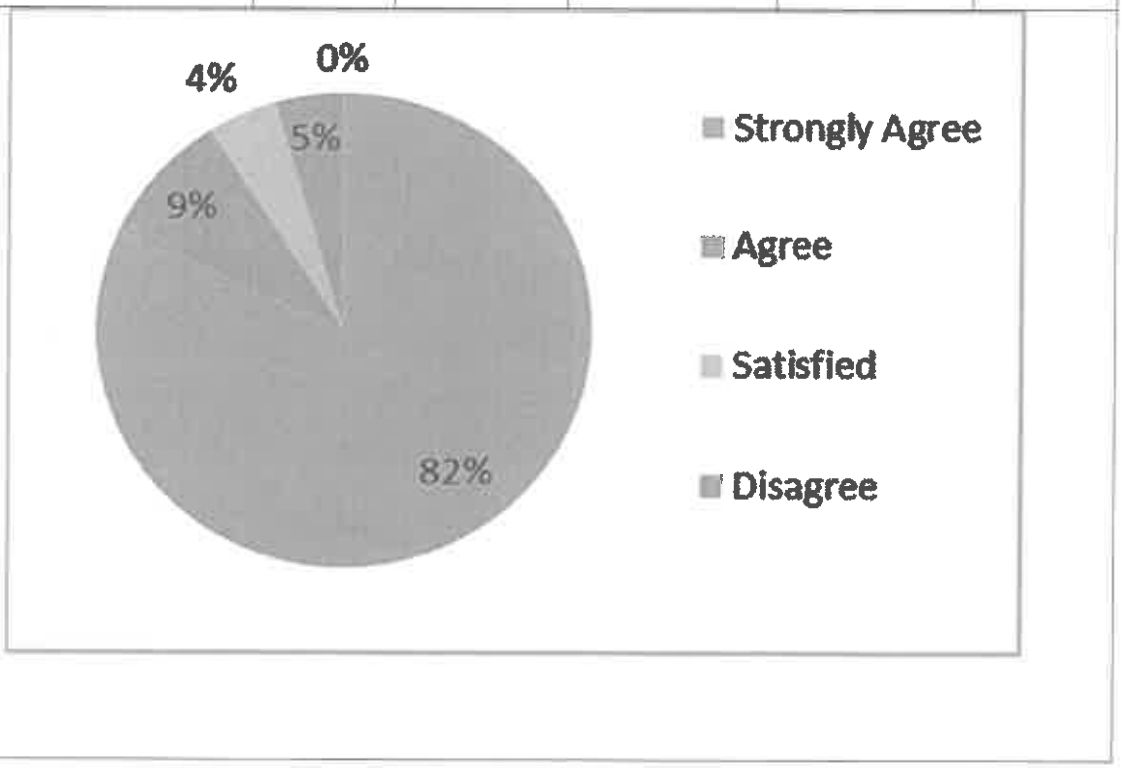
Sr. No.	Suggestions	Action Taken	Outcome
1	Improve the organization and credit allocation in the curriculum	Conducted a curriculum review and redistributed credit hours to ensure a more balanced workload	Enhanced academic workload management and better alignment of course content with student needs
2	Increase focus on real-world application and practical exposure	Expanded industry partnerships for internships, projects, and live case studies to enhance hands-on learning	Improved student preparedness for real-world challenges and better understanding of industry demands
3	Enhance multidisciplinary and cross-functional course offerings	Integrated courses from other departments such as business, design, and sustainability into engineering programs	Expanded students' horizons and fostered skills applicable across various sectors
4	Strengthen entrepreneurial skill development and industry readiness	Introduced innovation hubs, startup incubation programs, and courses in engineering entrepreneurship	Increased student engagement with industry trends and development of entrepreneurial projects

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Analysis of Peer Academician's Feedback of School of Engineering and Technology through Table and Pie Chart

Q.1 The syllabus of the courses are proper in relation to the competencies expected out of the programme.

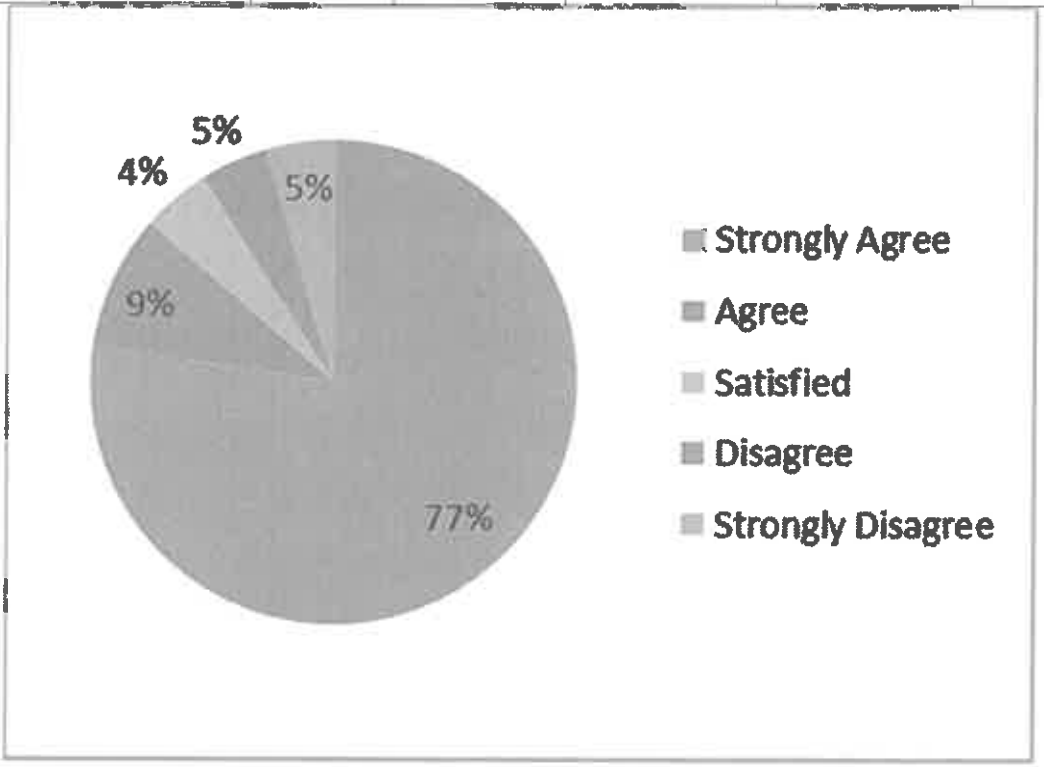
The syllabus of the courses are proper in relation to the competencies expected out of the programme.	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	81.81	9.09	4.54	4.54	0.00



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Q.2 The sequence and overall organization of the courses is proper in the curriculum.

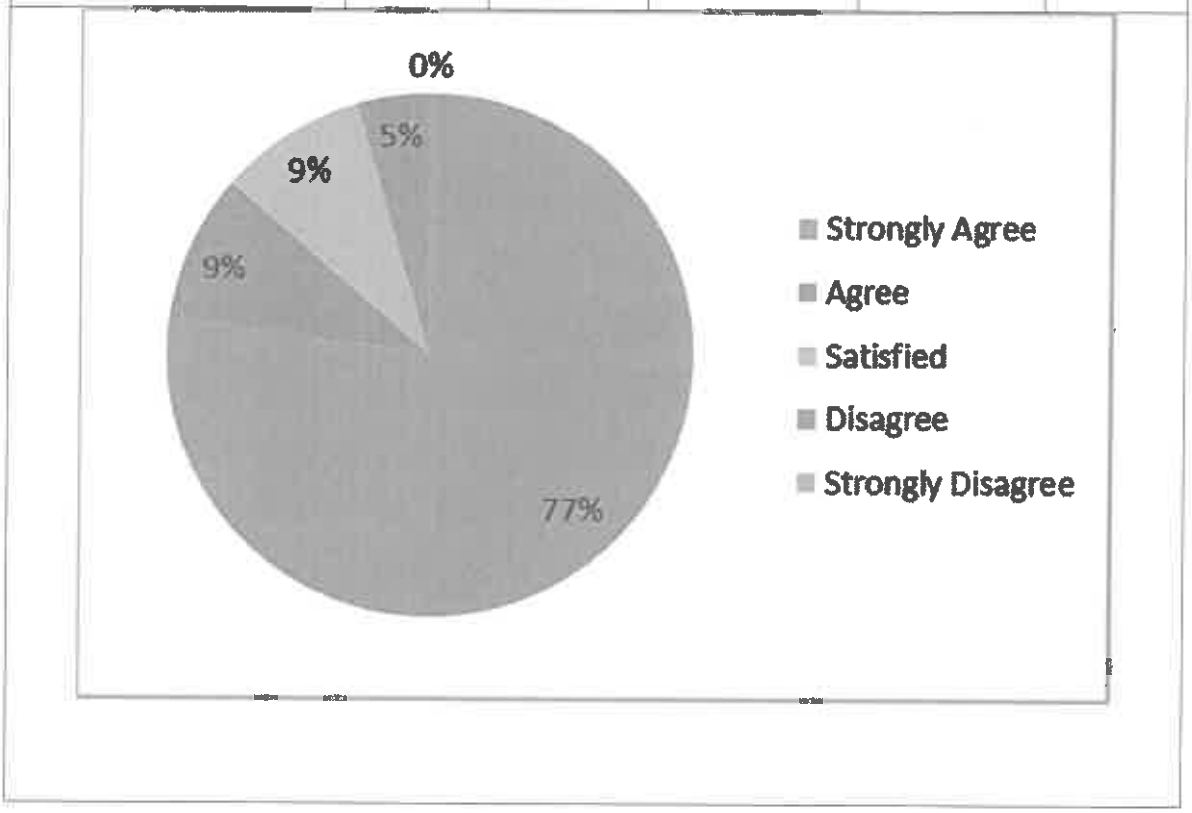
The sequence and overall organization of the courses is proper in the curriculum.	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	77.27	9.09	4.54	4.54	4.54



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Q.3 The curriculum has adequate scope for multidisciplinary knowledge and sufficient number of elective courses.

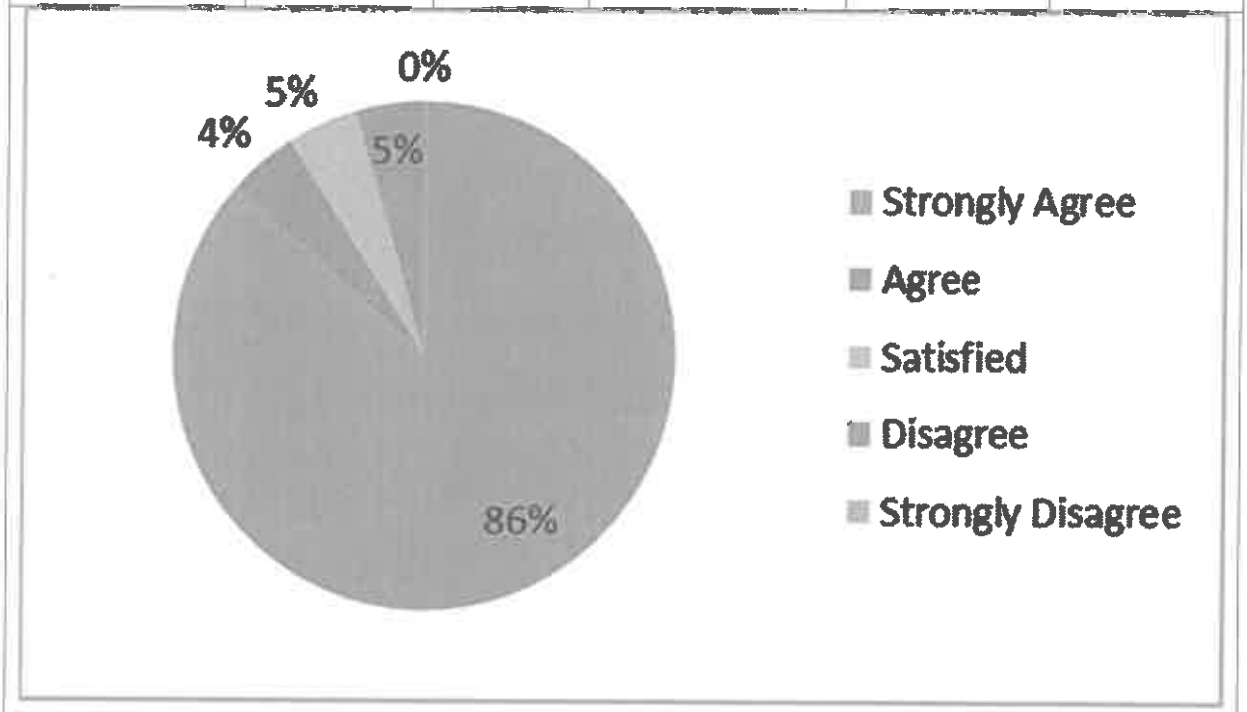
The curriculum has adequate scope for multidisciplinary knowledge and sufficient number of elective courses.	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	77.27	9.09	9.09	4.54	0.00



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Q.4 Extra care has been taken for extra learning or self-learning while designing the courses.

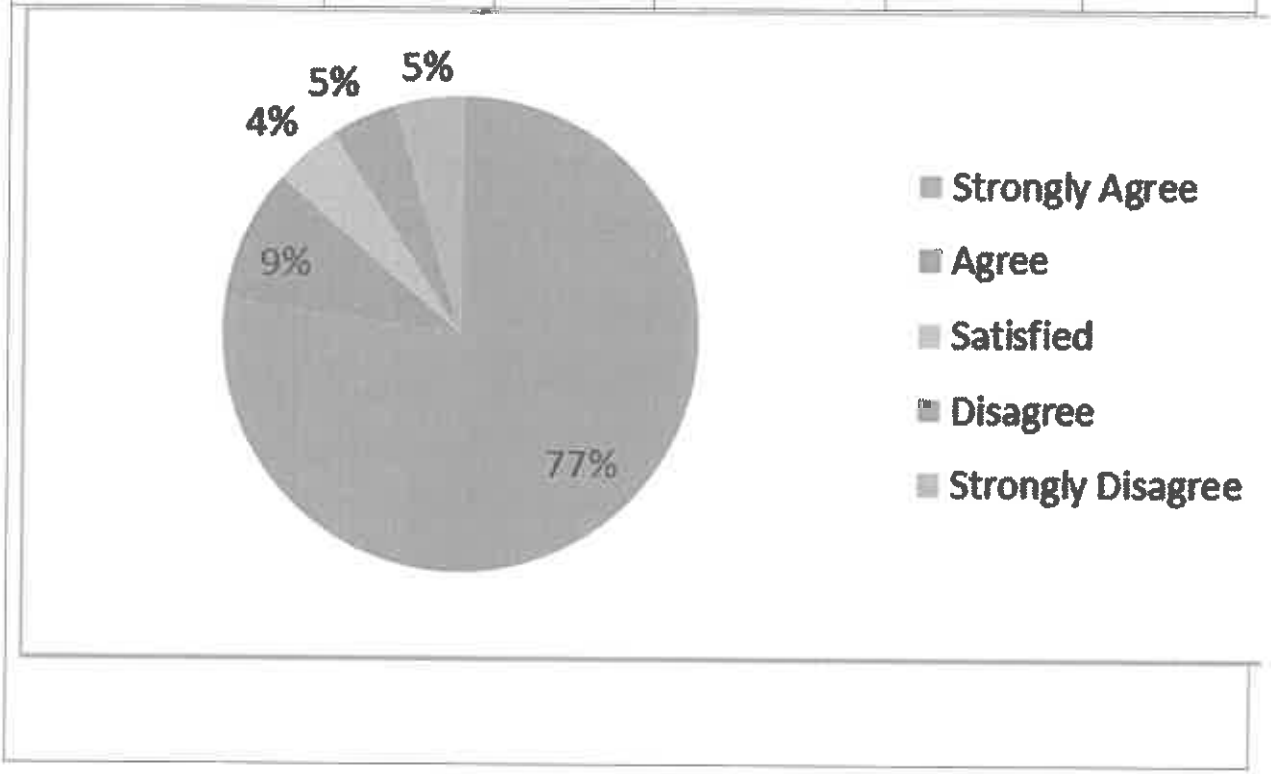
Extra care has been taken for extra learning or self-learning while designing the courses.	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	86.36	4.54	4.54	4.54	0.00



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Q.5 The curriculum provides enough scope for improving entrepreneurial skill as well as industry readiness.

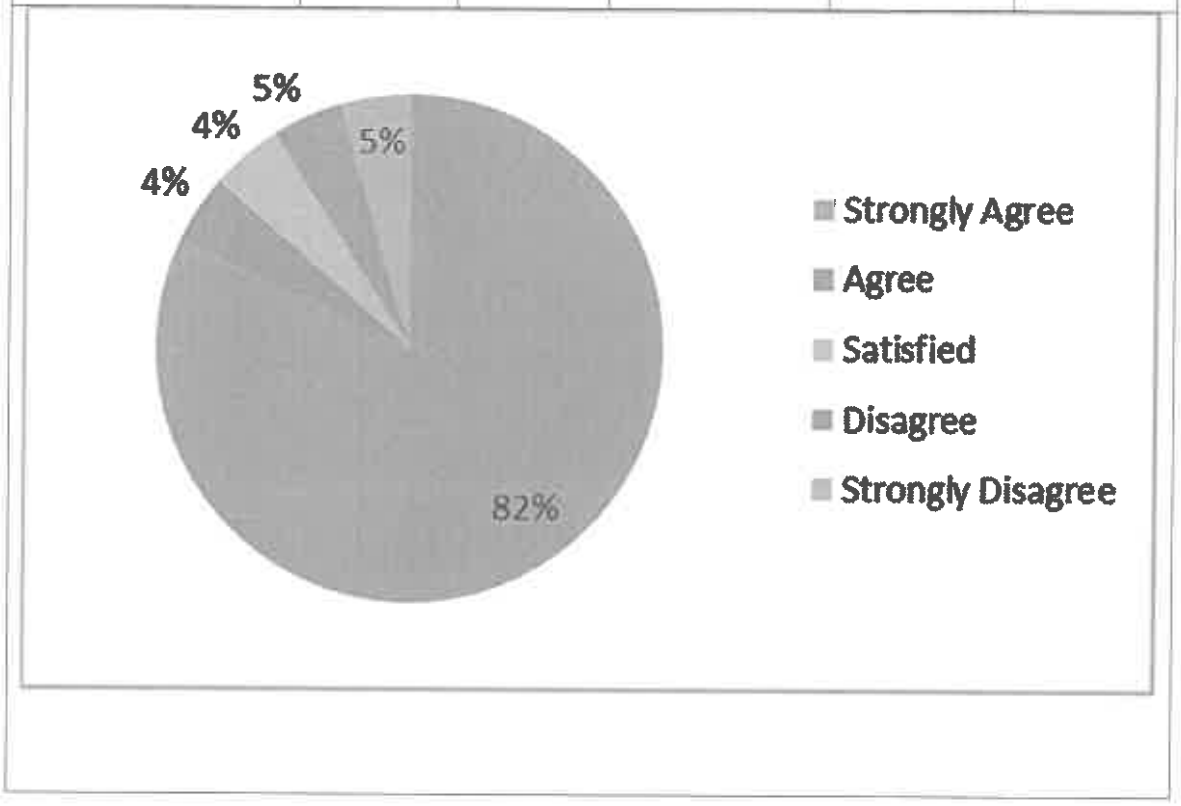
The curriculum provides enough scope for improving entrepreneurial skill as well as industry readiness.	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	77.27	9.09	4.54	4.54	4.54



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Q.6 The curriculum provides ample knowledge for increased employability and to promote students for higher education.

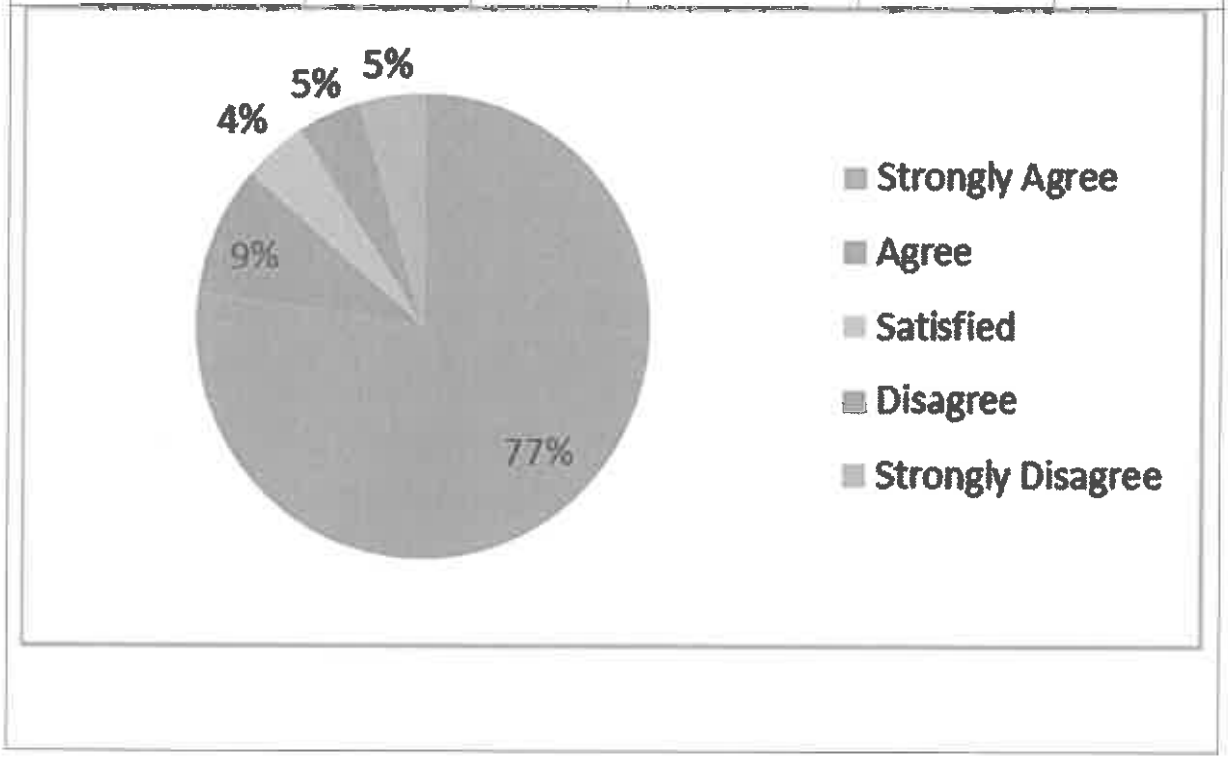
The curriculum provides ample knowledge for increased employability and to promote students for higher education.	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	81.81	4.54	4.54	4.54	4.54



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Q.7 The curriculum has focus on personality development by presence of courses on human values and professional ethics

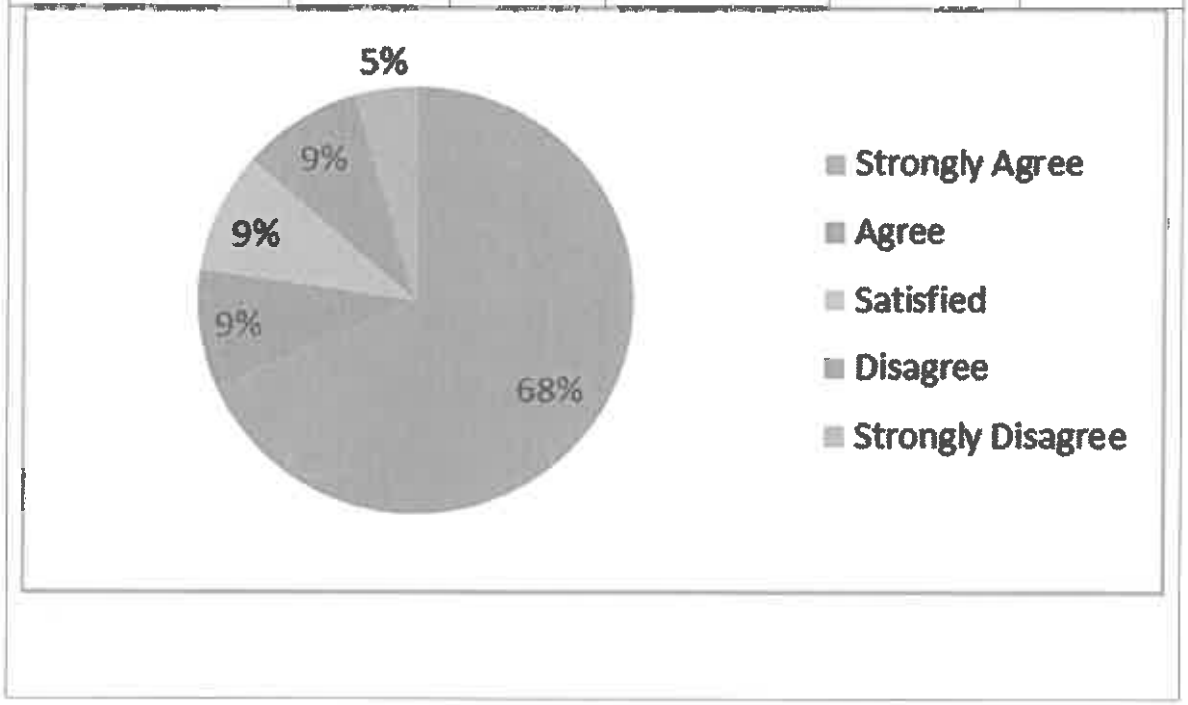
The curriculum has focus on personality development by presence of courses on human values and professional ethics	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	77.27	9.09	4.54	4.54	4.54



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Q.8 The curriculum is well organized and balanced for the programme with proper credit allocation.

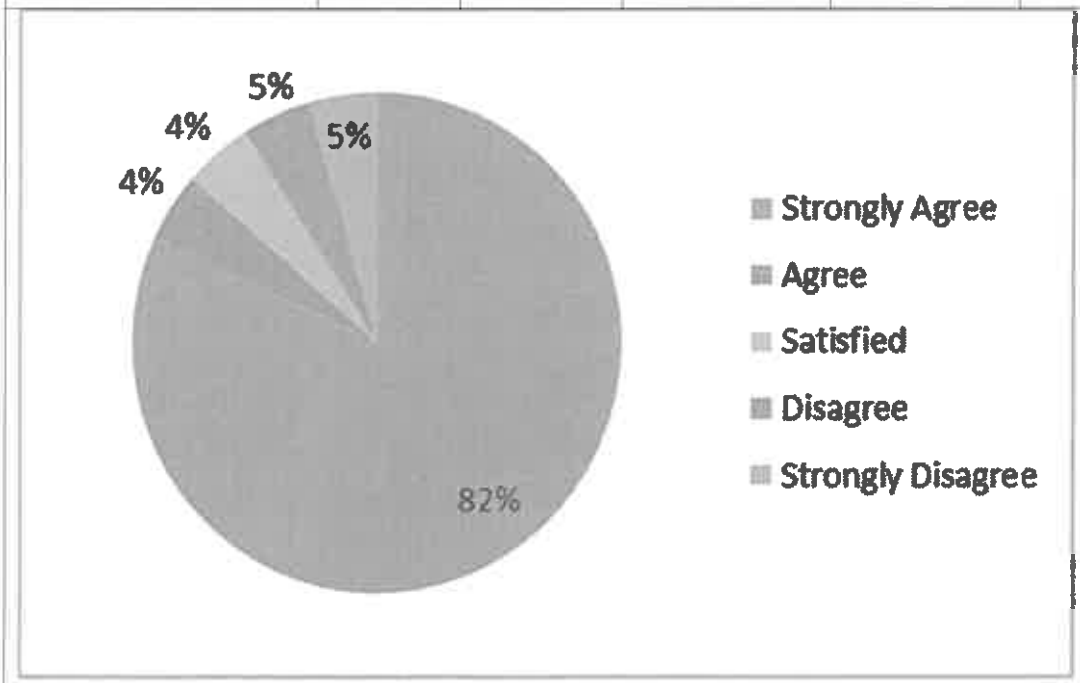
The curriculum is well organized and balanced for the programme with proper credit allocation.	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	68.10	9.09	9.09	9.09	4.54



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Q.9 The courses have adequate balance between theory and application for a student's holistic development.

The courses have adequate balance between theory and application for a student's holistic development.	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	81.81	4.54	4.54	4.54	4.54



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School of Engineering & Technology (22)						
Total no. of Peer Academicians: 22		Strongly Agree	Agree	Satisfied	Disagree	Strongly Disagree
The syllabus of the courses are proper in relation to the competencies expected out of the programme.	No. of Academicians	18.00	2.00	1.00	1.00	0.00
	Percentage	81.81	9.09	4.54	4.54	0.00
The sequence and overall organization of the courses is proper in the curriculum	No. of Academicians	17.00	2.00	1.00	1.00	1.00
	Percentage	77.27	9.09	4.54	4.54	4.54
The curriculum has adequate scope for multidisciplinary knowledge and sufficient number of elective courses	No. of Academicians	17.00	2.00	2.00	1.00	0.00
	Percentage	77.27	9.09	9.09	4.54	0.00
Extra care has been taken for extra learning or self-learning while designing the courses.	No. of Academicians	19.00	1.00	1.00	1.00	0.00
	Percentage	86.36	4.54	4.54	4.54	0.00
The curriculum provides enough scope for improving entrepreneurial skill as well as industry readiness.	No. of Academicians	17.00	2.00	1.00	1.00	1.00
	Percentage	77.27	9.09	4.54	4.54	4.54
The curriculum provides ample knowledge for increased employability and to promote students for higher education.	No. of Academicians	18.00	1.00	1.00	1.00	1.00
	Percentage	81.81	4.54	4.54	4.54	4.54

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The curriculum has focus on personality development by presence of courses on human values and professional ethics	No. of Academicians	17.00	2.00	1.00	1.00	1.00
	Percentage	77.27	9.09	4.54	4.54	4.54
The curriculum is well organized and balanced for the programme with proper credit allocation.	No. of Academicians	15.00	2.00	2.00	2.00	1.00
	Percentage	68.10	9.09	9.09	9.09	4.54
The courses have adequate balance between theory and application for a student's holistic development.	No. of Academicians	18.00	1.00	1.00	1.00	1.00
	Percentage	81.81	4.54	4.54	4.54	4.54

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Analysis of Feedback:

The peer feedback on the curriculum highlights several strengths, with the syllabus and course structure receiving particularly high ratings. The alignment of the syllabus with the competencies expected from the program scored an impressive 95.44%, indicating that the curriculum is well-tailored to the program's objectives. The curriculum's scope for multidisciplinary knowledge and electives, as well as the emphasis on self-learning, were also highly rated, both scoring 95.45% and 95.44%, respectively. These factors suggest that the curriculum provides ample opportunities for broadening students' perspectives and fostering independent learning. Additionally, the curriculum addresses entrepreneurial skills and industry readiness well, although these areas received slightly lower ratings at 90.9%. There is also strong support for employability, higher education preparation, and personality development through courses on human values and professional ethics, all receiving favorable ratings around 90%. However, the aspect of credit allocation and the overall balance of the program scored lower at 86.28%, indicating that there may be room for improvement in this area to better align the curriculum's structure with students' needs. Overall, the curriculum appears robust and comprehensive, with minor opportunities for refining the balance and credit allocation.

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Action Taken Report

(School of Engineering and Technology)

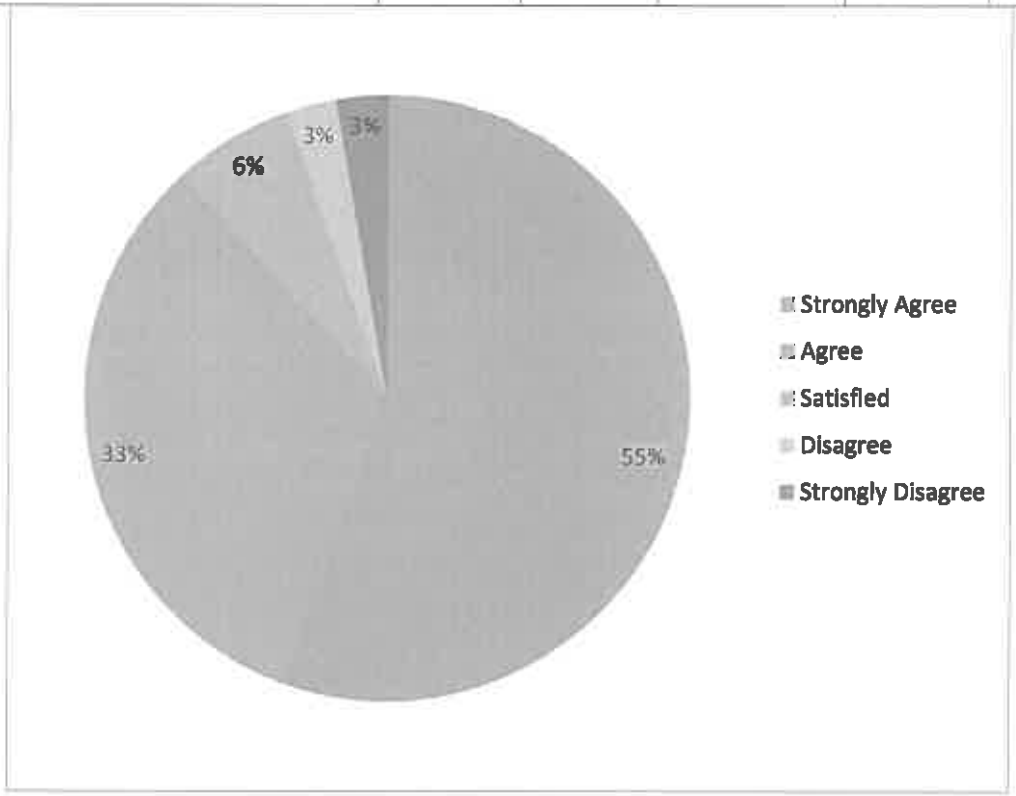
Sr. No.	Suggestions	Action taken	Outcome
1	Improve the balance and alignment of credit allocation across courses	Conducted a review of credit distribution and adjusted the load to better reflect course content and student workload	Achieved a more balanced workload across semesters; student feedback indicates better management of time and more effective pacing of the curriculum
2	Enhance entrepreneurial skills and industry readiness	Established partnerships with tech startups and companies for student internships and project collaborations; introduced entrepreneurship-focused workshops	Increased industry collaborations; students reported improved exposure to real-world applications of engineering concepts and career opportunities
3	Continue strengthening multidisciplinary learning opportunities and self-learning resources	Introduced interdisciplinary electives such as AI and Robotics, Cybersecurity, and Environmental Engineering; launched an online self-learning portal with industry-relevant resources	Expanded academic breadth; students embraced more diverse learning paths, and self-learning resources were frequently accessed and utilized
4	Maintain and expand focus on personality development, human values, and professional ethics	Enhanced the ethics curriculum by including more case studies and real-world ethical dilemmas in engineering practice, with guest speakers from industry	Students demonstrated improved ethical decision-making and professional conduct; positive feedback on the relevance and practical applicability of the curriculum

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Analysis of Students' Feedback of School of Engineering and Technology through Table and Pie Chart

Q.1. Whether the curriculum has depth of the subjects and clears the concept?

Curriculum has depth of the subjects and clears the concept	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	55.45455	32.72727	6.363636	2.727273	2.727273

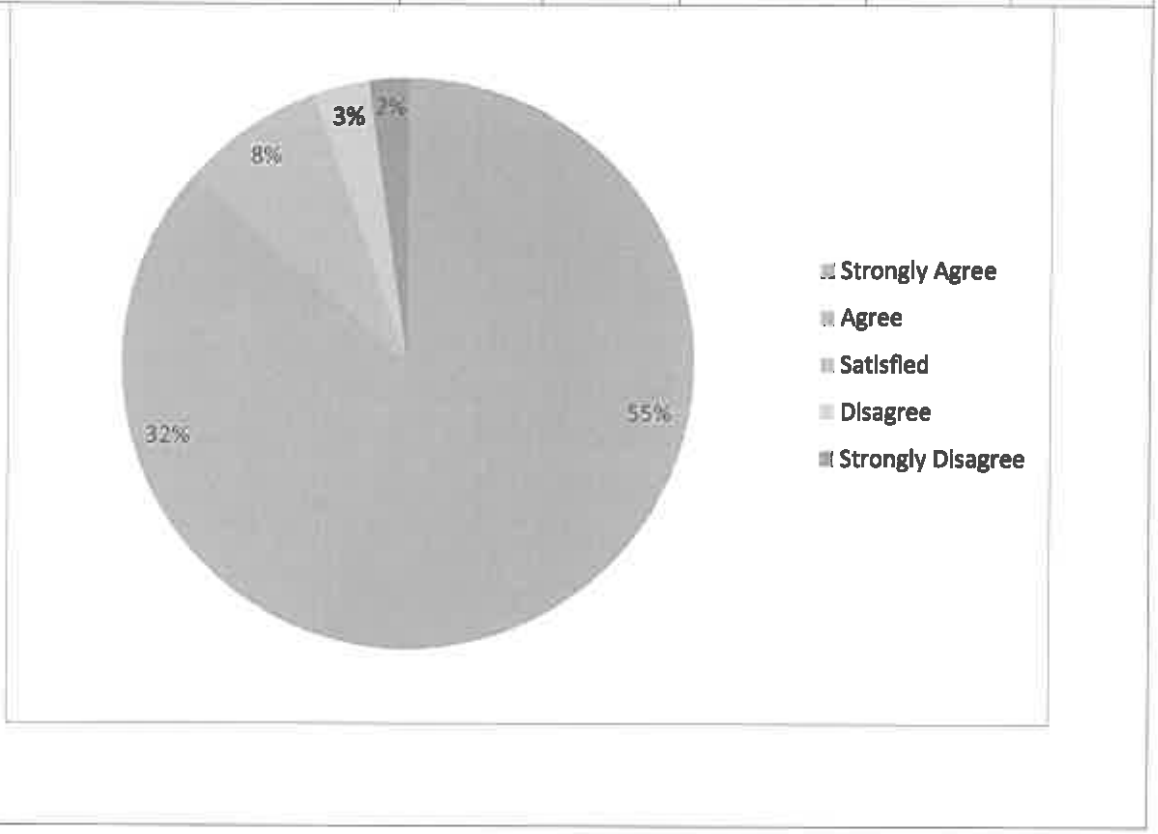


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Q.2. How do you rate the course outcomes and relevance to the course content?

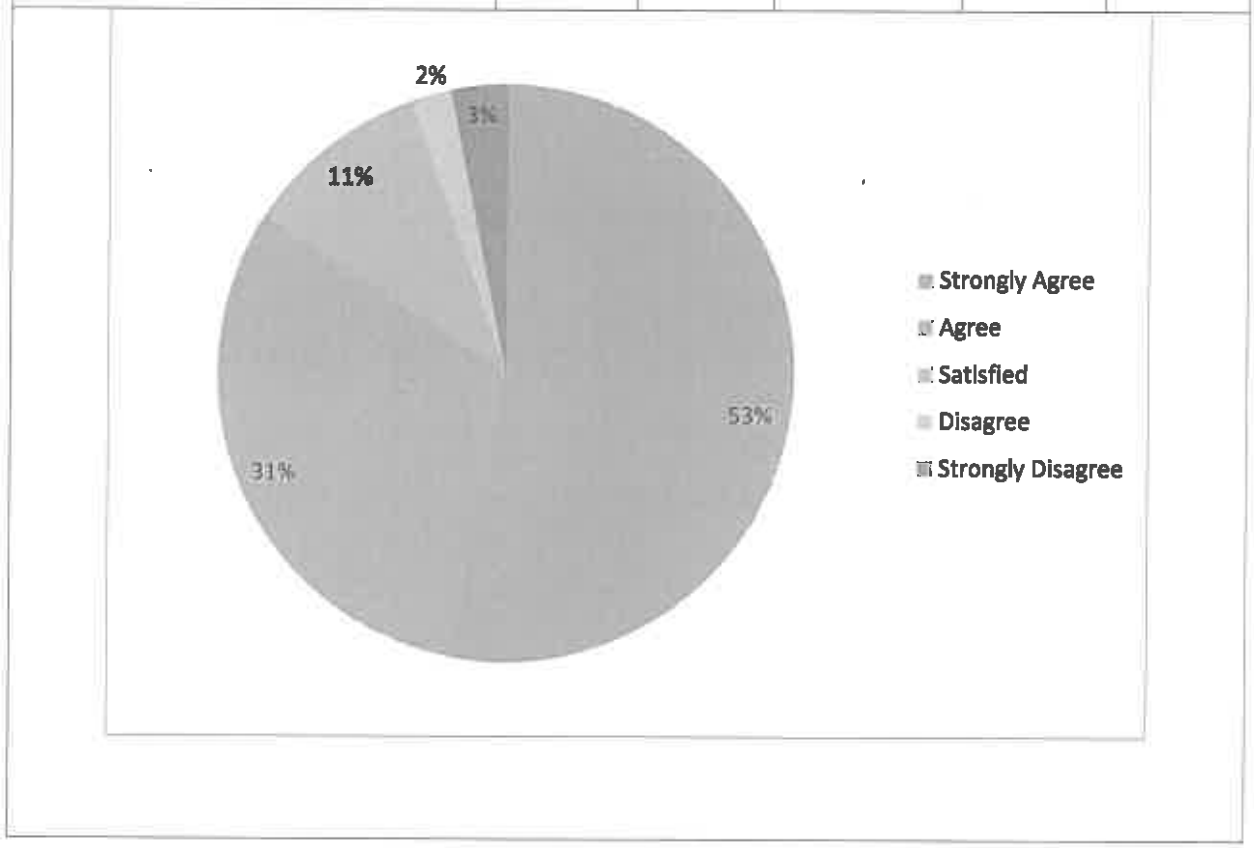
Rate the course outcomes and relevance to the course content	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	54.54545	31.81818	8.181818	3.181818	2.272727



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Q.3. How do you rate the sequence of units in the courses?

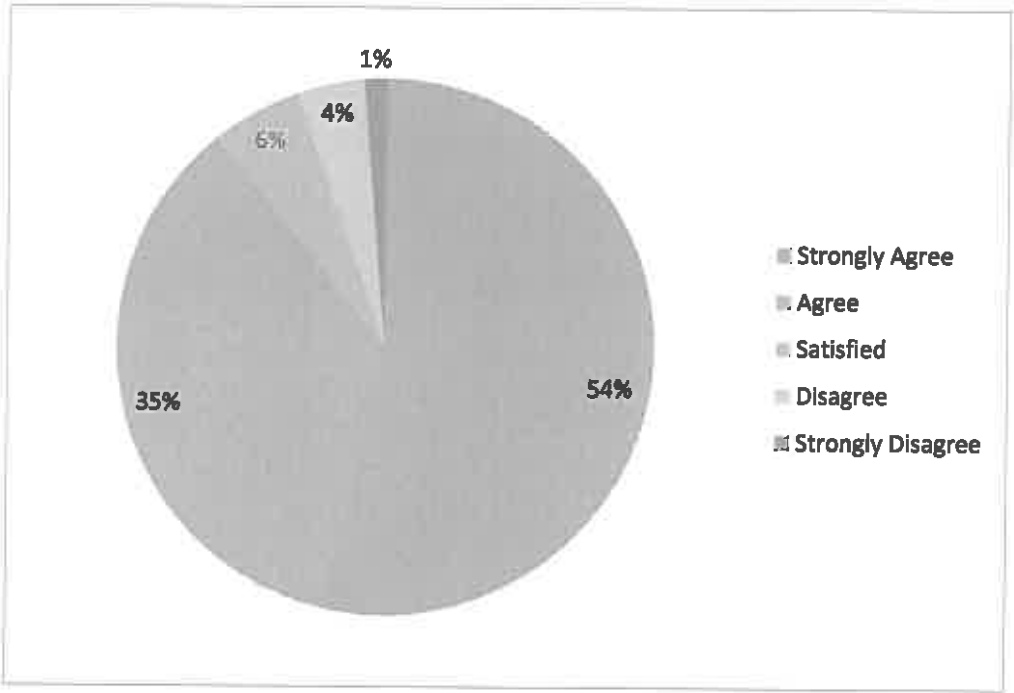
Rate the sequence of units in the courses	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	53.18182	30.90909	10.45455	2.272727	3.181818



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Q.4. How do you rate the credits allotted to individual courses?

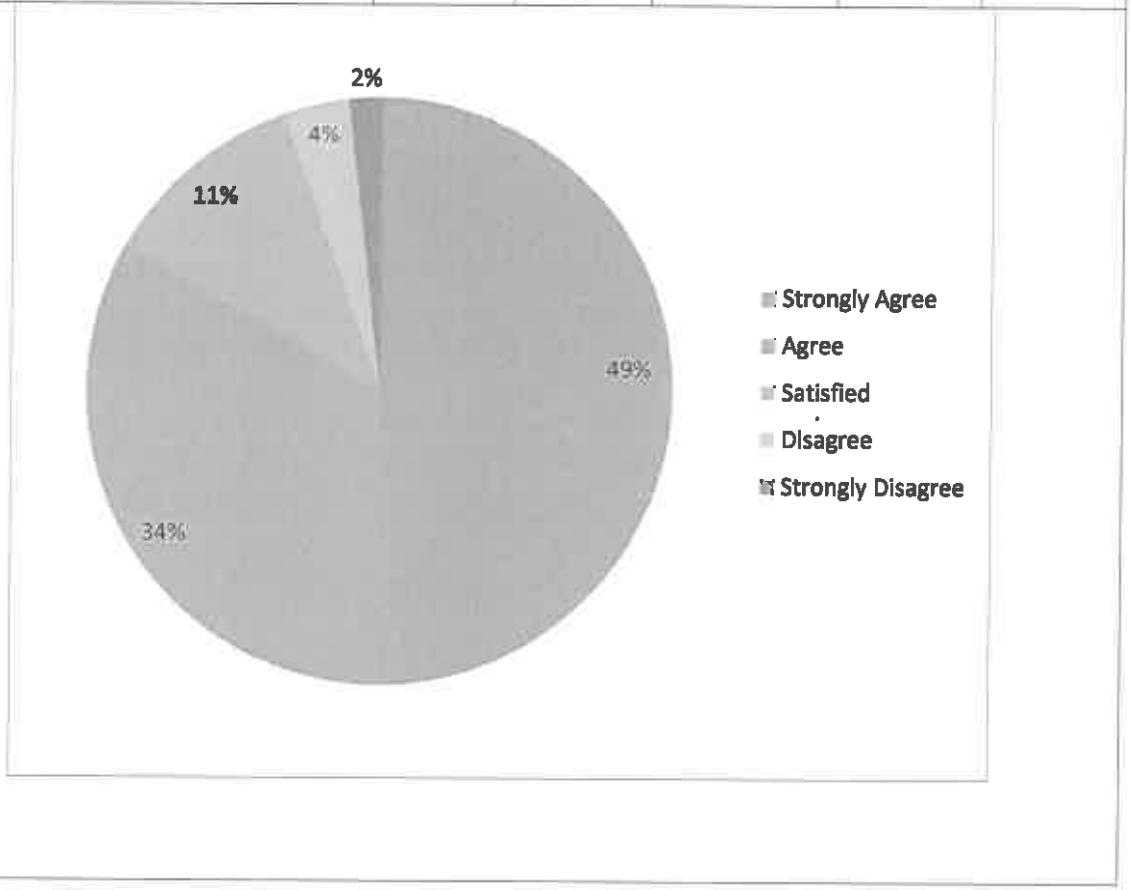
Rate the credits allotted to individual courses	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	53.63636	35.45455	5.454545	4.090909	1.363636



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Q.5. Does the curriculum focus on employability/career orientation?

Curriculum focus on employability/career orientation	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	48.63636	34.54545	11.36364	3.636364	1.818182

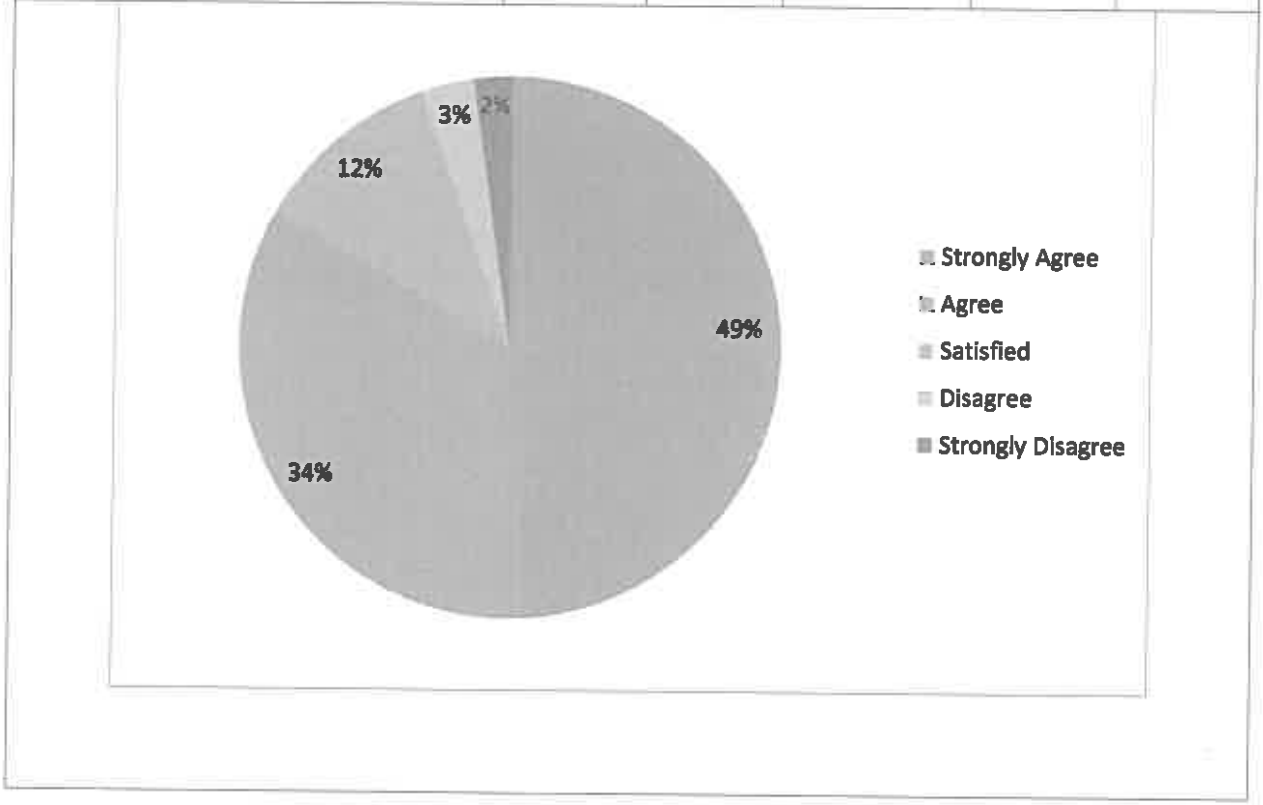


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Q.6. Does the curriculum focus on skill development/entrepreneurship?

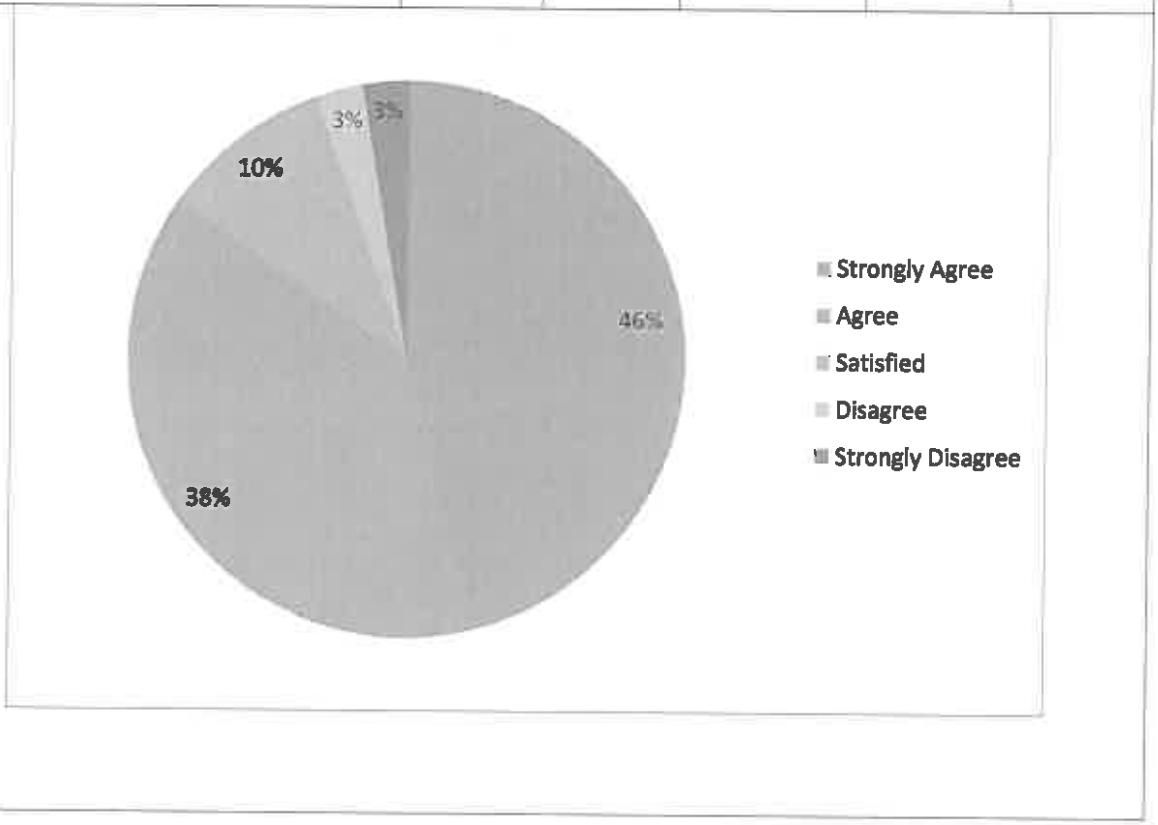
Curriculum focus on skill development/entrepreneurship	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	49.09091	34.09091	11.36364	3.181818	2.272727



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Q.7. Does the curriculum have satisfactory number of elective courses?

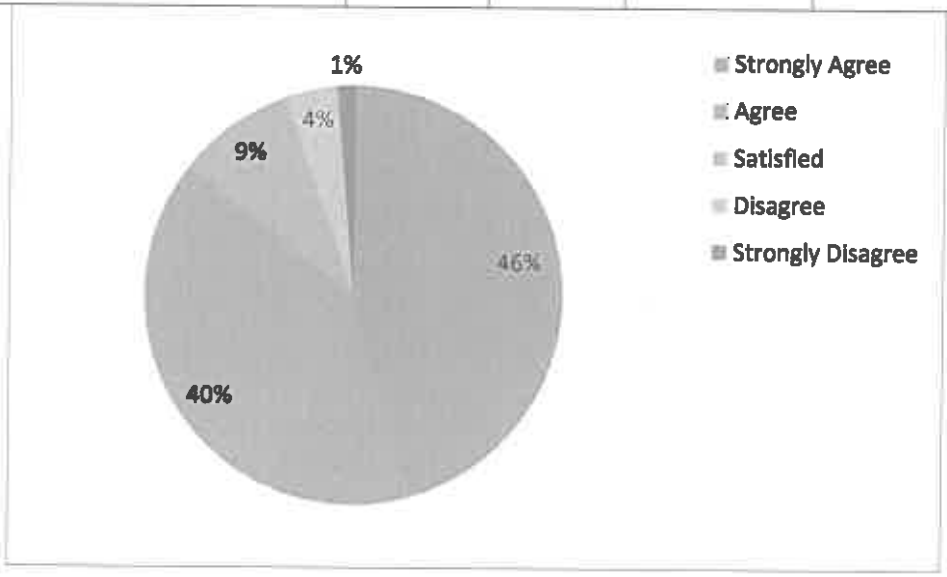
Curriculum have satisfactory number of elective courses	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	45.90909	38.63636	10	2.727273	2.727273



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Q.8. Does the curriculum focus on life skill or help in value addition?

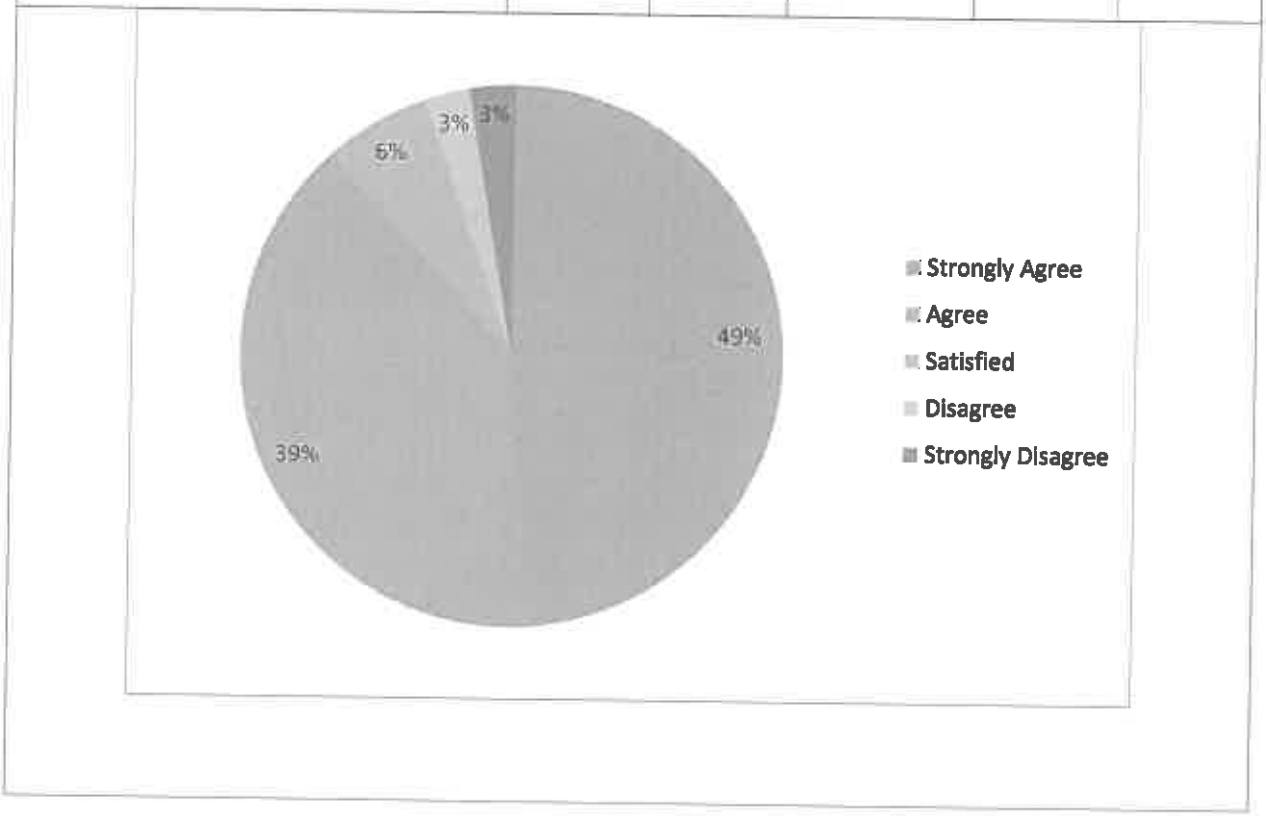
Curriculum focus on life skill or help in value addition	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	45.45455	40	9.090909	4.090909	1.363636



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Q.9. Do the theory subjects are properly linked to the laboratories/provide real-life exposure?

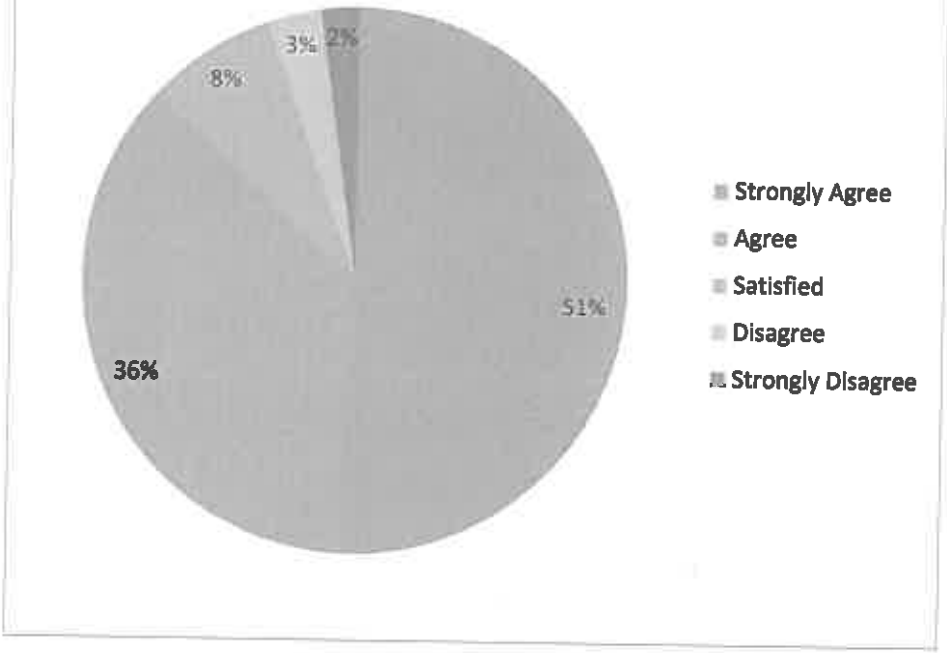
Theory subjects are properly linked to the laboratories/provide real-life exposure	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	48.63636	39.54545	6.363636	2.727273	2.727273



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Q.10. Does the curriculum provide multidisciplinary knowledge/information to a student?

Curriculum provide multidisciplinary knowledge/information to a student	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	50.90909	35.90909	7.727273	3.181818	2.272727



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School of Engineering & Technology (220)						
Question	**Details**	**Strongly Agree**	**Agree**	**Satisfactory**	**Disagree**	**Strongly Disagree**
Whether the curriculum has depth of the subjects and clears the concept?	No of Students	122	72	14	6	6
	Percentage	55.45454545	32.72727273	6.363636364	2.727272727	2.727272727
How do you rate the course outcomes and relevance to the course content?	No of Students	120	70	18	7	5
	Percentage	54.54545455	31.81818182	8.181818182	3.181818182	2.272727273
How do you rate the sequence of units in the courses?	No of Students	117	68	23	5	7
	Percentage	53.18181818	30.90909091	10.45454545	2.272727273	3.181818182
How do you rate the credits allotted to individual courses?	No of Students	118	78	12	9	3
	Percentage	53.63636364	35.45454545	5.454545455	4.090909091	1.363636364
Does the curriculum focus on employability/career orientation?	No of Students	107	76	25	8	4
	Percentage	48.63636364	34.54545455	11.36363636	3.636363636	1.818181818
Does the curriculum focus on skill development/entrepreneurship?	No of Students	108	75	25	7	5
	Percentage	49.09090909	34.09090909	11.36363636	3.181818182	2.272727273
Does the curriculum have satisfactory number of elective courses?	No of Students	101	85	22	6	6
	Percentage	45.90909091	38.63636364	10	2.727272727	2.727272727
Does the curriculum focus on life skill or help in value addition?	No of Students	100	88	20	9	3
	Percentage	45.45454545	40	9.090909091	4.090909091	1.363636364
Do the theory subjects are properly linked to the laboratories/provide real-life exposure?	No of Students	107	87	14	6	6
	Percentage	48.63636364	39.54545455	6.363636364	2.727272727	2.727272727
Does the curriculum provide multidisciplinary knowledge/information to a student?	No of Students	112	79	17	7	5
	Percentage	50.90909091	35.90909091	7.727272727	3.181818182	2.272727273

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Analysis of Feedback:

The student feedback for the School of Engineering & Technology reveals a largely positive outlook on the curriculum, with strong approval for the depth of subjects and conceptual clarity. A majority of students (55.45%, 122 students) strongly agree that the curriculum provides in-depth understanding and clears concepts, with an additional 32.73% agreeing. Similarly, 54.55% strongly agree and 31.82% agree that course outcomes are relevant to the content, indicating a solid alignment between course objectives and materials.

The sequence of units in courses also received positive feedback, with 53.18% strongly agreeing and 30.91% agreeing, suggesting that the overall structure of the courses is well-organized. Credit allocation was viewed favorably, with 53.64% of students strongly agreeing and 35.45% agreeing, reflecting satisfaction with the distribution of course credits.

On employability and career orientation, 48.64% of students strongly agree and 34.55% agree, which indicates a good focus on preparing students for their future careers, although there is room for enhancement in this area. The focus on skill development and entrepreneurship was similarly rated positively, with 49.09% strongly agreeing and 34.09% agreeing, though this area also has potential for further improvement.

Elective courses were considered satisfactory by 45.91% of students who strongly agreed and 38.64% who agreed, and life skills and value addition received positive feedback with 45.45% strongly agreeing and 40% agreeing. Practical integration, with theory subjects linked to laboratories and real-life exposure, received strong support, with 48.64% strongly agreeing and 39.55% agreeing. Lastly, multidisciplinary knowledge was positively recognized, with 50.91% strongly agreeing and 35.91% agreeing. Overall, the curriculum is seen as comprehensive, well-structured, and relevant, with some opportunities for improvement in career orientation, skill development, and elective course offerings.

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Action Taken Report

(School of Engineering and Technology)

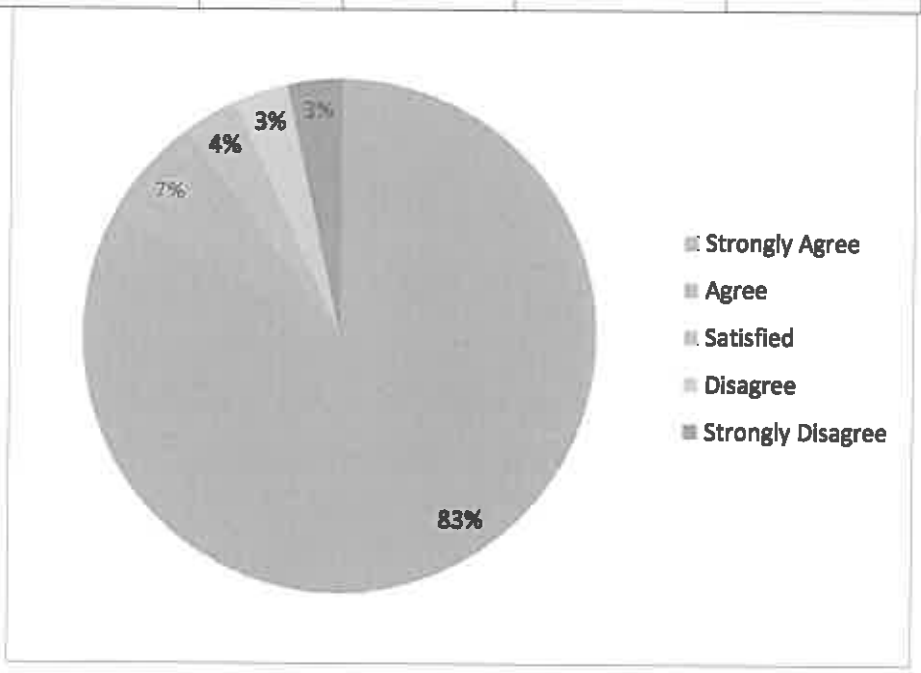
Sr. No.	Suggestions	Action Taken	Outcome
1	Enhance career orientation and employability focus in the curriculum.	Introduced workshops, industry collaborations, and placement support initiatives.	Increased focus on employability and career readiness, with improved industry exposure.
2	Strengthen skill development and entrepreneurship initiatives.	Launched entrepreneurship programs, hackathons, and startup incubator collaborations.	Higher engagement in skill-building activities and a better understanding of entrepreneurship.
3	Improve the integration of practical learning and real-life exposure.	Enhanced industry visits, internships, and lab-based practical sessions.	More hands-on experience and real-world exposure for students, leading to increased satisfaction.
4	Expand elective course offerings for broader academic exploration.	Introduced additional elective courses across diverse disciplines and emerging technologies.	Increased satisfaction with elective offerings, providing students with more flexibility and choice.

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Analysis of Teacher's Feedback of School of Engineering and Technology through Table and Pie Chart

Q.1 The curriculum is well organized and balanced for the programme with proper credit allocation.

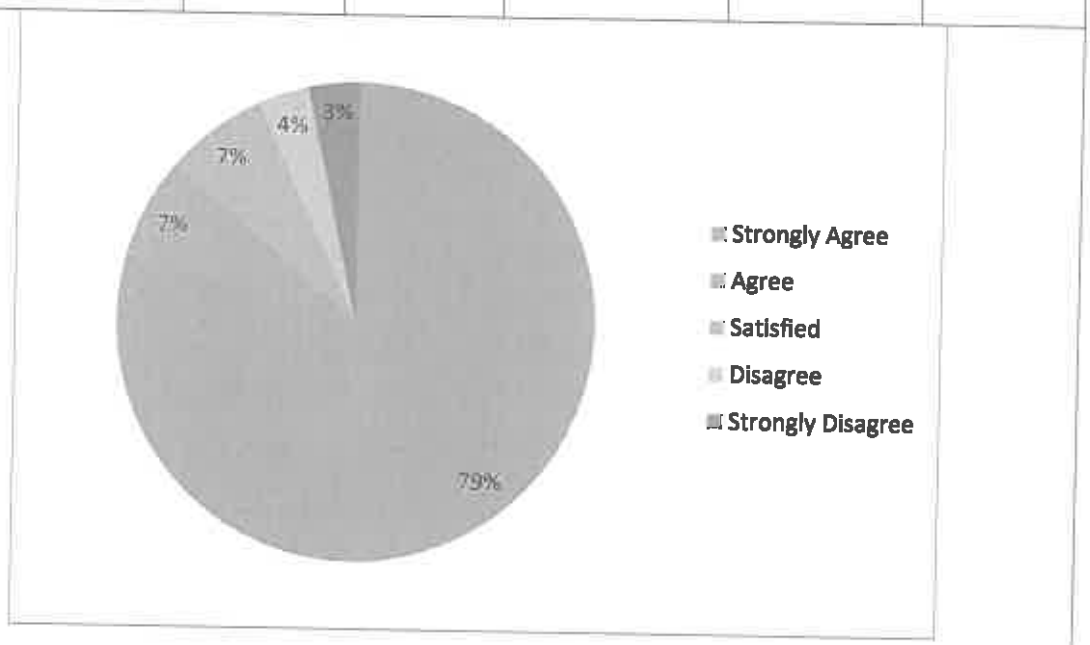
The curriculum is well organized and balanced for the programme with proper credit allocation	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	82.76	6.90	3.45	3.45	3.45



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Q.2 The courses have adequate balance between theory and application for student's holistic development.

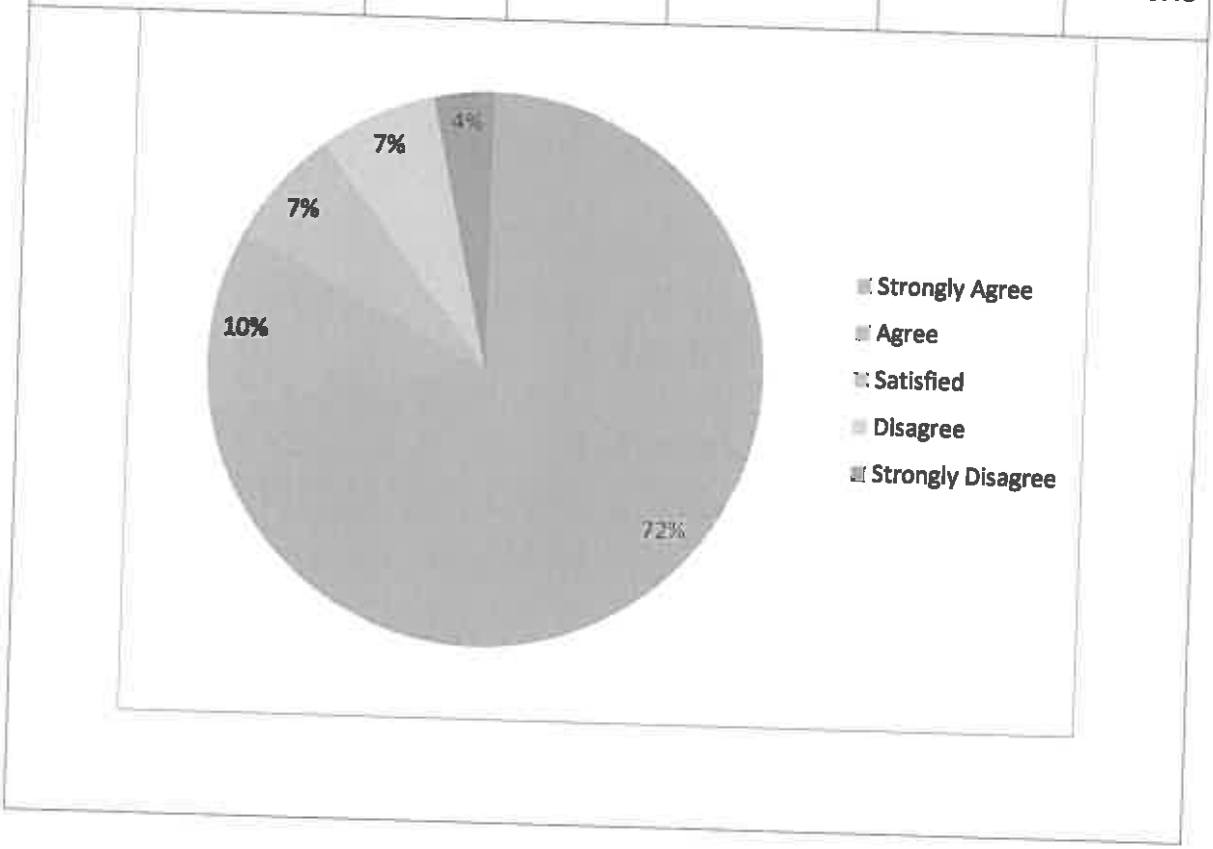
The courses have adequate balance between theory and application for student's holistic development.	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	79.31	6.90	6.90	3.45	3.45



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Q.3 The curriculum has adequate scope for multidisciplinary knowledge and sufficient number of elective courses.

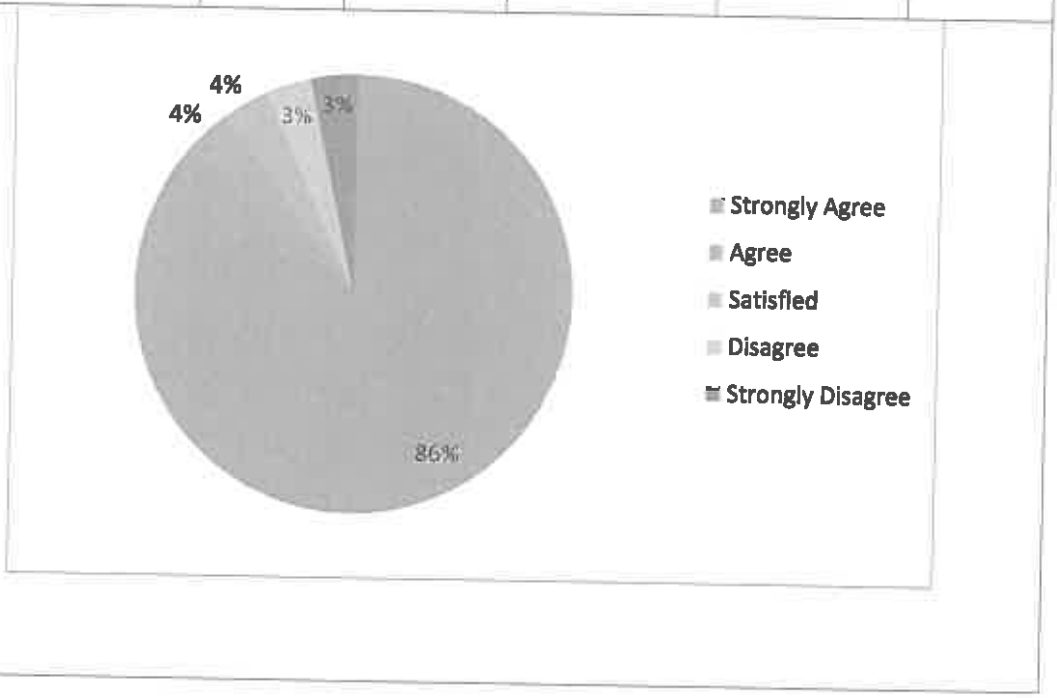
The curriculum has adequate scope for multidisciplinary knowledge and sufficient number of elective courses.	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	72.41	10.34	6.90	6.90	3.45



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Q.4 The curriculum has focus on personality development by presence of courses on human values and professional ethics

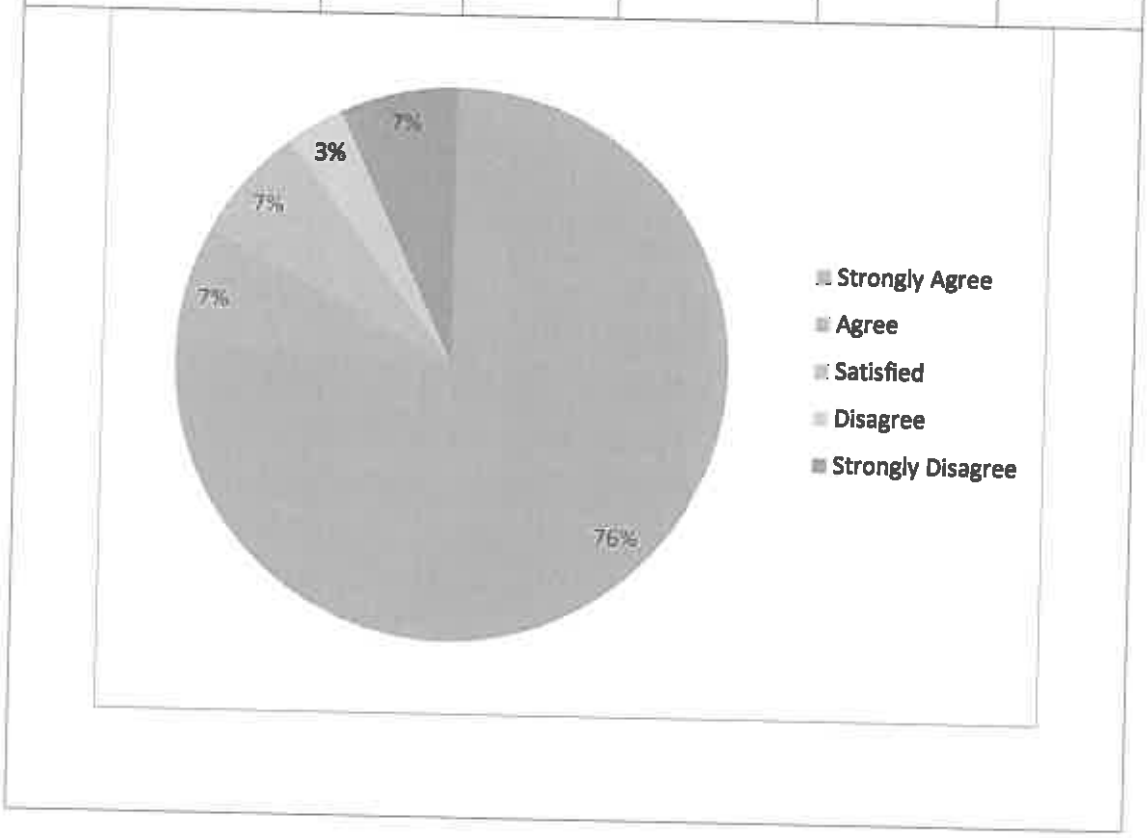
The curriculum has focus on personality development by presence of courses on human values and professional ethics.	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	86.21	3.45	3.45	3.45	3.45



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Q.5 The curriculum provides enough scope for improving entrepreneurial skill as well as industry readiness.

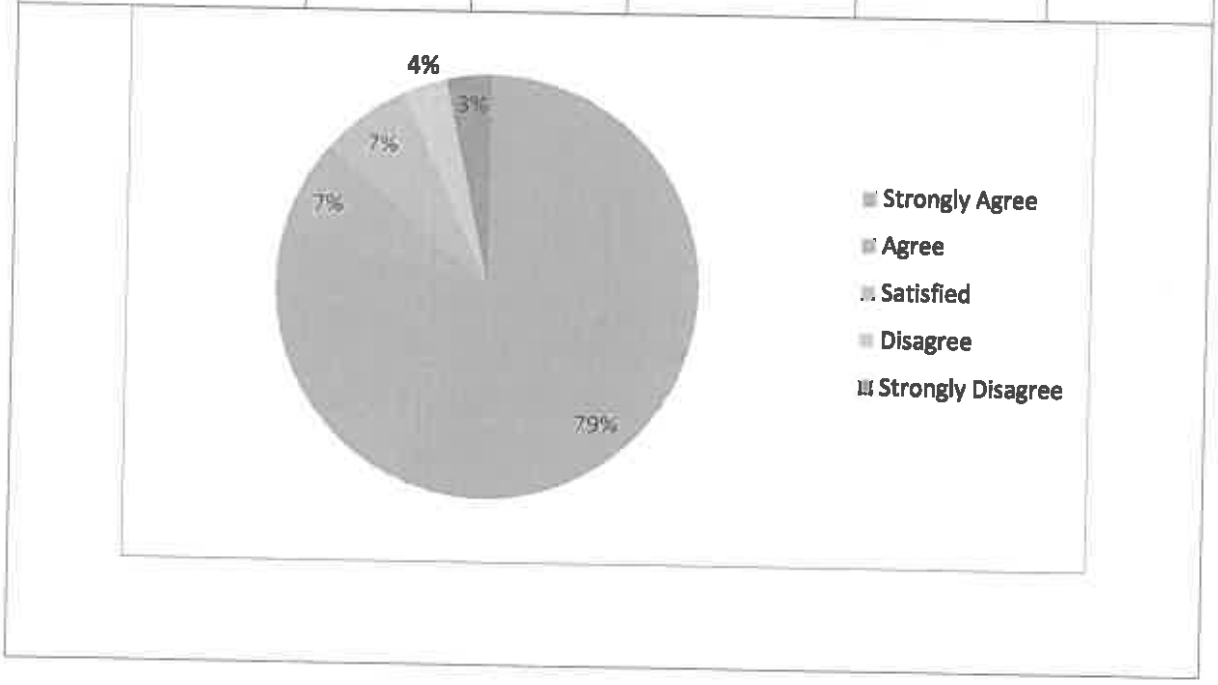
The curriculum provides enough scope for improving entrepreneurial skill as well as industry readiness.	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	75.86	6.90	6.90	3.45	6.90



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EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional
Area Gangoh, Distt. Saharanpur (U.P.)
247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

Q.6 The curriculum provides ample knowledge for increased employability and to promote students for higher education.

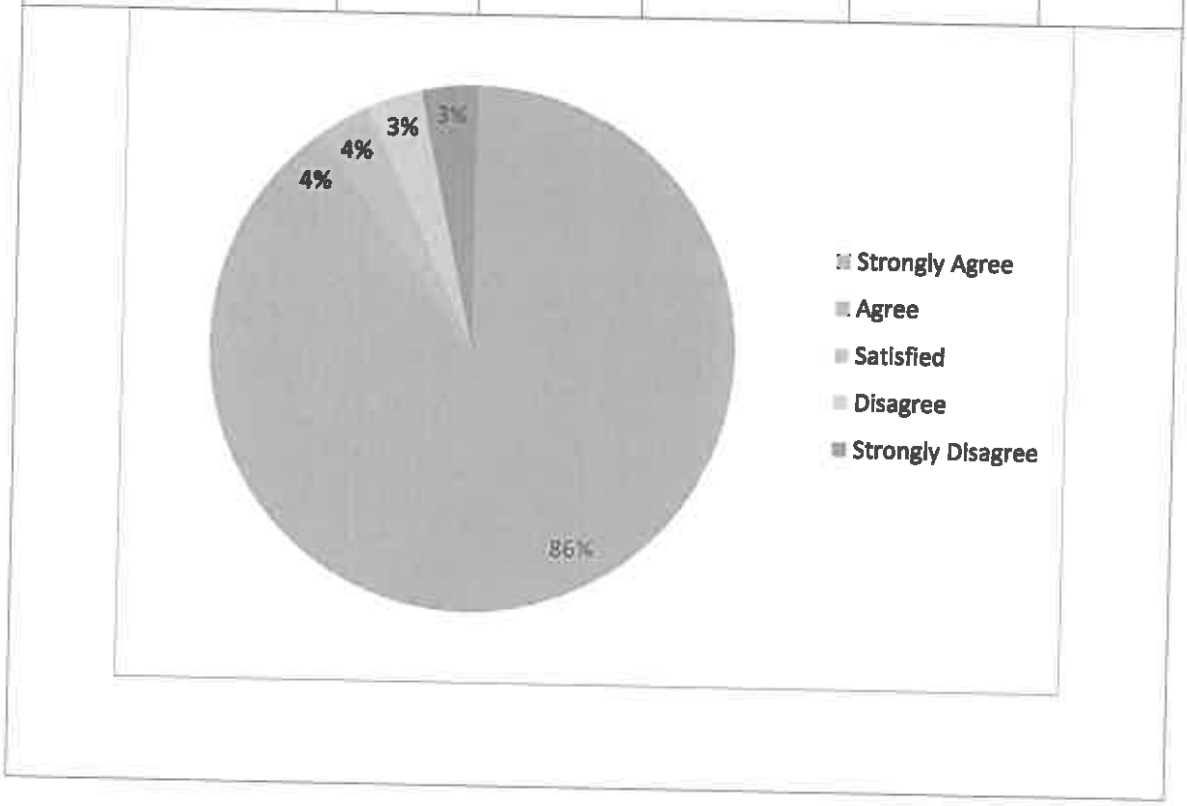
The curriculum provides ample knowledge for increased employability and to promote students for higher education.	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	79.31	6.90	6.90	3.45	3.45



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Babu Vijendra Marg, Adarsh Institutional
Area Gangoh, Distt. Saharanpur (U.P.)
247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

Q.7 The curriculum helps in enhancing problem solving capability related to local/global societal issues.

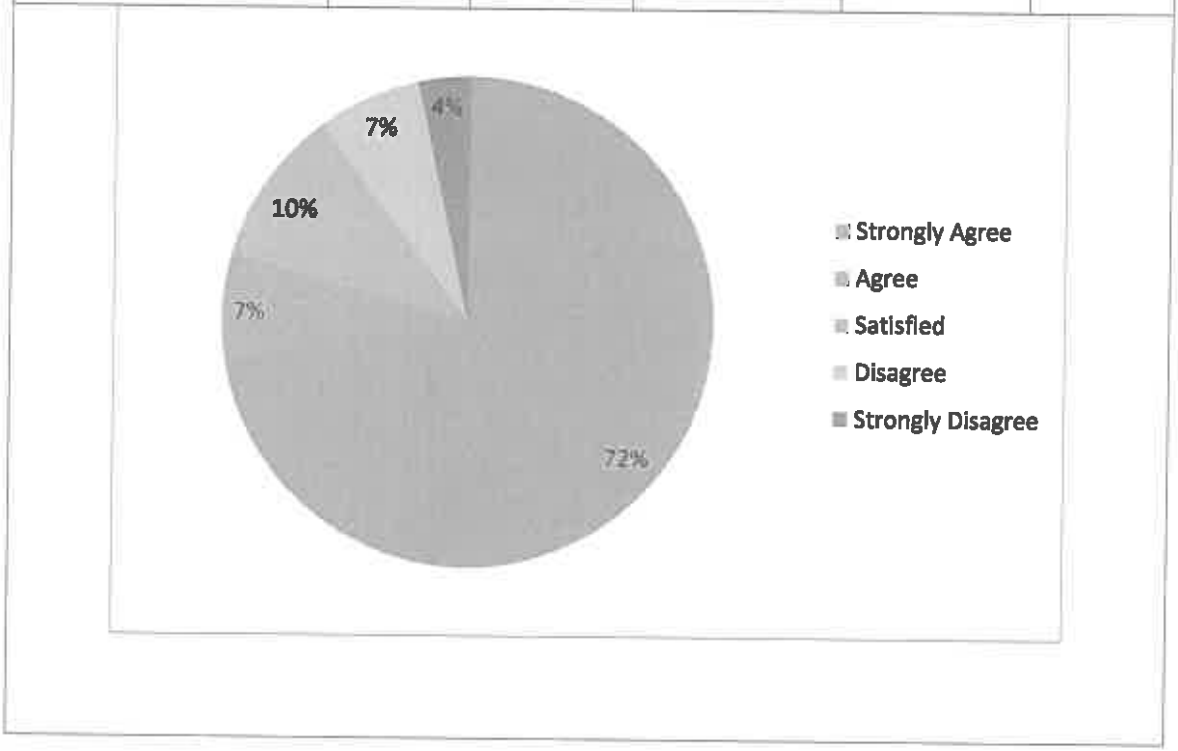
The curriculum helps in enhancing problem solving capability related to local/global societal issues.	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	86.21	3.45	3.45	3.45	3.45



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Babu Vijendra Marg, Adarsh Institutional
Area Gangoh, Distt. Saharanpur (U.P.)
247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U: www.sug.ac.in

Q.8 Adequate freedom is given to offer opinion on design & development of curriculum.

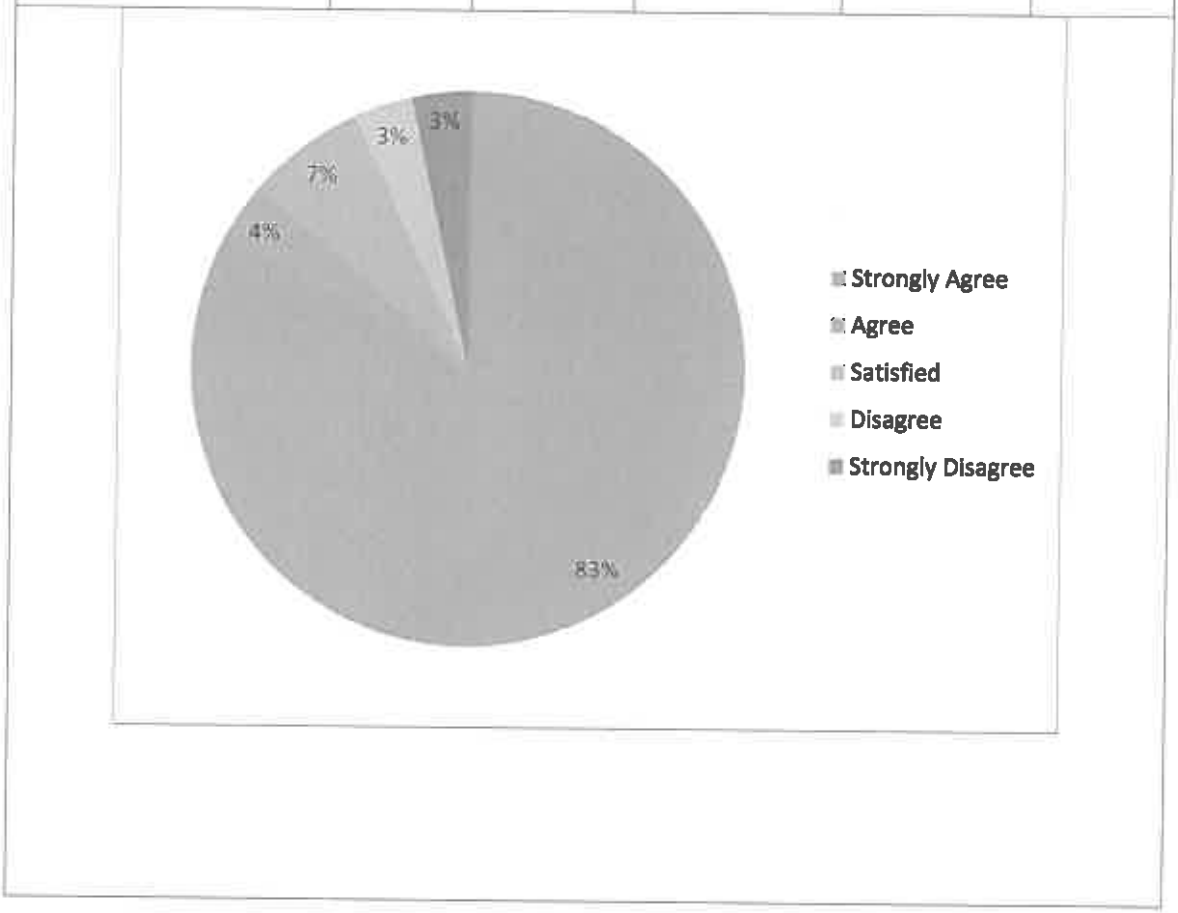
Adequate freedom is given to offer opinion on design & development of curriculum.	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	72.41	6.90	10.34	6.90	3.45



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Babu Vijendra Marg, Adarsh Institutional
Area Gangoh, Distt. Saharanpur (U.P.)
247341, India
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U.: www.sug.ac.in

Q.9 The existing system for curriculum revision is found to be effective.

The existing system for curriculum revision is found to be effective.	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	82.76	3.45	6.90	3.45	3.45



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School of Engineering and Technology(29)

Total no. of Teachers : 29		Strongly Agree	Agree	Satisfied	Disagree	Strongly Disagree
The curriculum is well organized and balanced for the programme with proper credit allocation.	No. of Teachers	24.00	2.00	1.00	1.00	1.00
	Percentage	82.76	6.90	3.45	3.45	3.45
The courses have adequate balance between theory and application for student's holistic development.	No. of Teachers	23.00	2.00	2.00	1.00	1.00
	Percentage	79.31	6.90	6.90	3.45	3.45
The curriculum has adequate scope for multidisciplinary knowledge and sufficient number of elective courses.	No. of Teachers	21.00	3.00	2.00	2.00	1.00
	Percentage	72.41	10.34	6.90	6.90	3.45
The curriculum has focus on personality development by presence of courses on human values and professional ethics	No. of Teachers	25.00	1.00	1.00	1.00	1.00
	Percentage	86.21	3.45	3.45	3.45	3.45
The curriculum provides enough scope for improving entrepreneurial skill as well as industry	No. of Teachers	22.00	2.00	2.00	1.00	2.00
	Percentage	75.86	6.90	6.90	3.45	6.90

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Babu Vijendra Marg, Adarsh Institutional
Area Gangoh, Distt. Saharanpur (U.P.)
247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

readiness.						
The curriculum provides ample knowledge for increased employability and to promote students for higher education.	No. of Teachers	23.00	2.00	2.00	1.00	1.00
	Percentage	79.31	6.90	6.90	3.45	3.45
The curriculum helps in enhancing problem solving capability related to local/global societal issues	No. of Teachers	25.00	1.00	1.00	1.00	1.00
	Percentage	86.21	3.45	3.45	3.45	3.45
Adequate freedom is given to offer opinion on design & development of curriculum.	No. of Teachers	21.00	2.00	3.00	2.00	1.00
	Percentage	72.41	6.90	10.34	6.90	3.45
The existing system for curriculum revision is found to be effective.	No. of Teachers	24.00	1.00	2.00	1.00	1.00
	Percentage	82.76	3.45	6.90	3.45	3.45

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Babu Vijendra Marg, Adarsh Institutional
Area Gangoh, Distt. Saharanpur (U.P.)
247341, India
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U.: www.sug.ac.in

Analysis of Feedback:

The overall feedback from teachers shows high satisfaction, with most aspects of the curriculum rated at 93.10%, indicating a well-structured program with balanced credit allocation and a good mix of theoretical and practical learning. Human values and professional ethics are effectively integrated, receiving positive feedback (93.10%), emphasizing the holistic development of students.

The curriculum offers flexibility, as seen in the 89.66% satisfaction with electives and the inclusion of multidisciplinary knowledge. This allows students to broaden their academic horizons. Teachers also appreciate the curriculum's emphasis on entrepreneurship and industry readiness (89.66%), preparing students for real-world challenges.

In terms of employability and problem-solving skills, the curriculum received a 93.10% satisfaction rating, demonstrating its relevance to current global and societal needs. Additionally, teachers' involvement in curriculum development (89.66%) and the curriculum revision system (93.10%) reflect an institutional commitment to continuous improvement and ensuring the curriculum stays relevant to industry needs and academic standards.

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EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional
Area Gangoh, Distt. Saharanpur (U.P.)
247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

Action Taken Report

(School of Engineering and Technology)

Sr. No.	Suggestions	Action taken	Outcome
1	Strengthen the integration of theory and practical learning.	Introduced more hands-on learning experiences, including industry-sponsored projects, lab-based exercises, and real-world engineering problems in courses. Increased partnerships with engineering firms for internships and collaborative research.	Students reported improved practical skills and better application of theoretical knowledge in real-world scenarios. Faculty observed an increase in student confidence and problem-solving capabilities.
2	Expand the scope for multidisciplinary learning and elective courses.	Added new electives in emerging fields such as artificial intelligence, renewable energy, and data science. Facilitated cross-department collaboration with the School of Computer Science, School of Environmental Sciences, and School of Business Studies for multidisciplinary projects and joint courses.	Students appreciated the broader academic options, allowing them to specialize or diversify their learning. Interdisciplinary courses provided a more holistic approach to engineering education, broadening students' perspectives.
3	Further enhance entrepreneurial skills and industry readiness.	Launched an entrepreneurship track within the curriculum, including startup incubation, patent law, and market research. Partnered with local tech incubators to provide mentorship and funding opportunities for student projects.	Several students started their own tech ventures or joined industry incubators, gaining entrepreneurial skills. Industry partners noted the increased industry-readiness of students graduating from the program.
4	Strengthen the curriculum revision process to remain aligned with current industry and academic trends.	Established an advisory board consisting of industry experts, alumni, and faculty members to ensure the curriculum reflects current technological trends and market needs. Incorporated regular feedback loops from both students and industry partners to guide revisions.	The curriculum became more adaptable to changes in technology and industry demands. Faculty and students noted that the updates kept their learning experiences relevant to the rapidly changing engineering landscape.

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

18th Meeting of BOS (Item No. 4 Annexure -4)

SHOBHIT UNIVERSITY GANGOH

SCHOOL OF ENGINEERING AND TECHNOLOGY

List of Examiners (2021-2022)

Sr. No.	Course code with Title	Name, Designation, Institution and Correspondence address of the Paper Setter/Examiner	Contact number with E. Mail ID
1	OOPS Using C++ (BCA-201)	External Examiner 1. Dr. Abahay Bhatia	dr.abhay@ritrookee.ac.in, 9837386973
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com, 97604492192
		3. Dr. Mamta	mamta.bansal345@gmail.com,9997025606
		Internal Examiner 1. Dr. Tarun Kumar Sharma	Tarun.sharma@shobhituniversity.ac.in, 9456086759
		2. Mr. Vinod Kumar	Vinod.kumar@shobhituniversity.ac.in, 9758749227
2	Database Management Systems(BCA-202)	External Examiner 1. Dr. Abahay Bhatia	dr.abhay@ritrookee.ac.in, 9837386973
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com, 97604492192
		3. Dr. Mamta	mamta.bansal345@gmail.com,9997025606
		Internal Examiner 1. Mr. Kuldeep Chauhan	Kuldeep.chauhan@shobhituniversity.ac.in, 9756997090
		2. Mr. Nitin Kumar	nitin.kumar@shobhituniversity.ac.in, 9758170029
3	Web & E-Commerce	External Examiner	

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

	Technologies(BCA-203)	1. Dr. Abahay Bhatia	dr.abhay@ritrookee.ac.in, 9837386973
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com, 97604492192
		3. Dr. Mamta	mamta.bansal345@gmail.com, 9997025606
		Internal Examiner 1. Mr. Nitin Kumar	nitin.kumar@shobhituniversity.ac.in, 9758170029
		2. Ms. Sumika Jain	Sumika.jai@shobhituniversity.ac.in, 9456666326
4	Discrete Structures(BCA-204)	External Examiner 1. Dr. Abahay Bhatia	dr.abhay@ritrookee.ac.in, 9837386973
		2. Dr. Mamta	mamta.bansal345@gmail.com, 9997025606
		3. Dr. Ankit Sharma	gurukul.ankit@gmail.com, 97604492192
		Internal Examiner 1. Mr. Vinod Kumar	
		2. Mr. Kuldeep Chauhan	Kuldeep.chauhan@shobhituniversity.ac.in, 9756997090
5	Environmental Studies(BCA-205)	External Examiner 1. Dr. Abahay Bhatia	dr.abhay@ritrookee.ac.in, 9837386973
		2. Dr. Mamta	mamta.bansal345@gmail.com, 9997025606
		3. Dr. Ankit Sharma	gurukul.ankit@gmail.com, 97604492192
		Internal Examiner 1. Mr. Vinod Kumar	Vinod.kumar@shobhituniversity.ac.in, 9758749227
		2. Ms. Sumika Jain	Sumika.jai@shobhituniversity.ac.in, 9456666326
6	OOPS Using C++	External Examiner	

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

	Lab(BCA-251)	1. Dr. Abahay Bhatia	dr.abhay@ritrookee.ac.in, 9837386973
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com, 97604492192
		3.Dr Mamta	mamta.bansal345@gmail.com,9997025606
		Internal Examiner 1. Mr. Vinod Kumar	Vinod.kumar@shobhituniversity.ac.in, 9758749227
		2. Ms. Sumika Jain	Sumika.jai@shobhituniversity.ac.in, 9456666326
7	Database Management Systems Lab(BCA-252)	External Examiner 1. Dr. Ankit Sharma	gurukul.ankit@gmail.com, 97604492192
		2. Dr. Abahay Bhatia	dr.abhay@ritrookee.ac.in, 9837386973
		3.dr Mamta	mamta.bansal345@gmail.com,9997025606
		Internal Examiner 1. Mr. Vinod Kumar	Vinod.kumar@shobhituniversity.ac.in, 9758749227
		2. Ms. Sumika Jain	Sumika.jai@shobhituniversity.ac.in, 9456666326
8	Seminar Based on Learning(BCA-253)	External Examiner 1. Dr. Abahay Bhatia	dr.abhay@ritrookee.ac.in, 9837386973
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com, 97604492192
		3. Dr. Mamta	mamta.bansal345@gmail.com,9997025606
		Internal Examiner 4. Dr. Tarun Kumar Sharma	Tarun.sharma@shobhituniversity.ac.in, 9456086759
		5. Mr. Vinod Kumar	Vinod.kumar@shobhituniversity.ac.in,

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

			9758749227
9	Data Structures(BCA-401)	External Examiner 1. Dr. Ankit Sharma	gurukul.ankit@gmail.com, 97604492192
		2. Dr. Mamta	
		3. Dr. Abahay Bhatia	dr.abhay@ritrookee.ac.in, 9837386973
		Internal Examiner 1. Dr. Tarun Kumar Sharma	Tarun.sharma@shobhituniversity.ac.in, 9456086759
		2. Mr. Vinod Kumar	Vinod.kumar@shobhituniversity.ac.in, 9758749227
10	Java Programming(BCA-402)	External Examiner 1. Dr. Ankit Sharma	gurukul.ankit@gmail.com, 97604492192
		2. Dr. Abahay Bhatia	dr.abhay@ritrookee.ac.in, 9837386973
		3. Dr. Mamta	mamta.bansal345@gmail.com, 9997025606
		Internal Examiner 1. Mr. Kuldeep Chauhan	Kuldeep.chauhan@shobhituniversity.ac.in, 9756997090
		2. Mr. Nitin Kumar	nitin.kumar@shobhituniversity.ac.in, 9758170029
11	Computer System Architecture(BCA-403)	External Examiner 1. Dr. Abahay Bhatia	dr.abhay@ritrookee.ac.in, 9837386973
		2. Dr. Mamta	mamta.bansal345@gmail.com, 9997025606
		3. Dr. Ankit Sharma	gurukul.ankit@gmail.com, 97604492192
		Internal Examiner 1. Dr. Tarun Kumar	Tarun.sharma@shobhituniversity.ac.in,

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

		Sharma	9456086759
		2. Mr. Vinod Kumar	Vinod.kumar@shobhituniversity.ac.in, 9758749227
12	Knowledge Management(BCA-404)	External Examiner 1. Dr. Abahay Bhatia	dr.abhay@ritrookee.ac.in, 9837386973
		2. Dr. Ankit Sharma.	gurukul.ankit@gmail.com, 97604492192
		3. Dr. Mamta	mamta.bansal345@gmail.com 9997025606
		Internal Examiner 1. 1.Mr. Kuldeep Chauhan	Kuldeep.chauhan@shobhituniversity.ac.in, 9756997090
		2. 2.Mr. Nitin Kumar	nitin.kumar@shobhituniversity.ac.in, 9758170029
13	Data Structures Lab(BCA-451)	External Examiner 1. 1. Dr. Mamta	mamta.bansal345@gmail.com 9997025606
		2. 2. Dr. Ankit Sharma	gurukul.ankit@gmail.com, 97604492192
		3. 3. Dr. Abahay Bhatia	dr.abhay@ritrookee.ac.in, 9837386973
		Internal Examiner 1. Dr. Varun Bansal	Varun.bansal@shobhituniversity.ac.in, 9411295559
		2. Mr. Vinod Kumar	Vinod.kumar@shobhituniversity.ac.in, 9758749227
14	Java Programming Lab(BCA-452)	External Examiner 1. Dr. Mamta	mamta.bansal345@gmail.com 9997025606
		2. Dr. Abahay Bhatia	dr.abhay@ritrookee.ac.in, 9837386973
		3. Dr. Ankit Sharma	gurukul.ankit@gmail.com, 97604492192

Shobhit University
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Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

		Internal Examiner 1. Dr. Varun Bansal	Varun.bansal@shobhituniversity.ac.in, 9411295559
		2. Mr. Vinod Kumar	Vinod.kumar@shobhituniversity.ac.in, 9758749227
15	Computer System Architecture Lab(BCA-453)	External Examiner 1. Dr. Mamta	mamta.bansal345@gmail.com 9997025606
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com, 97604492192
		3. Dr. Abahay Bhatia	dr.abhay@ritrookee.ac.in, 9837386973
		Internal Examiner 1. Mr. Kuldeep Chauhan	Kuldeep.chauhan@shobhituniversity.ac.in, 9756997090
		2. Mr. Nitin Kumar	nitin.kumar@shobhituniversity.ac.in, 9758170029
16	Seminar Based on Learning(BCA-454)	External Examiner 1. Dr. Mamta	mamta.bansal345@gmail.com 9997025606
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com, 97604492192
		3. Dr. Abahay Bhatia	dr.abhay@ritrookee.ac.in, 9837386973
		Internal Examiner 3. Mr. Kuldeep Chauhan	Kuldeep.chauhan@shobhituniversity.ac.in, 9756997090
		4. Mr. Nitin Kumar	nitin.kumar@shobhituniversity.ac.in, 9758170029
17	Data Communication and Computer Networks(BCA-601)	External Examiner 1. Dr. Abahay Bhatia	dr.abhay@ritrookee.ac.in, 9837386973
		2. Dr. Mamta	mamta.bansal345@gmail.com 9997025606

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

		3. Dr. Ankit Sharma	gurukul.ankit@gmail.com, 97604492192
		Internal Examiner 6. Mr. Kuldeep Chauhan	Kuldeep.chauhan@shobhituniversity.ac.in, 9756997090
		7. Mr. Nitin Kumar	nitin.kumar@shobhituniversity.ac.in, 9758170029
18	Artificial Intelligence(BCA-602)	External Examiner 1. Dr. Ankit Sharma	gurukul.ankit@gmail.com, 97604492192
		2. Dr. Mamta	mamta.bansal345@gmail.com 9997025606
		3. Dr. Abahay Bhatia	dr.abhay@ritrookee.ac.in, 9837386973
		Internal Examiner 5. Mr. Kuldeep Chauhan	Kuldeep.chauhan@shobhituniversity.ac.in, 9756997090
		6. Mr. Nitin Kumar	nitin.kumar@shobhituniversity.ac.in, 9758170029
19	Cyber Security & Cyber Laws(BCA-603)	External Examiner 1. Dr. Abahay Bhatia	dr.abhay@ritrookee.ac.in, 9837386973
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com, 97604492192
		3. Dr. Mamta	mamta.bansal345@gmail.com 9997025606
		Internal Examiner 8. Mr. Kuldeep Chauhan	Kuldeep.chauhan@shobhituniversity.ac.in, 9756997090
		9. Mr. Nitin Kumar	nitin.kumar@shobhituniversity.ac.in, 9758170029
20	Software Project management(BCA-604)	External Examiner 1. Dr. Mamta	mamta.bansal345@gmail.com 9997025606
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com, 97604492192

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional
Area Gangoh, Distt. Saharanpur (U.P.)
247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

		3. Dr. Abahay Bhatia	dr.abhay@ritrookee.ac.in, 9837386973
		Internal Examiner Ms. Sumika Jain	Sumika.jai@shobhituniversity.ac.in, 9456666326
		Mr. Vinod Kumar	Vinod.kumar@shobhituniversity.ac.in, 9758749227
21	Computer Networks Lab(BCA-651)	External Examiner 1. Dr. Mamta	mamta.bansal345@gmail.com, 9997025606
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com, 97604492192
		3. Dr. Abahay Bhatia	dr.abhay@ritrookee.ac.in, 9837386973
		Internal Examiner 1. Mr. Kuldeep Chauhan	Kuldeep.chauhan@shobhituniversity.ac.in, 9756997090
		2. Mr. Nitin Kumar	nitin.kumar@shobhituniversity.ac.in, 9758170029
22	Seminar and Group Discussion(BCA-656)	External Examiner 1. Dr. Ankit Sharma	gurukul.ankit@gmail.com, 97604492192
		2. Dr. Mamta	mamta.bansal345@gmail.com, 9997025606
		3. Dr. Abahay Bhatia	dr.abhay@ritrookee.ac.in, 9837386973
		Internal Examiner 1. Ms. Sumika Jain	Sumika.jai@shobhituniversity.ac.in, 9456666326
		2. Mr. Vinod Kumar	Vinod.kumar@shobhituniversity.ac.in, 9758749227
23	Research Project-II (BCA-658)	External Examiner Dr. Abahay Bhatia	dr.abhay@ritrookee.ac.in, 9837386973

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

		Dr. Ankit Sharma	gurukul.ankit@gmail.com, 97604492192
		Dr. Mamta	mamta.bansal345@gmail.com 9997025606
		Internal Examiner 1. Ms. Sumika Jain	Sumika.jai@shobhituniversity.ac.in 9456666326
		2. Mr. Vinod Kumar	Vinod.kumar@shobhituniversity.ac.in 9758749227

MCA List of Examiners (2021-2022)

Sr. No.	Course code with Title	Name, Designation, Institution and Correspondence address of the Paper Setter/Examiner	Contact number with E. Mail ID
1	Software Engineering & Project Management (MCA-201)	External Examiner 1. Dr. Abhay Bhatia	Dr.abhay@ritroorkee.ac.in 9837386973
		2. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		3. Dr. Mamta Bansal	Mamta.bansal345@gmail.com 9997025606
		Internal Examiner 1. Mr. Jitendra K. Saini	Jitendra.saini@shobhituniversity.ac.in 7669110295
		2. Mr. Shahnawaaj	Mohd.shahnawaz@shobhituniversity.ac.in 9536940100
2.	ASP .Net(MCA-202)	External Examiner 1. Dr. Ankit Sharma	Gurukul.ankit@gmail.com 9760492192
		2. Dr. Arun Giri	Arungiri123@yahoo.com 981880953
		3. Dr. Nidhi Tyagi	Nidhi.tyagi9785@gmail.com 9927007273
		Internal Examiner 1. Dr. Varun Bansal	Varun.bansal@shobhituniversity.ac.in 9675478559
		2. Mr. Shubham Kumar	Shubham.k@shobhituniversity.ac.in 7895408519

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional
Area Gangoh, Distt. Saharanpur (U.P.)
247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U: www.sug.ac.in

3.	Python(MCA-203)	External Examiner 1. Dr. Ankit Sharma	Gurukul.ankit@gmail.com 9760492192
		2. Dr. Arun Giri	Arungiri123@yahoo.com 981880953
		3. Dr. Nidhi Tyagi	Nidhi.tyagi9785@gmail.com 9927007273
		Internal Examiner 1. Dr. Tarun Kumar Sharma	Tarun.sharma@shobhituniversity.ac.in 9456086759
		2. Mr. Vinod Kumar	Vinod.kumar@shobhituniversity.ac.in 9758749227
4.	Artificial Intelligence(MCA-204)	External Examiner 1. Dr. Nidhi Tyagi	Nidhi.tyagi9785@gmail.com 9927007273
		2. Dr. Mamta Bansal	Mamta.bansal345@gmail.com 9997025606
		3. Dr. Abhay Bhatia	Dr.abhay@ritroorkee.ac.in 9837386973
		Internal Examiner 1. Mr. Jitendra K. Saini	Jitendra.saini@shobhituniversity.ac.in 7669110295
		2. Dr. Tarun Kumar Sharma	Tarun.sharma@shobhituniversity.ac.in 9456086759
5.	Distributed Operating System (MCA-231)	External Examiner 1. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		2. Dr. Ankit Sharma	Gurukul.ankit@gmail.com 9760492192
		3. Dr. Arun Giri	Arungiri123@yahoo.com 981880953
		Internal Examiner 1. Dr. Varun Bansal	Varun.bansal@shobhituniversity.ac.in 9675478559
		2. Mr. Jitendra K. Saini	Jitendra.saini@shobhituniversity.ac.in 7669110295
6.	Lab Software Engineering and Project Management	External Examiner 1. Dr. Ankit Sharma	Gurukul.ankit@gmail.com 9760492192
		2. Dr. Arun Giri	Arungiri123@yahoo.com 981880953

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional
Area Gangoh, Distt. Saharanpur (U.P.)
247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

	(MCA-251)	3. Dr. Nidhi Tyagi	Nidhi.tyagi9785@gmail.com 9927007273
		Internal Examiner 1. Dr. Varun Bansal	Varun.bansal@shobhituniversity.ac.in 9675478559
		2. Ms. Sumika Jain	Sumika.jain@shobhituniversity.ac.in 9456666326
7.	Lab ASP. Net (MCA-252)	External Examiner 1. Dr. Nidhi Tyagi	Nidhi.tyagi9785@gmail.com 9927007273
		2. Dr. Mamta Bansal	Mamta.bansal345@gmail.com 9997025606
		3. Dr. Abhay Bhati	Dr.abhay@ritroorkee.ac.in 9837386973
		Internal Examiner 1. Mr. Jitendra K. Saini	Jitendra.saini@shobhituniversity.ac.in 7669110295
		2. Mr. Shahnawaj	Mohd.shahnawaz@shobhituniversity.ac.in 9536940100
8.	Lab Python (MCA-253)	External Examiner 1. Dr. Mamta Bansal	Mamta.bansal345@gmail.com 9997025606
		2. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		3. Dr. Abhay Bhatia	Dr.abhay@ritroorkee.ac.in 9837386973
		Internal Examiner 1. Dr. Varun Bansal	Varun.bansal@shobhituniversity.ac.in 9675478559
		2. Ms. Sumika Jain	Sumika.jain@shobhituniversity.ac.in 9456666326
9.	MAJOR PROJECT PRESENTATION & VIVA(MCA-462)	External Examiner 1. Dr. Arun Giri	Arungiri123@yahoo.com 981880953
		2. Dr. Nidhi Tyagi	Nidhi.tyagi9785@gmail.com 9927007273
		3. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		Internal Examiner	Vinod.kumar@shobhituniversity.ac.in

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

		1. Mr. Vinod Kumar	9758749227
		2. Mr. Anuj Kumar	Anju.k@shobhituniversity.ac.in 7249989555

M.Tech List of Examiners (2021-2022)

Sr. No.	Course code with Title	Name, Designation, Institution and Correspondence address of the Paper Setter/Examiner	Contact number with E. Mail ID
1.	Resource Management of Computer Systems CE- 502	External Examiner 1. Dr. Arun Giri	arungiri123@yahoo.com 9818809053
		2. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		3. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		Internal Examiner 1. Ms. Sumika Jain	sumika.jain@shobhituniversity.ac.in 9456666326
		2. Mr. Raveendra Kr. Bharati	raveendra.bharati@shobhituniversity.ac.in 9953328744
2.	Soft Computing CE-504	External Examiner 1. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192
		3. Dr. Mamta Bansal	mamta.bansal345@gmail.com 9997025606
		Internal Examiner	anil.nishad@shobhituniversity.ac.in

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

		1. Mr. Raveendra Kr. Bharati	8171418088
		2. Mr. Kuldeep Chauhan	kuldeep.chauhan@shobhituniversity.ac.in 9756997090
3.	High Performance Computer Architecture CE- 506	External Examiner 1. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		2. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		3. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		Internal Examiner 1. Mr. Varun Bansal	varun.bansal@shobhituniversity.ac.in 9675478559
		2. Mr. Nitin Kumar	nitin.kumar@shobhituniversity.ac.in 9758170029
4.	Mobile & Wireless Communication CE-522	External Examiner 1. Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192
		2. Dr. Mamta Bansal	mamta.bansal345@gmail.com 9997025606
		3. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		Internal Examiner 1. Mr. Raveendra Kr. Bharati	anil.nishad@shobhituniversity.ac.in 8171418088
		2. Mr. Kuldeep Chauhan	kuldeep.chauhan@shobhituniversity.ac.in 9756997090
5.	Operating systems	External Examiner	dr.abhay@ritroorkee.ac.in

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

	Lab CE-552	1. Dr. Abhay Bhatia	9837386973
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192
		3. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		Internal Examiner 1. Mr. Vinod Kumar	vinod.kumar@shobhituniversity.ac.in 9758749227
		2. Ms. Sumika Jain	sumika.jain@shobhituniversity.ac.in 9456666326
6.	Seminar-II CE-582	External Examiner 1. Dr. Abhay Bhatia	dr.abhav@ritroorkee.ac.in 9837386973
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192
		3. Dr. Mamta Bansal	mamta.bansal345@gmail.com 9997025606
		Internal Examiner 1. Mr. Madhav P. Namdev	Madhav.namdev@shobhituniversity.ac.in 94572731592
		2. Mr. Raveendra Kr. Bharati	raveendra.bharati@shobhituniversity.ac.in 9953328744
7.	Dissertation CE- 692	External Examiner 1. Dr. Arun Giri	arungiri123@yahoo.com 9818809053
		2. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		3. Dr. Maheep Singh	kingmaheep@gmail.com

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Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

			9411293327
		Internal Examiner 1. Mr. Varun Bansal	varun.bansal@shobhituniversity.ac.in 9675478559
		2. Mr. Nitin Kumar	nitin.kumar@shobhituniversity.ac.in 9758170029

B.tech CSE (Examiner)

Sr. No.	Course code with Title	Name, Designation, Institution and Correspondence address of the Paper Setter/Examiner	Contact number with E. Mail ID
1.	MATHEMATICS-II (CMAN 102)	External Examiner 4. Dr. Arun Giri	arungiri123@yahoo.com 9818809053
		5. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		6. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		Internal Examiner 1. Dr. Vishvas Chand	vishvas.chand@shobhituniversity.ac.in 9286093196
		2. Mr. Abdulla Khan	abdulla.khan@shobhituniversity.ac.in 7454976780
2.	ENGINEERING PHYSICS (CPHN 102)	External Examiner 4. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		5. Dr. Maheep Singh	kingmaheep@gmail.com

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional
Area Gangoh, Distt. Saharanpur (U.P.)
247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.su.ac.in

			9411293327
		6. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		Internal Examiner 1. Mohd Ahamad	mohd.ahamad@shobhituniversity.ac.in 9548159750
		2. Mr. Hamid Ali	hamid.ali@shobhituniversity.ac.in 9759302770
3.	COMPUTER FUNDAMENTALS AND PROGRAMMING USING-C (CCSN 102)	External Examiner 4. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		5. Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192
		6. Dr. Mamta Bansal	mamta.bansal345@gmail.com 9997025606
		Internal Examiner 1. Mr. Varun Bansal	varun.bansal@shobhituniversity.ac.in 9675478559
		2. Mr. Kuldeep Chauhan	kuldeep.chauhan@shobhituniversity.ac.in 9756997090
4.	BASICS OF ELECTRICAL ENGINEERING (CEEN 102)	External Examiner 1. Dr. Arun Giri	arungiri123@yahoo.com 9818809053
		2. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		3. Dr. Maheep Singh	kingmaheep@gmail.com

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.suz.ac.in

			9411293327
		Internal Examiner 1. Dr. Jasvir Singh Rana	jasvirsingh.rana@shobhituniversity.ac.in 9759233859
		2. Mr. Shoyab Hussain	shoyab.hussain@shobhituniversity.ac.in 9837446390
5.	TECHNICAL COMMUNICATION (CPCN 102)	External Examiner 1. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		2. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		3. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		Internal Examiner 1. Mr. Dhruv Joshi	dhruv.joshi@shobhituniversity.ac.in 7302702677
		2. Ms. Abhilasha R. Goel	abhilasha.goyal@shobhituniversity.ac.in 8392821112
6.	ENGINEERING PHYSICS LAB (CPHN 152)	External Examiner 1. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192
		3. Dr. Mamta Bansal	mamta.bansal345@gmail.com 9997025606
		Internal Examiner	mohd.ahamad@shobhituniversity.ac.in

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

		1. Mohd Ahamad	9548159750
		2. Mr. Hamid Ali	hamid.ali@shobhituniversity.ac.in 9759302770
7.	COMPUTER PROGRAMMING USING C LAB (CCSN 152)	External Examiner 1. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		2. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		3. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		Internal Examiner 1. Mr. Varun Bansal	varun.bansal@shobhituniversity.ac.in 9675478559
		2. Mr. Kuldeep Chauhan	kuldeep.chauhan@shobhituniversity.ac.in 9756997090
8.	BASIC ELECTRICAL ENGINEERING LAB (CEEN 152)	External Examiner 1. Dr. Arun Giri	arungiri123@yahoo.com 9818809053
		2. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		3. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		Internal Examiner 1. Dr. Jasvir Singh Rana	jasvirsingh.rana@shobhituniversity.ac.in 9759233859
		2. Mr. Shoyab Hussain	shoyab.hussain@shobhituniversity.ac.in

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U: www.sug.ac.in

			9837446390
9.	OBJECT ORIENTED PROGRAMMING USING C++ (CCSN 202)	External Examiner 1. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192
		3. Dr. Mamta Bansal	mamta.bansal345@gmail.com 9997025606
		Internal Examiner 1. Dr. Tarun Kumar Sharma	tarun.sharma@shobhituniversity.ac.in 9456086759
		2. Mr. Vinod Kumar	vinod.kumar@shobhituniversity.ac.in 9758749227
10.	DESIGN AND ANALYSIS OF ALGORITHMS (CCSN 204)	External Examiner 1. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		2. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		3. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		Internal Examiner 1. Mr. Varun Bansal	varun.bansal@shobhituniversity.ac.in 9675478559
		2. Mr. Nitin Kumar	nitin.kumar@shobhituniversity.ac.in 9758170029
11.	INTERNET AND	External Examiner	dr.abhay@ritroorkee.ac.in

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

	WEB TECHNOLOGY (CCSN 206)	1. Dr. Abhay Bhatia	9837386973
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192
		3. Dr. Mamta Bansal	mamta.bansal345@gmail.com 9997025606
		Internal Examiner 1. Mr. Varun Bansal	varun.bansal@shobhituniversity.ac.in 9675478559
		2. Mr. Kuldeep Chauhan	kuldeep.chauhan@shobhituniversity.ac.in 9756997090
12.	COMPUTER NETWORKS (CCSN 208)	External Examiner 1. Dr. Arun Giri	arungiri123@yahoo.com 9818809053
		2. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		3. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		Internal Examiner 1. Mr. Varun Bansal	varun.bansal@shobhituniversity.ac.in 9675478559
		2. Mr. Kuldeep Chauhan	kuldeep.chauhan@shobhituniversity.ac.in 9756997090
13.	FORMAL LANGUAGES & AUTOMATION THEORY	External Examiner 1. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		2. Dr. Maheep Singh	kingmaheep@gmail.com

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

	(CCSN 210)		9411293327
		3. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		Internal Examiner 1. Mr. Nitin Kumar	nitin.kumar@shobhituniversity.ac.in 9758170029
		2. Ms. Sumika Jain	sumika.jain@shobhituniversity.ac.in 9456666326
14.	TECHNICAL ENGLISH (CBSN 202)	External Examiner 1. Dr. Arun Giri	arungiri123@yahoo.com 9818809053
		2. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		3. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		Internal Examiner 1. Dr. Jasvir Singh Rana	jasvirsingh.rana@shobhituniversity.ac.in 9759233859
		2. Mr. Shoyab Hussain	shoyab.hussain@shobhituniversity.ac.in 9837446390
15.	OBJECT ORIENTED PROGRAMMING USING C++ LAB (CCSN 252)	External Examiner 1. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192
		3. Dr. Mamta Bansal	mamta.bansal345@gmail.com

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Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

			9997025606
		Internal Examiner 1. Dr. Tarun Kumar Sharma	tarun.sharma@shobhituniversity.ac.in 9456086759
		2. Mr. Vinod Kumar	vinod.kumar@shobhituniversity.ac.in 9758749227
16.	DESIGN AND ANALYSIS OF ALGORITHMS LAB (CCSN 254)	External Examiner 1. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		2. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		3. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		Internal Examiner 1. Mr. Varun Bansal	varun.bansal@shobhituniversity.ac.in 9675478559
		2. Mr. Nitin Kumar	nitin.kumar@shobhituniversity.ac.in 9758170029
17.	INTERNET AND WEB TECHNOLOGY LAB (CCSN 256)	External Examiner 1. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192
		3. Dr. Mamta Bansal	mamta.bansal345@gmail.com 9997025606
		Internal Examiner	varun.bansal@shobhituniversity.ac.in

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional
Area Gangoh, Distt. Saharanpur (U.P.)
247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

		1. Mr. Varun Bansal	9675478559
		2. Mr. Kuldeep Chauhan	kuldeep.chauhan@shobhituniversity.ac.in 9756997090
18.	COMPUTER GRAPHICS (CCSN 302)	External Examiner 1. Dr. Arun Giri	arungiri123@yahoo.com 9818809053
		2. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		3. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		Internal Examiner 1. Dr. Tarun Kumar Sharma	tarun.sharma@shobhituniversity.ac.in 9456086759
		2. Ms. Sumika Jain	sumika.jain@shobhituniversity.ac.in 9456666326
19.	DATA WAREHOUSING & DATA MINING (CCSN 304)	External Examiner 1. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192
		3. Dr. Mamta Bansal	mamta.bansal345@gmail.com 9997025606
		Internal Examiner 1. Mr. Varun Bansal	varun.bansal@shobhituniversity.ac.in 9675478559
		2. Ms. Sumika Jain	sumika.jain@shobhituniversity.ac.in

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

			9456666326
20.	MOBILE COMPUTING (CCSN 306)	External Examiner 1. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		2. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		3. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		Internal Examiner 1. Ms. Sumika Jain	sumika.jain@shobhituniversity.ac.in 9456666326
		2. Mr. Nitin Kumar	nitin.kumar@shobhituniversity.ac.in 9758170029
21.	KNOWLEDGE MANAGEMENT & EXPERT SYSTEM (CCSN 308)	External Examiner 1. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192
		3. Dr. Mamta Bansal	mamta.bansal345@gmail.com 9997025606
		Internal Examiner 1. Dr. Mahipal Singh	registrargangoh@shobhituniversity.ac.in 9759174581
		2. Dr. Shri Kant Gupta	shrikant.gupta@shobhituniversity.ac.in 8279909590

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

22.	SOFTWARE PROJECT MANAGEMENT (CUCS 342)	External Examiner 1. Dr. Arun Giri	arungiri123@yahoo.com 9818809053
		2. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		3. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		Internal Examiner 1. Mr. Kuldeep Chauhan	kuldeep.chauhan@shobhituniversity.ac.in 9756997090
		2. Ms. Sumika Jain	sumika.jain@shobhituniversity.ac.in 9456666326
23.	ENVIRONMENTAL STUDIES (CBSN 302)	External Examiner 1. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192
		3. Dr. Mamta Bansal	mamta.bansal345@gmail.com 9997025606
		Internal Examiner 1. Dr. Jasvir Singh Rana	jasvirsingh.rana@shobhituniversity.ac.in 9759233859
		2. Mr. Shoyab Hussain	shoyab.hussain@shobhituniversity.ac.in 9837446390
24.	COMPUTER	External Examiner	dr.abhay@ritroorkee.ac.in

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

	GRAPHICS LAB (CCSN 352)	1. Dr. Abhay Bhatia	9837386973
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192
		3. Dr. Mamta Bansal	mamta.bansal345@gmail.com 9997025606
		Internal Examiner 1. Dr. Tarun Kumar Sharma	tarun.sharma@shobhituniversity.ac.in 9456086759
		2. Ms. Sumika Jain	sumika.jain@shobhituniversity.ac.in 9456666326
25.	DATA WAREHOUSING & DATA MINING LAB (CCSN 354)	External Examiner 1. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		2. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		3. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		Internal Examiner 1. Mr. Varun Bansal	varun.bansal@shobhituniversity.ac.in 9675478559
		2. Ms. Sumika Jain	sumika.jain@shobhituniversity.ac.in 9456666326
26.	MINI PROJECT (CCSN 356)	External Examiner 1. Dr. Arun Giri	arungiri123@yahoo.com 9818809053
		2. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com

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EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341. India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

			9927007273
		3. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		Internal Examiner 1. Dr. Tarun Kumar Sharma	tarun.sharma@shobhituniversity.ac.in 9456086759
		2. Mr. Varun Bansal	varun.bansal@shobhituniversity.ac.in 9675478559
27.	INTERNSHIP AND Report Presentation (CCSN 462)	External Examiner 1. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		2. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		3. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		Internal Examiner 1. Dr. Mahipal Singh	registrargangh@shobhituniversity.ac.in 9759174581
		2. Dr. Tarun Kumar Sharma	tarun.sharma@shobhituniversity.ac.in 9456086759

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Babu Vijendra Marg, Adarsh Institutional
Area Gangoh, Distt. Saharanpur (U.P.)
247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.R.: www.sug.ac.in

SHOBHIT UNIVERSITY GANGOH
School of Engineering and Technology

Date: 09/06/2022

NOTICE

Subject: Meeting of the Board of Studies

All members of the Board of Studies are hereby informed that a meeting will be held as per the following details:

Date: 23/06/2022
Time: 10.00 AM
Venue: SOET, Shobhit University, Gangoh

Agenda:

1. Confirmation of minutes of the previous meeting
2. Approval of Examiners (Theory & Practical) and Paper Setters for the odd semester courses in BCA, MCA, B.Tech & M.Tech for session **July to Dec. 2022.**
3. Discussion on the value Added courses offered for students and ratification of the same.
4. Any other matter with the permission of the Chair

All members are requested to make it convenient to attend the meeting and come prepared with relevant documents and suggestions.

Prof.(Dr.) Varun Bansal
Chairperson, Board of Studies
Head of the Department
09/06/2022

School of Engineering and Technology ★ Shobhit University Gangoh ★

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Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

SHOBHIT UNIVERSITY GANGOH
School of Engineering and Technology

Date: 09/06/2022

To
Dr. Rajesh Kumar Saini
Head of the Department
Dept. of Mathematics Science and Computer Application
Bundelkhand University, Jhansi

Subject: Invitation to Attend the Board of Studies Meeting

Dear Sir

Greetings from School of Engineering and Technology

We are pleased to invite you to participate as an external subject expert in the upcoming meeting of the Board of Studies for the School of Engineering and Technology, scheduled as follows:

Date: 23/06/2022
Time: 10.00 AM
Mode: SOET, Shobhit University, Gangoh

The meeting will deliberate on important academic matters including syllabus revision, new course proposals, and academic planning for the upcoming session. Your expert insights and contributions would be invaluable to the academic enrichment of our programs.

We request you to kindly confirm your availability and mode of attendance at your earliest convenience. For online participation, a meeting link will be shared upon confirmation. If attending in person, necessary hospitality arrangements will be made.

We look forward to your positive response and support.

Thank you.

Warm regards,

Prof.(Dr.) Varun Bansal
Chairperson, Board of Studies

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail:
U.:

SHOBHIT UNIVERSITY GANGOH
School of Engineering and Technology

Date: 09/06/2022

To
Dr. Neeraj Singhal
Professor
School of Computer Science and Engineering
Sir Chhotu Ram Institute of Engineering & Technology

Subject: Invitation to Attend the Board of Studies Meeting

Dear Sir

Greetings from School of Engineering and Technology

We are pleased to invite you to participate as an external subject expert in the upcoming meeting of the Board of Studies for the School of Engineering and Technology, scheduled as follows:

Date: 23/06/2022
Time: 10.00 AM
Mode: SOET, Shobhit University, Gangoh

The meeting will deliberate on important academic matters including syllabus revision, new course proposals, and academic planning for the upcoming session. Your expert insights and contributions would be invaluable to the academic enrichment of our programs.

We request you to kindly confirm your availability and mode of attendance at your earliest convenience. For online participation, a meeting link will be shared upon confirmation. If attending in person, necessary hospitality arrangements will be made.

We look forward to your positive response and support.

Thank you.

Warm regards,

Prof. (Dr.) Varun Bansal
Chairperson, Board of Studies

School of Engineering and Technology
Shobhit University Gangoh

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Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U: www.su.ac.in

SHOBHIT UNIVERSITY GANGOH

School of Engineering and Technology

Date: 23/06/2022

Attendance Sheet (School of Engineering and Technology, BOS Meeting on 23/06/2022)

Sr. No	Name	External/Internal Member	Signature
1	Prof.(Dr.) Rajesh Kumar Saini	External Expert	
2	Dr. Neeraj Singhal	External Expert	
3	Dr. Mahipal Singh	Internal Member	
4	Dr. Jasvir Singh Rana	Internal Member	

Chairman

School of Engineering and Technology ★ Shobhit University Gangoh ★

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Babu Vijendra Marg, Adarsh Institutional
Area Gangoh, Distt. Saharanpur (U.P.)
247341, India
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U.: www.sug.ac.in

School of Engineering and Technology (Shobhit University, Gangoh)

Dated: 20th May,2022

Office Note

Sub: Regarding Constitution of Board of Studies (BOS)

School of Engineering and Technology (Shobhit University, Gangoh) requests the pleasure of Hon'ble Vice Chancellor, Shobhit University, Gangoh for the constitution of BOS for a period of three years w.e.f 12th June,2022. As per the schedule 8 of University Ordinance for UG/PG programme of School of Engineering and Technology (Relevant page is attached). The composition of faculty BOS is as follows: -

(i) Director/Principal/HoD of concerned Departments/College/Institute: **Chairperson**
(ii) All Professors of the concerned Departments/College/Institute: **Member(s)**
(iii) Two Associate Professors of the concerned Departments/College/Institute: **Member(s)**
(iv) Two Assistant Professors of the concerned Departments/College/Institute: **Member(s)**
(v) Two to four outside subject experts nominated by the Vice-Chancellor: **Member(s)** (Associate Professor or above or equivalent)

Following names are hereby proposed by the School of Engineering and Technology (Shobhit University, Gangoh) for BOS. Kindly approved it so that the necessary action be taken in due course of time

(i) Dr. Varun Bansal, Professor & Principal Chairman, Board of School of Engineering and Technology, Shobhit University Gangoh **Chairperson**
(ii) All Professor of the concerned Department **Member(s)**
- Dr. Jasveer Singh Rana

(iii) Two Associate Professor of the concerned Department **Members(s)**
(iv) Two Assistant Professor of the concerned Department **Members(s)**
- Mr. Vinod Kumar

(v) Kindly also approve any two of the following names as External Experts Member(s)

1. Dr. Neeraj Singhal Professor and Head, School of Computer Science and Application, Sir Chhotu Ram Institute of Engineering & Technology Contact no.- 9897037210, Email- Neeraj.singhal785@gmail.com
2. Dr. Rajesh Kumar Saini, Professor and Head, Dept. of Mathematics Science and Computer Application, Bundelkhand University, Jhansi Contact no. 9897596425, Email- Rajesh.saini4512@gmail.com
3. Dr. Mamta Bansal, Assistant Professor, Roorkee institute of technology, Roorkee, UK Contact no. 9997025606, Email- mamta.bansal345@gmail.com
4. Dr. Maheep Singh, Assistant Professor, Gurukul kangri University, Haridwar, UK Contact no. 9411293327, Email- kingmaheep@gmail.com

Submitted for approval please

VC
Approved

Dr. Varun Bansal
Head, Board of School of Engineering and Technology
Shobhit University Gangoh

Shobhit University
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Area Gangoh, Distt. Saharanpur (U.P.)
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U.: www.sug.ac.in

School of Engineering and Technology

Date: 23.06.2022

Minutes of the Meeting of Board of Studies

19th meeting of the Board of Studies of the School of Engineering and Technology, Shobhit University Gangoh was organized on 23rd June 2022 at 10:00 am onwards. The following members were present in the meeting:

1.	Prof. (Dr.) Varun Bansal Head of the Department Computer Science and Engineering Shobhit University Gangoh	Chairperson
2.	Prof. (Dr.) Rajesh Kumar Saini Head of the Department Dept. of Mathematics Science and Computer Application Bundelkhand University, Jhansi	External expert
3.	Dr. Neeraj Singhal Professor School of Computer Science and Engineering Sir Chhotu Ram Institute of Engineering & Technology	External Expert
4.	Dr. Mahipal Singh Professor School of Engineering and Technology Shobhit University Gangoh	Member
5.	Dr. Jasvir Singh Rana Professor School of Engineering and Technology Shobhit University Gangoh	Member

Welcome address by Chairman
The Chairman extended a warm welcome to all the members of Board of Studies and the following information was tabled before the members of the Board of Studies:

Input given by the Subject Experts on the Scheme and syllabi of the ongoing Batches.

The following discussed and approved on Choice Based Credit System:

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247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sng.ac.in

Item BOS 19.1: Approval of the Minutes of the 18th BOS Meeting held on 22 Dec. 2021 Was circulated among the members and the same were notified after the approval of the Board of Studies. {Annexure- 1}

Item BOS 19.2: Approval of Examiners (Theory & Practical) and Paper Setters for the odd semester courses in BCA , MCA , B. Tech , & M. Tech for session **July to Dec. 2022** The same is being sent to the Controller of Examinations, Shobhit University Gangoh, in a sealed cover. {Annexure-2}

Item BOS 19.3: Discussion on the Value Added courses offered for students and ratification of the same.

- BOS members approved the list of Value added courses offered to students.

The meeting ended with a vote of thanks to the Chairman, Board of Studies.

The suggestions given by the panel of BOS have been discussed with the Vice Chancellor and Dean Academics. The action taken on the suggestions has been approved by competent authorities.

Signed by:

(Chairman, BOS)

(Vice Chancellor)

(Dean Academics)

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Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
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E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

19th Meeting of BOS (Item No. 1 Annexure -1)
School of Engineering & Technology

Date: 22.12.2021

Minutes of the Meeting of Board of Studies

18th meeting of the Board of Studies of the School of Engineering and Technology, Shobhit University Gangoh was organized on 22th Dec. 2021 at 10:00 am onwards. The following members were present in the meeting:

1.	Prof.(Dr.) Tarun Kumar Sharma Head of the Department (Computer Science and Engineering) Shobhit University Gangoh	Chairperson
2.	Prof.(Dr.) Anil Lamba Professor and Head School of Computer Science and Application Geeta University	External expert
3.	Dr. Amit Goyal Professor and Head School of Computer Science and Engineering Chandigarh University	External Expert
4.	Dr. Jasvir Singh Rana Associate Professor School of Engineering and Technology Shobhit University Gangoh	Member
5.	Mr. Anil Kumar Assistant Professor School of Engineering and Technology Shobhit University Gangoh	Member

Welcome address by Chairman

The Chairman extended a warm welcome to all the members of Board of Studies and the following information was tabled before the members of the Board of Studies:

Input given by the Subject Experts on the Scheme and syllabi of the ongoing Batches.

The following discussed and approved on Choice Based Credit System:

Item BOS 18.1: Approval of the Minutes of the 17th BOS Meeting held on 28 June 2021

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Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
URL: www.shobhituniversity.ac.in

Was circulated among the members and the same were notified after the approval of the Board of Studies. {Annexure- 1}

Item BOS 18.2: Approval of Revision in Syllabus of B. Tech 2nd, 4th, & 6th semester w. e. f. the academic session 2021-22.

- **BOS approved Revision in Syllabus of B. Tech 2nd, 4th, & 6th semester {Annexure-2}**

Item BOS 18.3:Analysis of Students' feedback & Action taken report:

- BOS Chairman has expressed that the student feedback and action taken report process is done at the end of semester. The BOS members noted the same.

Item BOS 18.4: Analysis of the feedback on curriculum from stakeholders:

- The BOS chairman presented the analysis report of stakeholders' feedback on curriculum. The BOS members noted the same and advised to incorporate the suggestions as per the feasibility. The Action Taken Report is enclosed herewith. {Annexure-3}

Item BOS 18.5: Approval of Examiners (Theory & Practical) and Paper Setters for the even semester courses in BCA , MCA , B.Tech & M.Tech for the session **Jan. to June 2022**. The same is being sent to the Controller of Examinations, Shobhit University Gangoh, in a sealed cover. {Annexure-4}

Item BOS 18.6: Discussion on the Value Added courses offered for students and ratification of the same.

- BOS members approved the list of Value added courses offered to students.

The meeting ended with a vote of thanks to the Chairman, Board of Studies.

The suggestions given by the panel of BOS have been discussed with the Vice Chancellor and Dean Academics. The action taken on the suggestions has been approved by competent authorities.

Signed by:

(Chairman, BOS)

SHOBHIT UNIVERSITY GANGOH 247341

(Vice Chancellor)

SHOBHIT UNIVERSITY GANGOH 247341

(Dean Academics)

SHOBHIT UNIVERSITY GANGOH 247341

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EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional
Area Gangoh, Distt. Saharanpur (U.P.)
247341, India
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U.: www.sug.ac.in

19th Meeting of BOS (Item No. 2 Annexure -2)

SHOBHIT UNIVERSITY GANGOH
SCHOOL OF ENGINEERING AND TECHNOLOGY
List of Examiners (2022-2023)

Sr. No.	Course code with Title	Name, Designation, Institution and Correspondence address of the Paper Setter/Examiner	Contact number with E. Mail ID
1.	Fundamental of Computer and C Programming (BCA-101)	External Examiner	
		1. Dr. Arun Giri	arungiri123@yahoo.com, 9818809053
		2. Dr. Nidhi Tyagi 3. Dr. Maheep Singh	nidhi.tyagi9785@gmail.com, 9927007273 kingmaheep@gmail.com, 9411293327
		Internal Examiner 1. Dr. Tarun Kumar Sharma	Tarun.sharma@shobhituniversity.ac.in, 9456086759
		2. Dr. Varun Bansal	Varun.bansal@shobhituniversity.ac.in, 9411295559
2	Problem Solving using Computer (BCA-102)	External Examiner 1. Dr. Abahay Bhatia	dr.abhay@ritrookee.ac.in, 9837386973
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com, 97604492192
		3. Dr. Mamta	mamta.bansal345@gmail.com, 9997025606
		Internal Examiner	Kuldeep.chauhan@shobhitunivers

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E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

		1. Mr. Kuldeep Chauhan	ity.ac.in, 9756997090
		2. Mr. Vinod Kumar	Vinod.kumar@shobhituniversity.ac.in, 9758749227
3	Professional Communication(BCA-103)	External Examiner 1. Dr. Abahay Bhatia	dr.abhay@ritrookee.ac.in, 9837386973
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com, 97604492192
		3. Dr. Mamta	mamta.bansal345@gmail.com,9997025606
		Internal Examiner 1.Dr. Varun Bansal	Varun.bansal@shobhituniversity.ac.in, 9411295559
		2.Mr. Nitin Kumar	nitin.kumar@shobhituniversity.ac.in, 9758170029
4	Mathematics(BCA-104)	External Examiner 1. Dr. Abahay Bhatia	dr.abhay@ritrookee.ac.in, 9837386973
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com, 97604492192
		3. Dr. Mamta	mamta.bansal345@gmail.com,9997025606
		Internal Examiner 1. Dr. Varun Bansal	Varun.bansal@shobhituniversity.ac.in, 9411295559
		2. Mr. Kuldeep Chauhan	Kuldeep.chauhan@shobhituniversity.ac.in, 9756997090

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E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

5	Fundamental of Computer and C Programming Lab(BCA-151)	External Examiner 1. Dr. Abahay Bhatia	dr.abhay@ritrookee.ac.in, 9837386973
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com, 97604492192
		3. Dr. Mamta	mamta.bansal345@gmail.com,99 97025606
		Internal Examiner 1.Dr. Varun Bansal	Varun.bansal@shobhituniversity.ac.in, 9411295559
		2.Sumika Jain	Sumika.jai@shobhituniversity.ac.in, 9456666326
6	Software Lab using Python(BCA-152)	External Examiner 1. Dr. Abahay Bhatia	dr.abhay@ritrookee.ac.in, 9837386973
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com, 97604492192
		3. Dr. Mamta	mamta.bansal345@gmail.com,99 97025606
		Internal Examiner 1. Dr. Tarun Kumar Sharma	Tarun.sharma@shobhituniversity.ac.in, 9456086759
		2. Mr. Vinod Kumar	Vinod.kumar@shobhituniversity.ac.in, 9758749227
7	English Communication Lab(BCA-153)	External Examiner 1. Dr. Abahay Bhatia	dr.abhay@ritrookee.ac.in, 9837386973
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com, 97604492192

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E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

		3. Dr. Mamta	mamta.bansal345@gmail.com,9997025606
		Internal Examiner 1. Dr. Tarun Kumar Sharma	Tarun.sharma@shobhituniversity.ac.in, 9456086759
		2. Mr. Vinod Kumar	Vinod.kumar@shobhituniversity.ac.in, 9758749227
8	Seminar Based on Learning (BCA-154)	External Examiner 1 Dr. Abahay Bhatia	dr.abhay@ritrookee.ac.in, 9837386973
		3. Dr. Ankit Sharma	gurukul.ankit@gmail.com, 97604492192
		4. Dr. Mamta	mamta.bansal345@gmail.com,9997025606
		Internal Examiner 1. Dr. Tarun Kumar Sharma	Tarun.sharma@shobhituniversity.ac.in, 9456086759
		2. Mr. Vinod Kumar	Vinod.kumar@shobhituniversity.ac.in, 9758749227
9	Operating Systems(BCA-301)	External Examiner 1.Dr Mamta	mamta.bansal345@gmail.com,9997025606
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com, 97604492192
		3. Dr. Abahay Bhatia	dr.abhay@ritrookee.ac.in, 9837386973
		Internal Examiner 1. Ms. Sumika Jain	Sumika.jai@shobhituniversity.ac.in, 9456666326
		2. Mr. Vinod Kumar	Vinod.kumar@shobhituniversity.a

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E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

			c.in, 9758749227
10	HTML, DHTML and CSS Programming(BCA-302)	External Examiner 1. Dr. Abahay Bhatia	dr.abhay@ritrookee.ac.in, 9837386973
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com, 97604492192
		3. Dr. Mamta	mamta.bansal345@gmail.com,99 97025606
		Internal Examiner 1. Dr. Varun Bansal	Varun.bansal@shobhituniversity.ac.in, 9411295559
		2. Mr. Kuldeep Chauhan	Kuldeep.chauhan@shobhituniversity.ac.in, 9756997090
11	Theory of Computation(BCA-303)	External Examiner 1. Dr. Mamta	mamta.bansal345@gmail.com 99 97025606
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com, 97604492192
		3. Dr. Abahay Bhatia	dr.abhay@ritrookee.ac.in, 9837386973
		Internal Examiner 1. Mr. Nitin Kumar	nitin.kumar@shobhituniversity.ac.in, 9758170029
		2. Mr. Vinod Kumar	Vinod.kumar@shobhituniversity.ac.in, 9758749227
12	Multimedia and Applications(BCA-304)	External Examiner 1. Dr. Ankit Sharma	gurukul.ankit@gmail.com, 97604492192
		2. Dr. Mamta	mamta.bansal345@gmail.com 99

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EDUCATION EMPOWERS
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U.: www.su.ac.in

			97025606
		3. Dr. Abahay Bhatia	dr.abhay@ritrookee.ac.in, 9837386973
		Internal Examiner 1. Mr. Kuldeep Chauhan	Kuldeep.chauhan@shobhituniversity.ac.in, 9756997090
		2. Mr. Nitin Kumar	nitin.kumar@shobhituniversity.ac.in, 9758170029
13	Optimization Techniques(BCA-305)	External Examiner 1. Dr. Abahay Bhatia	dr.abhay@ritrookee.ac.in, 9837386973
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com, 97604492192
		3. Dr. Mamta	mamta.bansal345@gmail.com 99 97025606
		Internal Examiner 1. Mr. Vinod Kumar	Vinod.kumar@shobhituniversity.ac.in, 9758749227
		2. Ms. Sumika Jain	Sumika.jai@shobhituniversity.ac.in, 9456666326
14	Operating Systems Lab(BCA-351)	External Examiner 1. Dr. Abahay Bhatia	dr.abhay@ritrookee.ac.in, 9837386973
		2. Dr. Mamta	mamta.bansal345@gmail.com 99 97025606
		3. Dr. Ankit Sharma	gurukul.ankit@gmail.com, 97604492192
		Internal Examiner 1. Mr. Kuldeep Chauhan	Kuldeep.chauhan@shobhituniversity.ac.in, 9756997090

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

		2. Mr. Nitin Kumar	nitin.kumar@shobhituniversity.ac.in, 9758170029
15	HTML Programming Lab(BCA-352)	External Examiner 1. Dr. Mamta	mamta.bansal345@gmail.com 9997025606
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com, 97604492192
		3. Dr. Abahay Bhatia	dr.abhay@ritrookee.ac.in, 9837386973
		Internal Examiner 1. Ms. Sumika Jain	Sumika.jai@shobhituniversity.ac.in, 9456666326
		2. Mr. Vinod Kumar	Vinod.kumar@shobhituniversity.ac.in, 9758749227
16	Seminar Based on Learning(BCA-353)	External Examiner 1. Dr. Abahay Bhatia	dr.abhay@ritrookee.ac.in, 9837386973
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com, 97604492192
		3. Dr. Mamta	mamta.bansal345@gmail.com 9997025606
		Internal Examiner 3. Mr. Kuldeep Chauhan	Kuldeep.chauhan@shobhituniversity.ac.in, 9756997090
		4. Mr. Nitin Kumar	nitin.kumar@shobhituniversity.ac.in, 9758170029
17	Software Engineering(BCA-501)	External Examiner 1. Dr. Abahay Bhatia	dr.abhay@ritrookee.ac.in, 9837386973
		2. Dr. Mamta	mamta.bansal345@gmail.com 99

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EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

			97025606
		3. Dr. Ankit Sharma	gurukul.ankit@gmail.com, 97604492192
		Internal Examiner 1. Dr. Varun Bansal	Varun.bansal@shobhituniversity.ac.in, 9411295559
		2. Mr. Vinod Kumar	Vinod.kumar@shobhituniversity.ac.in, 9758749227
18	Analysis of Algorithms & Data Structures(BCA-502)	External Examiner 1. Dr. Ankit Sharma	gurukul.ankit@gmail.com, 97604492192
		2. Dr. Mamta	mamta.bansal345@gmail.com 99 97025606
		3. Dr. Abahay Bhatia	dr.abhay@ritrookee.ac.in, 9837386973
		Internal Examiner 1. Mr. Kuldeep Chauhan	Kuldeep.chauhan@shobhituniversity.ac.in, 9756997090
		2. Mr. Nitin Kumar	nitin.kumar@shobhituniversity.ac.in, 9758170029
19	Mobile Computing(BCA-503)	External Examiner 1. Dr. Mamta	mamta.bansal345@gmail.com 99 97025606
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com, 97604492192
		3. Dr. Abahay Bhatia	dr.abhay@ritrookee.ac.in, 9837386973
		Internal Examiner 1. Dr. Varun Bansal	Varun.bansal@shobhituniversity.a

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

			c.in, 9411295559
		2. Mr. Vinod Kumar	Vinod.kumar@shobhituniversity.ac.in, 9758749227
20	Big Data and Machine Learning(BCA-504)	External Examiner 1. Dr. Ankit Sharma	gurukul.ankit@gmail.com, 97604492192
		2. Dr. Mamta	mamta.bansal345@gmail.com,9997025606
		3. Dr. Abahay Bhatia	dr.abhay@ritrookee.ac.in, 9837386973
		Internal Examiner 1. Mr. Kuldeep Chauhan	Kuldeep.chauhan@shobhituniversity.ac.in, 9756997090
		2. Mr. Nitin Kumar	nitin.kumar@shobhituniversity.ac.in, 9758170029
21	Software Engineering Lab(BCA-551)	External Examiner 1. Dr. Mamta	mamta.bansal345@gmail.com,9997025606
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com, 97604492192
		3. Dr. Abahay Bhatia	dr.abhay@ritrookee.ac.in, 9837386973
		Internal Examiner 3. Dr. Varun Bansal	Varun.bansal@shobhituniversity.ac.in, 9411295559
		4. Mr. Vinod Kumar	Vinod.kumar@shobhituniversity.ac.in, 9758749227

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

22	Algorithms and Data Structures with C++ Lab (BCA-552)	External Examiner 1. Dr. Ankit Sharma	gurukul.ankit@gmail.com, 97604492192
		2. Dr. Abahay Bhatia	dr.abhay@ritrookee.ac.in, 9837386973
		3. Dr. Mamta	mamta.bansal345@gmail.com 99 97025606
		Internal Examiner 1. Dr. Varun Bansal	Vinod.kumar@shobhituniversity.ac.in, 9758749227
		2. Mr. Vinod Kumar	Vinod.kumar@shobhituniversity.ac.in, 9758749227
23	Research Project-I(BCA-558)	External Examiner 1. Dr. Abahay Bhatia	dr.abhay@ritrookee.ac.in, 9837386973
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com, 97604492192
		3. Dr. Mamta	mamta.bansal345@gmail.com 99 97025606
		Internal Examiner 1. Dr. Varun Bansal	Varun.bansal@shobhituniversity.ac.in, 9411295559
		2. Mr. Vinod Kumar	Vinod.kumar@shobhituniversity.ac.in, 9758749227

MCA (List of Examiners)

Sr. No.	Course code with Title	Name, Designation, Institution and Correspondence address of the Paper Setter/Examiner	Contact number with E. Mail ID

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

1.	Java (MCA-101)	External Examiner 4. Dr. Abhay Bhatia	Dr.abhay@ritroorkee.ac.in 9837386973 Dr.abhay@ritroorkee.ac.in 9837386973
		5. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		6. Dr. Mamta Singh	Mamta.bansal345@gmail.com 9997025606
		Internal Examiner 3. Mr. Jitendra K. Saini	Jitendra.saini@shobhituniversity.ac.in 7669110295
		4. Mr. Shahnawaaj	Mohd.shahnawaz@shobhituniversity.ac.in 9536940100
2	Advanced DBMS (MCA-102)	External Examiner 4. Dr. Ankit Sharma	Gurukul.ankit@gmail.com 9760492192
		5. Dr. Arun Giri	Arungiri123@yahoo.com 981880953
		6. Dr. Nidhi Tyagi	Nidhi.tyagi9785@gmail.com 9927007273
		Internal Examiner 3. Dr. Varun Bansal	Varun.bansal@shobhituniversity.ac.in 9675478559
		4. Mr. Shubham Kumar	Shubham.k@shobhituniversity.ac.in 7895408519
3	Advanced DAA (MCA-103)	External Examiner 1. Dr. Mamta Bansal	Mamta.bansal345@gmail.com 9997025606
		2. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		3. Dr. Abhay Bhatia	Dr.abhay@ritroorkee.ac.in 9837386973
		Internal Examiner	Sumika.jain@shobhituniversity.ac.

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional
Area Gangoh, Distt. Saharanpur (U.P.)
247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

		1. Ms. Sumika Jain	in 9456666326
		2. Mr. Kuldeep Chauhan	Kuldeep.chauhan@shobhituniversity.ac.in 9756997090
4	Network Fundamentals (MCA-104)	External Examiner 1. Dr. Abhay Bhati	Dr.abhay@ritroorkee.ac.in 9837386973
		2. Dr. Ankit Sharma	Gurukul.ankit@gmail.com 9760492192
		3. Dr. Mamta Bansal	Mamta.bansal345@gmail.com 9997025606
		Internal Examiner 1. Ms. Sumika Jain	Sumika.jain@shobhituniversity.ac.in 9456666326
		2. Mr. Kuldeep Chauhan	Kuldeep.chauhan@shobhituniversity.ac.in 9756997090
5	Optimization Techniques (MCA-133)	External Examiner 1. Dr. Abhay Bhati	Dr.abhay@ritroorkee.ac.in 9837386973
		2. Dr. Ankit Sharma	Gurukul.ankit@gmail.com 9760492192
		3. Dr. Mamta Bansal	Mamta.bansal345@gmail.com 9997025606
		Internal Examiner 1. Ms. Sumika Jain	Sumika.jain@shobhituniversity.ac.in 9456666326
		2. Mr. Kuldeep Chauhan	Kuldeep.chauhan@shobhituniversity.ac.in 9756997090
6	Lab JAVA (MCA-151)	External Examiner 1. Dr. Ankit Sharma	Gurukul.ankit@gmail.com 9760492192
		2. Dr. Arun Giri	Arungiri123@yahoo.com 981880953
		3. Dr. Nidhi Tyagi	Nidhi.tyagi9785@gmail.com 9927007273

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional
Area Gangoh, Distt. Saharanpur (U.P.)
247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

		Internal Examiner 1. Dr. Varun Bansal	Varun.bansal@shobhituniversity.ac.in 9675478559
		2. Mr. Shubham Kumar	Shubham.k@shobhituniversity.ac.in 7895408519
7	Lab Advanced DBMS (MCA-152)	External Examiner 1. Dr. Abhay Bhatia	Dr.abhay@ritroorkee.ac.in 9837386973
		2. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		3. Dr. Mamta Bansal	Mamta.bansal345@gmail.com 9997025606
		Internal Examiner 1. Mr. Jitendra K. Saini	Jitendra.saini@shobhituniversity.ac.in 7669110295
		2. Mr. Shahnawaaj	Mohd.shahnawaz@shobhituniversity.ac.in 9536940100
8	Lab Design and analysis of Algorithm (MCA-153)	External Examiner 1. Dr. Nidhi Tyagi	Nidhi.tyagi9785@gmail.com 9927007273
		2. Dr. Mamta Bansal	Mamta.bansal345@gmail.com 9997025606
		3. Dr. Abhay Bhatia	Dr.abhay@ritroorkee.ac.in 9837386973
		Internal Examiner 1. Mr. Jitendra K. Saini	Jitendra.saini@shobhituniversity.ac.in 7669110295
		2. Dr. Tarun Kumar Sharma	Tarun.sharma@shobhituniversity.ac.in 9456086759
9.	PHP (MCA-301)	External Examiner 1. Dr. Ankit Sharma	Gurukul.ankit@gmail.com 9760492192
		2. Dr. Arun Giri	Arungiri123@yahoo.com 981880953
		3. Dr. Nidhi Tyagi	Nidhi.tyagi9785@gmail.com 9927007273

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional
Area Gangoh, Distt. Saharanpur (U.P.)
247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

		Internal Examiner 1. Dr. Varun Bansal	Varun.bansal@shobhituniversity.ac.in 9675478559
		2. Ms. Sumika Jain	Sumika.jain@shobhituniversity.ac.in 9456666326
10.	Data Science (MCA-302)	External Examiner 1. Dr. Mamta Bansal	Mamta.bansal345@gmail.com 9997025606
		2. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		3. Dr. Abhay Bhatia	Dr.abhay@ritroorkee.ac.in 9837386973
		Internal Examiner 1. Dr. Varun Bansal	Varun.bansal@shobhituniversity.ac.in 9675478559
		2. Ms. Sumika Jain	Sumika.jain@shobhituniversity.ac.in 9456666326
11.	Cryptography and Network Security(MCA-304)	External Examiner 1. Dr. Ankit Sharma	Gurukul.ankit@gmail.com 9760492192
		2. Dr. Arun Giri	Arungiri123@yahoo.com 981880953
		3. Dr. Nidhi Tyagi	Nidhi.tyagi9785@gmail.com 9927007273
		Internal Examiner 1. Mr. Nitin Kumar	Nitin.kumar@shobhituniversity.ac.in 9758170029
		2. Ms. Sumika Jain	Sumika.jain@shobhituniversity.ac.in 9456666326
12.	Compiler	External Examiner	Gurukul.ankit@gmail.com

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional
Area Gangoh, Distt. Saharanpur (U.P.)
247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

	Design(MCA-322)	1. Dr. Ankit Sharma	9760492192
		2. Dr. Arun Giri	Arungiri123@yahoo.com 981880953
		3. Dr. Nidhi Tyagi	Nidhi.tyagi9785@gmail.com 9927007273
		Internal Examiner 1. Dr. Varun Bansal	Varun.bansal@shobhituniversity.ac.in 9675478559
		2. Mr. Shubham Kumar	Shubham.k@shobhituniversity.ac.in 7895408519
13.	Lab PHP(MCA-351)	External Examiner 1. Dr. Abhay Bhatia	Dr.abhay@ritroorkee.ac.in 9837386973
		2. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		3. Dr. Mamta Bansal	Mamta.bansal345@gmail.com 9997025606
		Internal Examiner 1. Mr. Vinod Kumar	Vinod.kumar@shobhituniversity.ac.in 9758749227
		2. Mr. Anuj Kumar	Anju.k@shobhituniverstiy.ac.in 7249989555
14.	Lab Data Science(MCA-352)	External Examiner 1. Dr. Arun Giri	Arungiri123@yahoo.com 981880953
		2. Dr. Nidhi Tyagi	Nidhi.tyagi9785@gmail.com 9927007273
		3. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		Internal Examiner 1. Mr. Vinod Kumar	Vinod.kumar@shobhituniversity.ac.in 9758749227
		2. Mr. Anuj Kumar	Anju.k@shobhituniverstiy.ac.in

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

			7249989555
15.	Lab Cryptography and Network Security(MCA-353)	External Examiner 1. Dr. Abhay Bhati	Dr.abhay@ritroorkee.ac.in 9837386973
		2. Dr. Ankit Sharma	Gurukul.ankit@gmail.com 9760492192
		3. Dr. Mamta Bansal	Mamta.bansal345@gmail.com 9997025606
		Internal Examiner 1. Ms. Sumika Jain	Sumika.jain@shobhituniversity.ac.in 9456666326
		2. Mr. Kuldeep Chauhan	Kuldeep.chauhan@shobhituniversity.ac.in 9756997090
24.	Minor Project (MCA-354)	External Examiner 1. Dr. Arun Giri	Arungiri123@yahoo.com 981880953
		2. Dr. Nidhi Tyagi	Nidhi.tyagi9785@gmail.com 9927007273
		3. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		Internal Examiner 1. Mr. Vinod Kumar	Vinod.kumar@shobhituniversity.ac.in 9758749227
		2. Mr. Anuj Kumar	Anju.k@shobhituniversity.ac.in 7249989555
25.	Seminar Based on Learning(MCA-355)	External Examiner 1. Dr. Ankit Sharma	Gurukul.ankit@gmail.com 9760492192
		2. Dr. Nidhi Tyagi	Nidhi.tyagi9785@gmail.com 9927007273
		3. Dr. Arun Giri	Arungiri123@yahoo.com 981880953
		Internal Examiner 1. Mr. Nitin Kumar	Nitin.kumar@shobhituniversity.ac

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

			.in 9758170029
		2. Mr. Vinod Kumar	Vinod.kumar@shobhituniversity.ac.in 9758749227

M.Tech(List of Examiners)

Sr. No.	Course code with Title	Name, Designation, Institution and Correspondence address of the Paper Setter/Examiner	Contact number with E. Mail ID
1.	Software Engineering Methodologies CE- 501	External Examiner 7. Dr. Arun Giri	arungiri123@yahoo.com 9818809053
		8. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		9. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		Internal Examiner 1. Mr. Kuldeep Chauhan	kuldeep.chauhan@shobhituniversity.ac.in 9756997090
		2. Mr. Vinod Kumar	vinod.kumar@shobhituniversity.ac.in 9758749227
2.	Analysis and Design of Algorithms CE-503	External Examiner 7. Dr. Abhay Bhatia	dr.abhay@iitroorkee.ac.in 9837386973
		8. Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192
		9. Dr. Mamta Bansal	mamta.bansal345@gmail.com 9997025606
		Internal Examiner 5. Ms. Sumika Jain	sumika.jain@shobhituniversity.ac.in 9456666326

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

		2. Mr. Raveendra Kr. Bharati	raveendra.bharati@shobhituniversity.ac.in 9953328744
3.	Advanced Database Management Systems CE- 505	External Examiner 1. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		2. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		3. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		Internal Examiner 1. Mr. Raveendra Kr. Bharati	raveendra.bharati@shobhituniversity.ac.in 9953328744
		2. Mr. Nitin Kumar	nitin.kumar@shobhituniversity.ac.in 9758170029
4.	Computer Communication and Networks CE- 507	External Examiner 1. Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192
		2. Dr. Mamta Bansal	mamta.bansal345@gmail.com 9997025606
		3. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		Internal Examiner 1. Mr. Raveendra Kr. Bharati	anil.nishad@shobhituniversity.ac.in 8171418088
		2. Mr. Kuldeep Chauhan	kuldeep.chauhan@shobhituniversity.ac.in 9756997090
5.	Fundamental of	External Examiner	dr.abhay@ritroorkee.ac.in

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional
Area Gangoh, Distt. Saharanpur (U.P.)
247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

	Computer Programming (Audit) CE- 509	1. Dr. Abhay Bhatia	9837386973
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192
		3. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		Internal Examiner 1. Mr. Vinod Kumar	vinod.kumar@shobhituniversity.ac.in 9758749227
		2. Ms. Sumika Jain	sumika.jain@shobhituniversity.ac.in 9456666326
6.	Fundamental of Mathematics (Audit) CE- 511	External Examiner 1. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192
		3. Dr. Mamta Bansal	mamta.bansal345@gmail.com 9997025606
		Internal Examiner 1. Mr. Madhav P. Namdev	Madhav.namdev@shobhituniversity.ac.in 94572731592
		2. Mr. Raveendra Kr. Bharati	raveendra.bharati@shobhituniversity.ac.in 9953328744
7.	Algorithms Lab CE-551	External Examiner 1. Dr. Arun Giri	arungiri123@yahoo.com 9818809053
		2. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional
Area Gangoh, Distt. Saharanpur (U.P.)
247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

		3. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		Internal Examiner 1. Mr. Vinod Kumar	vinod.kumar@shobhituniversity.ac.in 9758749227
		2. Mr. Raveendra Kr. Bharati	raveendra.bharati@shobhituniversity.ac.in 9953328744
8.	Seminar-I CE- 581	External Examiner 1. Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192
		2. Dr. Mamta Bansal	mamta.bansal345@gmail.com 9997025606
		3. Dr. Arun Giri	arungiri123@yahoo.com 9818809053
		Internal Examiner 1. Mr. Varun Bansal	varun.bansal@shobhituniversity.ac.in 9675478559
		2. Ms. Sumika Jain	sumika.jain@shobhituniversity.ac.in 9456666326
9	Data Mining and Warehousing CE-601	External Examiner	
		1. Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192
		2. Dr. Mamta Bansal	mamta.bansal345@gmail.com 9997025606
		3. Dr. Arun Giri	arungiri123@yahoo.com

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional
Area Gangoh, Distt. Saharanpur (U.P.)
247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

			9818809053
		Internal Examiner 1. Mr. Vinod Kumar	vinod.kumar@shobhituniversity.ac.in 9758749227
		2. Mr. Raveendra Kr. Bharati	raveendra.bharati@shobhituniversity.ac.in 9953328744
10	Internet and Web Technology CE- 603	External Examiner	
		1. Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192
		2. Dr. Mamta Bansal	mamta.bansal345@gmail.com 9997025606
		3. Dr. Arun Giri	arungiri123@yahoo.com 9818809053
		Internal Examiner 1. Mr. Varun Bansal	varun.bansal@shobhituniversity.ac.in 9675478559
		2. Ms. Sumika Jain	sumika.jain@shobhituniversity.ac.in 9456666326
11	Medical Image Processing CE- 605	External Examiner	
		1. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192
		3. Dr. Mamta Bansal	mamta.bansal345@gmail.com 9997025606

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

		Internal Examiner 1. Mr. Madhav P. Namdev	Madhav.namdev@shobhituniversity.ac.in 94572731592
		2. Mr. Raveendra Kr. Bharati	raveendra.bharati@shobhituniversity.ac.in 9953328744
12	Software Verification, Validation and Testing CE- 607	External Examiner	
		1. Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192
		2. Dr. Mamta Bansal	mamta.bansal345@gmail.com 9997025606
		3. Dr. Arun Giri	arungiri123@yahoo.com 9818809053
		Internal Examiner 1. Ms. Sumika Jain	sumika.jain@shobhituniversity.ac.in 9456666326
		2. Mr. Raveendra Kr. Bharati	raveendra.bharati@shobhituniversity.ac.in 9953328744
13	Network Security CE-625	External Examiner	
		1. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192
		3. Dr. Mamta Bansal	mamta.bansal345@gmail.com 9997025606
		Internal Examiner	vinod.kumar@shobhituniversity.ac.in

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

		1. Mr. Vinod Kumar	9758749227
		2. Mr. Raveendra Kr. Bharati	raveendra.bharati@shobhituniversity.ac.in 9953328744
14	Minor Project CE-671	External Examiner	
		1. Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192
		2. Dr. Mamta Bansal	mamta.bansal345@gmail.com 9997025606
		3. Dr. Arun Giri	arungiri123@yahoo.com 9818809053
		Internal Examiner 1. Mr. Kuldeep Chauhan	kuldeep.chauhan@shobhituniversity.ac.in 9756997090
		2. Mr. Vinod Kumar	vinod.kumar@shobhituniversity.ac.in 9758749227

B.tech CSE (Examiner)

Sr. No.	Course code with Title	Name, Designation, Institution and Correspondence address of the Paper Setter/Examiner	Contact number with E. Mail ID
1.	MATHEMATICS-I (CMAN 101)	External Examiner 10. Dr. Arun Giri	arungiri123@yahoo.com 9818809053
		11. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		12. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh. Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

		Internal Examiner 5. Mr. Raveendra Kr. Bharati	raveendra.bharati@shobhituniversity.ac.in 9953328744
		6. Mr. Abdulla Khan	abdulla.khan@shobhituniversity.ac.in 7454976780
2.	ENGINEERING MECHANICS (CMEN 101)	External Examiner 10. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		11. Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192
		12. Dr. Mamta Bansal	mamta.bansal345@gmail.com 9997025606
		Internal Examiner 1. Mr. Shoyab Hussain	shoyab.hussain@shobhituniversity.ac.in 9837446390
		2. Mr. Anil Kumar Joshi	anil.joshi@shobhituniversity.ac.in 9690758787
3.	FUNDAMENTALS OF ELECTRONICS (CECN 101)	External Examiner 4. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		5. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		6. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		Internal Examiner 1. Dr. Jasvir Singh Rana	jasvirsingh.rana@shobhituniversity.ac.in

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

			9759233859
		2. Mr. Hamid Ali	hamid.ali@shobhituniversity.ac.in 9759302770
4.	ENGINEERING CHEMISTRY AND ENVIRONMENTAL (CESN 101)	External Examiner 1. Dr. Arun Giri	arungiri123@yahoo.com 9818809053
		2. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		3. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		Internal Examiner 1. Mr. Y.P Malik	yp.malik@shobhituniversity.ac.in 8650145236
		2. Ms. Abhilasha R. Goel	abhilasha.goel@shobhituniversity.ac.in 6396705043
5.	PRESENTATION AND COMMUNICATION SKILLS (CPCN 101)	External Examiner 1. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192
		3. Dr. Mamta Bansal	mamta.bansal345@gmail.com 9997025606
		Internal Examiner 1. Ms. Abhilasha R. Goel	abhilasha.goel@shobhituniversity.ac.in 6396705043
		2. Ms. Sumika Jain	sumika.jain@shobhituniversity.

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

			ac.in 9456666326
6.	ENGINEERING WORKSHOP PRACTICE (CMEN 151)	External Examiner 7. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		8. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		9. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		Internal Examiner 1. Mr. Shoyab Hussain	shoyab.hussain@shobhituniversity.ac.in 9837446390
		2. Mr. Anil Kumar Joshi	anil.joshi@shobhituniversity.ac.in 9690758787
7.	ENGINEERING GRAPHICS LAB (CMEN 153)	External Examiner 1. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192
		3. Dr. Mamta Bansal	mamta.bansal345@gmail.com 9997025606
		Internal Examiner 1. Dr. Jasvir Singh Rana	jasvirsingh.rana@shobhituniversity.ac.in 9759233859
		2. Mr. Hamid Ali	hamid.ali@shobhituniversity.ac.in 9759302770

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

8.	COMMUNICATION LAB (CPCN 151)	External Examiner 1. Dr. Arun Giri	arungiri123@yahoo.com 9818809053
		2. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		3. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		Internal Examiner 1. Dr. Shri Kant Gupta	shrikant.gupta@shobhituniversity.ac.in 8279909590
		2. Mr. Varun Bansal	varun.bansal@shobhituniversity.ac.in 9675478559
9.	DATA STRUCTURE USING 'C' (CCSN 201)	External Examiner 1. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		2. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		3. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		Internal Examiner 1. Mr. Varun Bansal	varun.bansal@shobhituniversity.ac.in 9675478559
		2. Ms. Sumika Jain	sumika.jain@shobhituniversity.ac.in 9456666326
10.	DBMS	External Examiner	dr.abhay@ritroorkee.ac.in

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

	(CCSN 203)	1. Dr. Abhay Bhatia	9837386973
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192
		3. Dr. Mamta Bansal	mamta.bansal345@gmail.com 9997025606
		Internal Examiner 1. Dr. Tarun Kumar Sharma	tarun.sharma@shobhituniversity.ac.in 9456086759
		2. Mr. Nitin Kumar	nitin.kumar@shobhituniversity.ac.in 9758170029
11.	OPERATING SYSTEMS (UNIX PROGRAMMING) (CCSN 205)	External Examiner 1. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		2. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		3. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		Internal Examiner 1. Ms. Sumika Jain	sumika.jain@shobhituniversity.ac.in 9456666326
		2. Mr. Nitin Kumar	nitin.kumar@shobhituniversity.ac.in 9758170029
12.	JAVA PROGRAMMING (CCSN 207)	External Examiner 1. Dr. Arun Giri	arungiri123@yahoo.com 9818809053
		2. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

			9927007273
		3. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		Internal Examiner 1. Mr. Vinod Kumar	vinod.kumar@shobhituniversity.ac.in 9758749227
		2. Mr. Varun Bansal	varun.bansal@shobhituniversity.ac.in 9675478559
13.	DISCRETE MATHEMATICS (CCSN 209)	External Examiner 1. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192
		3. Dr. Mamta Bansal	mamta.bansal345@gmail.com 9997025606
		Internal Examiner 1. Dr. Vishvas Chand	vishvas.chand@shobhituniversity.ac.in 9286093196
		2. Ms. Abhilasha R. Goel	abhilasha.goel@shobhituniversity.ac.in 6396705043
14.	VALUE EDUCATION, HUMAN RIGHTS ANDLEGISLATIVE PROCEDURES (CBSN 201)	External Examiner 1. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		2. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		3. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional
Area Gangoh, Distt. Saharanpur (U.P.)
247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

			9837386973
		Internal Examiner 1. Dr. Shri Kant Gupta	shrikant.gupta@shobhituniversity.ac.in 8279909590
		2. Ms. Taruna Pahuja	
15.	DATA STRUCTURE USING 'C' LAB (CCSN 251)	External Examiner 1. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		2. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		3. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		Internal Examiner 1. Mr. Varun Bansal	varun.bansal@shobhituniversity.ac.in 9675478559
		2. Ms. Sumika Jain	sumika.jain@shobhituniversity.ac.in 9456666326
16.	DBMS LAB (CCSN 253)	External Examiner 1. Dr. Arun Giri	arungiri123@yahoo.com 9818809053
		2. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		3. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		Internal Examiner 1. Dr. Tarun Kumar Sharma	tarun.sharma@shobhituniversity.ac.in 9456086759

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

		2. Mr. Nitin Kumar	nitin.kumar@shobhituniversity.ac.in 9758170029
17.	JAVA PROGRAMMING LAB (CCSN 255)	External Examiner 1. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		2. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		3. Dr. Abhay Bhatia	dr.abhav@ritroorkee.ac.in 9837386973
		Internal Examiner 1. Mr. Vinod Kumar	vinod.kumar@shobhituniversity.ac.in 9758749227
		2. Mr. Varun Bansal	varun.bansal@shobhituniversity.ac.in 9675478559
18.	SOFTWARE ENGINEERING (CCSN 301)	External Examiner 1. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		2. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		3. Dr. Abhay Bhatia	dr.abhav@ritroorkee.ac.in 9837386973
		Internal Examiner 1. Dr. Tarun Kumar Sharma	tarun.sharma@shobhituniversity.ac.in 9456086759
		2. Mr. Varun Bansal	varun.bansal@shobhituniversity.ac.in

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

			9675478559
19.	COMPILER DESIGN (CCSN 303)	External Examiner 4. Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192
		5. Dr. Mamta Bansal	mamta.bansal345@gmail.com 9997025606
		6. Dr. Arun Giri	arungiri123@yahoo.com 9818809053
		Internal Examiner 1. Mr. Varun Bansal	varun.bansal@shobhituniversity.ac.in 9675478559
		2. Mr. Nitin Kumar	nitin.kumar@shobhituniversity.ac.in 9758170029
20.	OBJECT ORIENTED ANALYSIS AND DESIGN (CCSN 305)	External Examiner 1. Dr. Arun Giri	arungiri123@yahoo.com 9818809053
		2. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		3. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		Internal Examiner 1. Mr. Vinod Kumar	vinod.kumar@shobhituniversity.ac.in 9758749227
		2. Ms. Sumika Jain	sumika.jain@shobhituniversity.ac.in 9456666326
21.	CRYPTOGRAPHY	External Examiner	nidhi.tyagi9785@gmail.com

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

	& INFORMATION SECURITY (CCSN 307)	1. Dr. Nidhi Tyagi	9927007273
		2. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		3. Dr. Abhay Bhatia	dr.abhav@ritroorkee.ac.in 9837386973
		Internal Examiner 1. Ms. Sumika Jain	sumika.jain@shobhituniversity.ac.in 9456666326
		2. Mr. Kuldeep Chauhan	kuldeep.chauhan@shobhituniversity.ac.in 9756997090
22.	CLOUD COMPUTING (CUCS 345)	External Examiner 1. Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192
		2. Dr. Mamta Bansal	mamta.bansal345@gmail.com 9997025606
		3. Dr. Arun Giri	arungiri123@yahoo.com 9818809053
		Internal Examiner 1. Dr. Tarun Kumar Sharma	tarun.sharma@shobhituniversity.ac.in 9456086759
		2. Mr. Varun Bansal	varun.bansal@shobhituniversity.ac.in 9675478559
23.	ENERGY STUDIES (CBSN 301)	External Examiner 1.Dr. Abhay Bhatia	dr.abhav@ritroorkee.ac.in 9837386973
		2.Dr. Ankit Sharma	gurukul.ankit@gmail.com

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

			9760492192
		3. Dr. Mamta Bansal	mamta.bansal345@gmail.com 9997025606
		Internal Examiner 1. Dr. Mahipal Singh	registrargangh@shobhituniversity.ac.in 9759174581
		2. Dr. Shri Kant Gupta	shrikant.gupta@shobhituniversity.ac.in 8279909590
24.	SOFTWARE ENGINEERING LAB (CCSN 351	External Examiner 1. Dr. Arun Giri	arungiri123@yahoo.com 9818809053
		2. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		3. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		Internal Examiner 1. Dr. Tarun Kumar Sharma	tarun.sharma@shobhituniversity.ac.in 9456086759
		2. Mr. Varun Bansal	varun.bansal@shobhituniversity.ac.in 9675478559
25.	COMPILER DESIGN LAB (CCSN 353)	External Examiner 1. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		2. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		3. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

			9837386973
		Internal Examiner 1. Mr. Varun Bansal	varun.bansal@shobhituniversity.ac.in 9675478559
		2. Mr. Nitin Kumar	nitin.kumar@shobhituniversity.ac.in 9758170029
26.	OBJECT ORIENTED ANALYSIS AND DESIGN LAB (CCSN 355)	External Examiner 1. Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192
		2. Dr. Mamta Bansal	mamta.bansal345@gmail.com 9997025606
		3. Dr. Arun Giri	arungiri123@yahoo.com 9818809053
		Internal Examiner 1. Mr. Vinod Kumar	vinod.kumar@shobhituniversity.ac.in 9758749227
		2. Ms. Sumika Jain	sumika.jain@shobhituniversity.ac.in 9456666326
27.	ARTIFICIAL INTELLIGENCE (CCSN 401)	External Examiner 1. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192
		3. Dr. Mamta Bansal	mamta.bansal345@gmail.com 9997025606
		Internal Examiner	sumika.jain@shobhituniversity.

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

		1. Ms. Sumika Jain	ac.in 9456666326
		2. Mr. Anil Kumar	anil.joshi@shobhituniversity.ac.in 9690758787
28.	DISTRIBUTED COMPUTING SYSTEMS (CCSN 403)	External Examiner 1. Dr. Arun Giri	arungiri123@yahoo.com 9818809053
		2. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		3. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		Internal Examiner 1. Mr. Nitin Kumar	nitin.kumar@shobhituniversity.ac.in 9758170029
		2. Mr. Kuldeep Chauhan	kuldeep.chauhan@shobhituniversity.ac.in 9756997090
29.	ADVANCED COMPUTER SYSTEM ARCHITECTURE (CCSN 405)	External Examiner 1. Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192
		2. Dr. Mamta Bansal	mamta.bansal345@gmail.com 9997025606
		3. Dr. Arun Giri	arungiri123@yahoo.com 9818809053
		Internal Examiner 1. Mohd Ahamad	mohd.ahamad@shobhituniversity.ac.in 9548159750

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

		2. Mr. Hamid Ali	hamid.ali@shobhituniversity.ac.in 9759302770
30.	PYTHON (CCSN 415)	External Examiner 1. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		2. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		3. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		Internal Examiner 1. Mr. Vinod Kumar	vinod.kumar@shobhituniversity.ac.in 9758749227
		2. Mr. Kuldeep Chauhan	kuldeep.chauhan@shobhituniversity.ac.in 9756997090
31.	COMPUTER BASED NUMERICAL & STATISTICAL TECHNIQUES (CUCS 447)	External Examiner 1. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192
		3. Dr. Mamta Bansal	mamta.bansal345@gmail.com 9997025606
		Internal Examiner 1. Mr. Abdulla Khan	abdulla.khan@shobhituniversity.ac.in 7454976780
		2. Mr. Raveendra Kr. Bharati	raveendra.bharati@shobhituniversity.ac.in

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

			9953328744
32.	LAW FOR ENGINEERS (CBSN 401)	External Examiner 1. Dr. Arun Giri	arungiri123@yahoo.com 9818809053
		2. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		3. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		Internal Examiner 1. Mr. Kuldeep Chauhan	kuldeep.chauhan@shobhituniversity.ac.in 9756997090
		2. Mr. Mahendra Kumar	mahendra.kumar@shobhituniversity.ac.in 9458432303
33.	ARTIFICIAL INTELLIGENCE LAB (CCSN 451)	External Examiner 1. Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192
		2. Dr. Mamta Bansal	mamta.bansal345@gmail.com 9997025606
		3. Dr. Arun Giri	arungiri123@yahoo.com 9818809053
		Internal Examiner 1. Ms. Sumika Jain	sumika.jain@shobhituniversity.ac.in 9456666326
		2. Mr. Anil Kumar	anil.joshi@shobhituniversity.ac.in 9690758787
34.	DISTRIBUTED	External Examiner	dr.abhay@iitroorkee.ac.in

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

	COMPUTING SYSTEMS LAB (CCSN 453)	1. Dr. Abhay Bhatia	9837386973
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192
		3. Dr. Mamta Bansal	mamta.bansal345@gmail.com 9997025606
		Internal Examiner 1. Mr. Nitin Kumar	nitin.kumar@shobhituniversity.ac.in 9758170029
		2. Mr. Kuldeep Chauhan	kuldeep.chauhan@shobhituniversity.ac.in 9756997090
35.	SEMINAR & GROUP DISCUSSION (CCSN 481)	External Examiner 1. Dr. Arun Giri	arungiri123@yahoo.com 9818809053
		2. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		3. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		Internal Examiner 1. Dr. Tarun Kumar Sharma	tarun.sharma@shobhituniversity.ac.in 9456086759
		2. Dr. Mahipal Singh	registrargangh@shobhituniversity.ac.in 9759174581

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Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail:
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SHOBHIT UNIVERSITY GANGOH
School of Engineering and Technology

Date: 08/12/2022

NOTICE

Subject: Meeting of the Board of Studies

All members of the Board of Studies are hereby informed that a meeting will be held as per the following details:

Date: 22/12/2022
Time: 10.00 AM
Venue: SOET, Shobhit University, Gangoh

Agenda:

1. Confirmation of minutes of the previous meeting
2. Analysis of the Students' feedback & Action taken report and Analysis of the feedback on curriculum from stakeholders
3. Approval of Examiners (Theory & Practical) and Paper Setters for the even semester courses in BCA, MCA, B.Tech & M.Tech for session **Jan. to June. 2023.**
4. Discussion on the value Added courses offered for students and ratification of the same.
5. Any other matter with the permission of the Chair

All members are requested to make it convenient to attend the meeting and come prepared with relevant documents and suggestions.

Prof.(Dr.) Varun Bansal
Chairperson, Board of Studies
Head of the Department
08/12/2022

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Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrarg[illegible]
U[illegible]

SHOBHIT UNIVERSITY GANGOH
School of Engineering and Technology

Date: 08/12/2022

To
Dr. Rajesh Kumar Saini
Head of the Department
Dept. of Mathematics Science and Computer Application
Bundelkhand University, Jhansi

Subject: Invitation to Attend the Board of Studies Meeting

Dear Sir

Greetings from School of Engineering and Technology

We are pleased to invite you to participate as an external subject expert in the upcoming meeting of the Board of Studies for the School of Engineering and Technology, scheduled as follows:

Date: 22/12/2022
Time: 10.00 AM
Mode: SOET, Shobhit University, Gangoh

The meeting will deliberate on important academic matters including syllabus revision, new course proposals, and academic planning for the upcoming session. Your expert insights and contributions would be invaluable to the academic enrichment of our programs.

We request you to kindly confirm your availability and mode of attendance at your earliest convenience. For online participation, a meeting link will be shared upon confirmation. If attending in person, necessary hospitality arrangements will be made.

We look forward to your positive response and support.

Thank you.

Warm regards.

Prof. (Dr.) Varun Bansal
Chairperson, Board of Studies

School of Engineering and Technology ★ Shobhit University Gangoh ★

Babu Vijendra Marg, Adarsh Institutional
Area Gangoh, Distt. Saharanpur (U.P.)
247341, India
Tel: +91 [illegible]
E-mail: registrargangoh@shobhituniversity.ac.in
U: www.shu.ac.in

SHOBHIT UNIVERSITY GANGOH
School of Engineering and Technology

Date: 08/12/2022

To
Dr. Neeraj Singhal
Professor
School of Computer Science and Engineering
Sir Chhotu Ram Institute of Engineering & Technology

Subject: Invitation to Attend the Board of Studies Meeting

Dear Sir

Greetings from School of Engineering and Technology

We are pleased to invite you to participate as an external subject expert in the upcoming meeting of the Board of Studies for the School of Engineering and Technology, scheduled as follows:

Date: 22/12/2022
Time: 10.00 AM
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The meeting will deliberate on important academic matters including syllabus revision, new course proposals, and academic planning for the upcoming session. Your expert insights and contributions would be invaluable to the academic enrichment of our programs.

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We look forward to your positive response and support.

Thank you.

Warm regards,

Prof.(Dr.) Varun Bansal
Chairperson, Board of Studies

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830210052
E-mail: registrargangoh@shobhituniversity.ac.in
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SHOBHIT UNIVERSITY GANGOH
School of Engineering and Technology

Date: 22/12/2022

Attendance Sheet (School of Engineering and Technology, BOS Meeting on 22/12/2022)

Sr. No	Name	External/Internal Member	Signature
1	Prof.(Dr.) Rajesh Kumar Saini	External Expert	Rajesh Kumar Saini
2	Dr. Neeraj Singhal	External Expert	Neeraj Singhal
3	Dr. Mahipal Singh	Internal Member	Mahipal
4	Dr. Jasvir Singh Rana	Internal Member	Jasvir Singh

Chairman

School of Engineering and Technology
Shobhit University Ga...

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U.: www.sug.ac.in

School of Engineering & Technology

Date: 22.12.2022

Minutes of the Meeting of Board of Studies

20th meeting of the Board of Studies of the School of Engineering and Technology, Shobhit University Gangoh was organized on 22nd Dec. 2022 at 10:00 am onwards. The following members were present in the meeting:

1.	Prof. (Dr.) Varun Bansal Head of the Department Computer Science and Engineering Shobhit University Gangoh	Chairperson
2.	Prof. (Dr.) Rajesh Kumar Saini Head of the Department Dept. of Mathematics Science and Computer Application Bundelkhand University, Jhansi	External expert
3.	Dr. Neeraj Singhal Professor School of Computer Science and Engineering Sir Chhotu Ram Institute of Engineering & Technology	External Expert
4.	Dr. Mahipal Singh Professor School of Engineering and Technology Shobhit University Gangoh	Member
5.	Dr. Jasvir Singh Rana Professor School of Engineering and Technology Shobhit University Gangoh	Member

Welcome address by Chairman
The Chairman extended a warm welcome to all the members of Board of Studies and the following information was tabled before the members of the Board of Studies:

Input given by the Subject Experts on the Scheme and syllabi of the ongoing Batches.

The following discussed and approved on Choice Based Credit System:

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Area Gangoh, Distt. Saharanpur (U.P.)
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Item BOS 20.1: Approval of the Minutes of the 19th BOS Meeting held on 23 June 2022 Was circulated among the members and the same were notified after the approval of the Board of Studies. {Annexure- 1}

Item BOS 20.2: Analysis of Students' feedback & Action taken report:

- BOS Chairman has expressed that the student feedback and action taken report process is done at the end of semester. The BOS members noted the same.

Item BOS 20.3: Analysis of the feedback on curriculum from stakeholders:

- The BOS chairman presented the analysis report of stakeholders' feedback on curriculum. The BOS members noted the same and advised to incorporate the suggestions as per the feasibility. The Action Taken Report is enclosed herewith. {Annexure-2}

Item BOS 20.4: Approval of Examiners (Theory & Practical) and Paper Setters for the even semester courses in BCA , MCA , B.Tech & M.Tech for session **Jan. to June 2023** The same is being sent to the Controller of Examinations, Shobhit University Gangoh, in a sealed cover. {Annexure-3}

Item BOS 20.5: Discussion on the Value Added courses offered for students and ratification of the same.

- BOS members approved the list of Value added courses offered to students

The meeting ended with a vote of thanks to the Chairman, Board of Studies.

The suggestions given by the panel of BOS have been discussed with the Vice Chancellor and Dean Academics. The action taken on the suggestions has been approved by competent authorities.

Signed by:

SHOBHIT UNIVERSITY GANGOH 247341

Chairman, BOS

(Vice Chancellor)

SHOBHIT UNIVERSITY GANGOH 247341

SHOBHIT UNIVERSITY GANGOH 247341

(Dean Academics)

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Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhiniversity.ac.in
U.: www.svg.ac.in

20th Meeting of BOS (Item No. 1 Annexure -1)
School of Engineering and Technology

Date: 23.06.2022

Minutes of the Meeting of Board of Studies

19th meeting of the Board of Studies of the School of Engineering and Technology, Shobhit University Gangoh was organized on 23rd June 2022 at 10:00 am onwards. The following members were present in the meeting:

1.	Prof. (Dr.) Varun Bansal Head of the Department Computer Science and Engineering Shobhit University Gangoh	Chairperson
2.	Prof. (Dr.) Rajesh Kumar Saini Head of the Department Dept. of Mathematics Science and Computer Application Bundelkhand University, Jhansi	External expert
3.	Dr. Neeraj Singhal Professor School of Computer Science and Engineering Sir Chhotu Ram Institute of Engineering & Technology	External Expert
4.	Dr. Mahipal Singh Professor School of Engineering and Technology Shobhit University Gangoh	Member
5.	Dr. Jasvir Singh Rana Professor School of Engineering and Technology Shobhit University Gangoh	Member

Welcome address by Chairman
The Chairman extended a warm welcome to all the members of Board of Studies and the following information was tabled before the members of the Board of Studies:

Input given by the Subject Experts on the Scheme and syllabi of the ongoing Batches.

The following discussed and approved on Choice Based Credit System:

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E-mail: registrargangoh
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Item BOS 19.1: Approval of the Minutes of the 18th BOS Meeting held on 22 Dec. 2021 Was circulated among the members and the same were notified after the approval of the Board of Studies. {Annexure- 1}

Item BOS 19.2: Approval of Examiners (Theory & Practical) and Paper Setters for the odd semester courses in BCA , MCA , B. Tech , & M. Tech for session **July to Dec. 2022** The same is being sent to the Controller of Examinations, Shobhit University Gangoh, in a sealed cover. {Annexure-2}

Item BOS 19.3: Discussion on the Value Added courses offered for students and ratification of the same.

- BOS members approved the list of Value added courses offered to students.

The meeting ended with a vote of thanks to the Chairman, Board of Studies.

The suggestions given by the panel of BOS have been discussed with the Vice Chancellor and Dean Academics. The action taken on the suggestions has been approved by competent authorities.

Signed by:

(Member, BOS)

(Dean Academics)

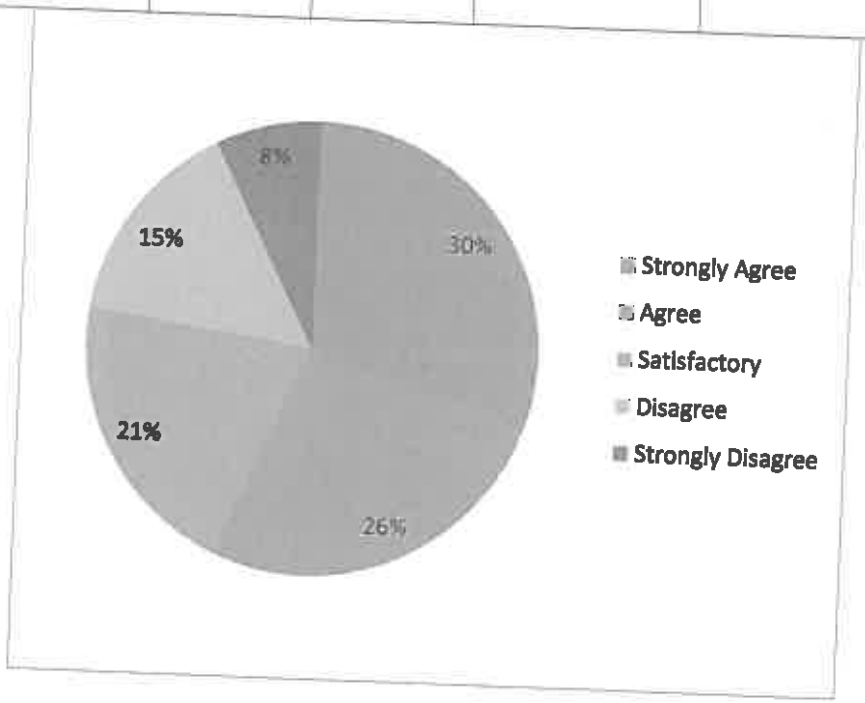
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Babu Vijendra Marg, Adarsh Institutional
Area Gangoh, Distt. Saharanpur (U.P.)
247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

20th Meeting of BOS (Item No. 2 Annexure -2)

Analysis of Alumni' Feedback of School of Engineering and Technology through Table and Pie Chart

Q.1 The courses based on state of art trends and recent developments?

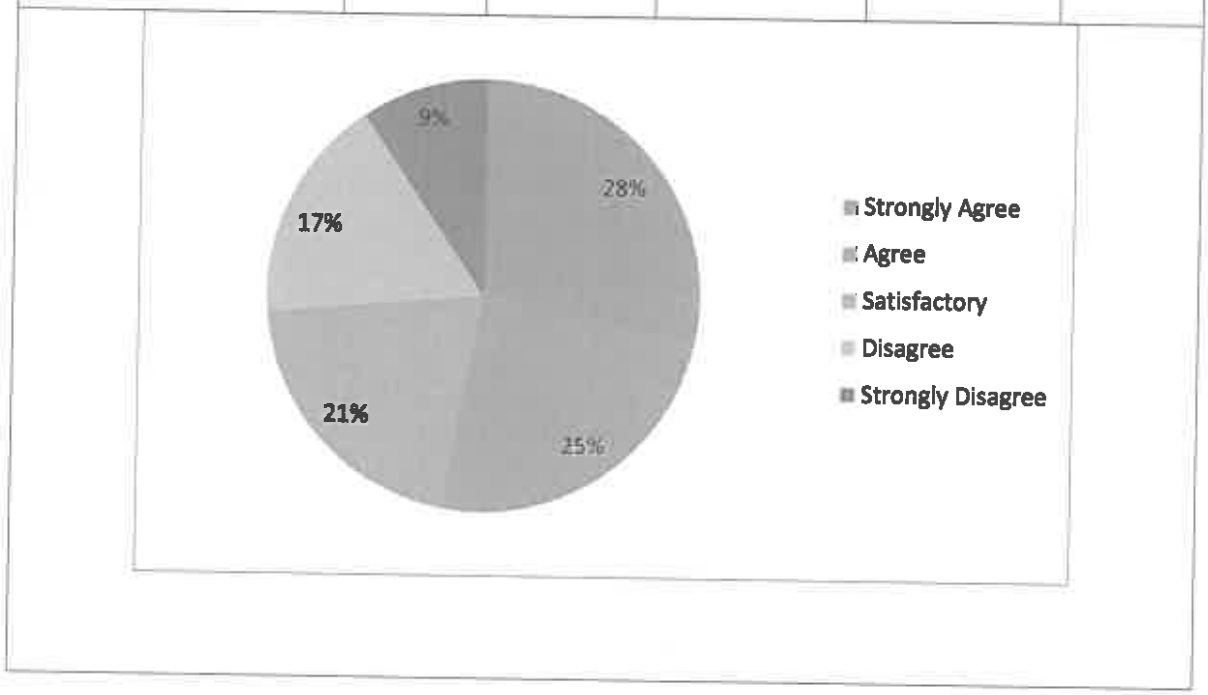
The courses based on state of art trends and recent developments	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	30.19	26.42	20.75	15.09	7.55



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Q.2 The courses found to be helpful in developing skills and knowledge in respective domain?

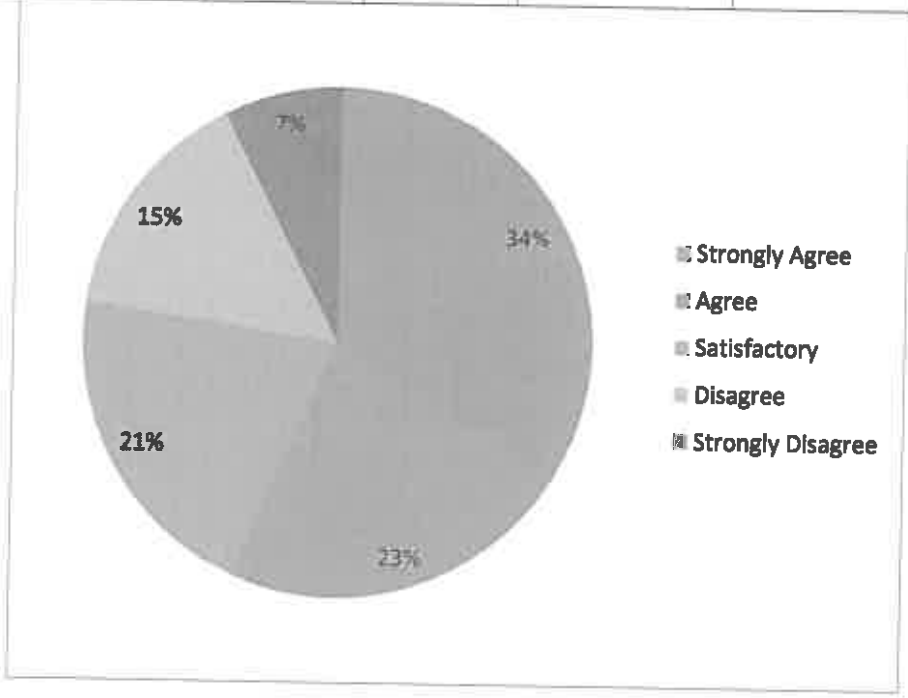
The courses found to be helpful in developing skills and knowledge in respective domain	Strongly Agree	Agree	satisfactory	Disagree	Strongly Disagree
Response (%)	28.30	24.53	20.75	16.98	9.43



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Q.3 The courses found to be productive in competing professionally at national/international level?

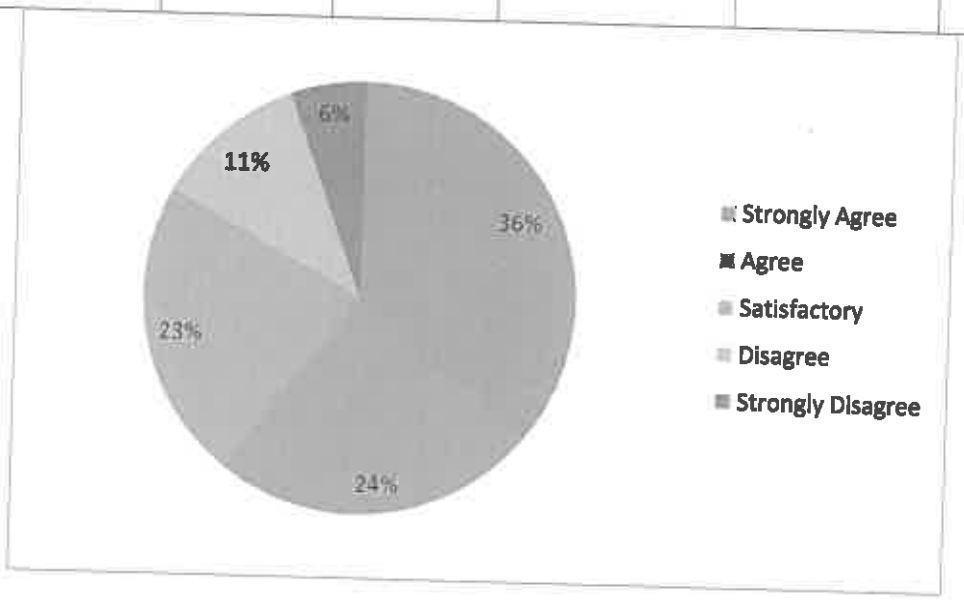
The courses found to be productive in competing professionally at national/international level	Strongly Agree	Agree	satisfactory	Disagree	Strongly Disagree
Response (%)	33.96	22.64	20.75	15.09	7.55



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Q.4 The courses found to be appropriate in motivating students towards nation building by inculcating ethical and professional values?

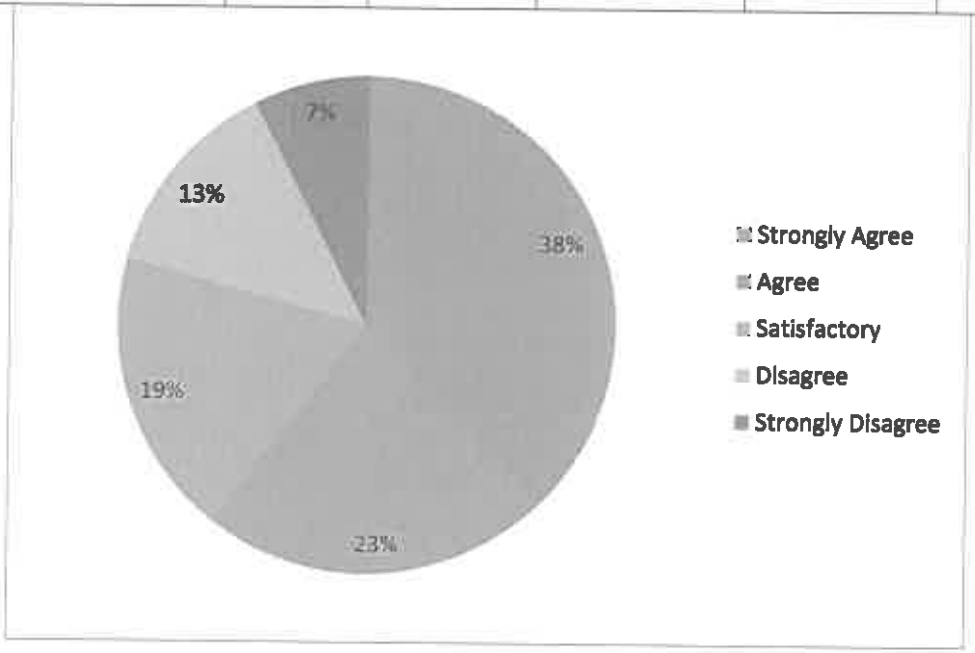
The courses found to be appropriate in motivating students towards nation building by inculcating ethical and professional values	Strongly Agree	Agree	satisfactory	Disagree	Strongly Disagree
Response (%)	35.85	24.53	22.64	11.32	5.66



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Q.5 The programme helped to understand the impact of domain knowledge in social and global context?

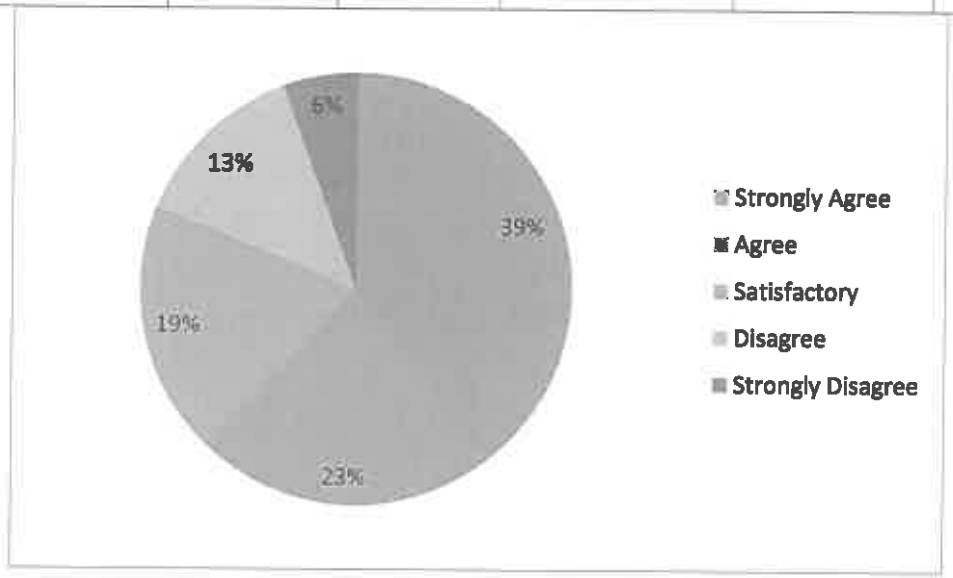
The programme helped to understand the impact of domain knowledge in social and global context	Strongly Agree	Agree	satisfactory	Disagree	Strongly Disagree
Response (%)	37.74	22.64	18.87	13.21	7.55



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Q.6 Theprogramme provided awareness on recent advancements and innovations?

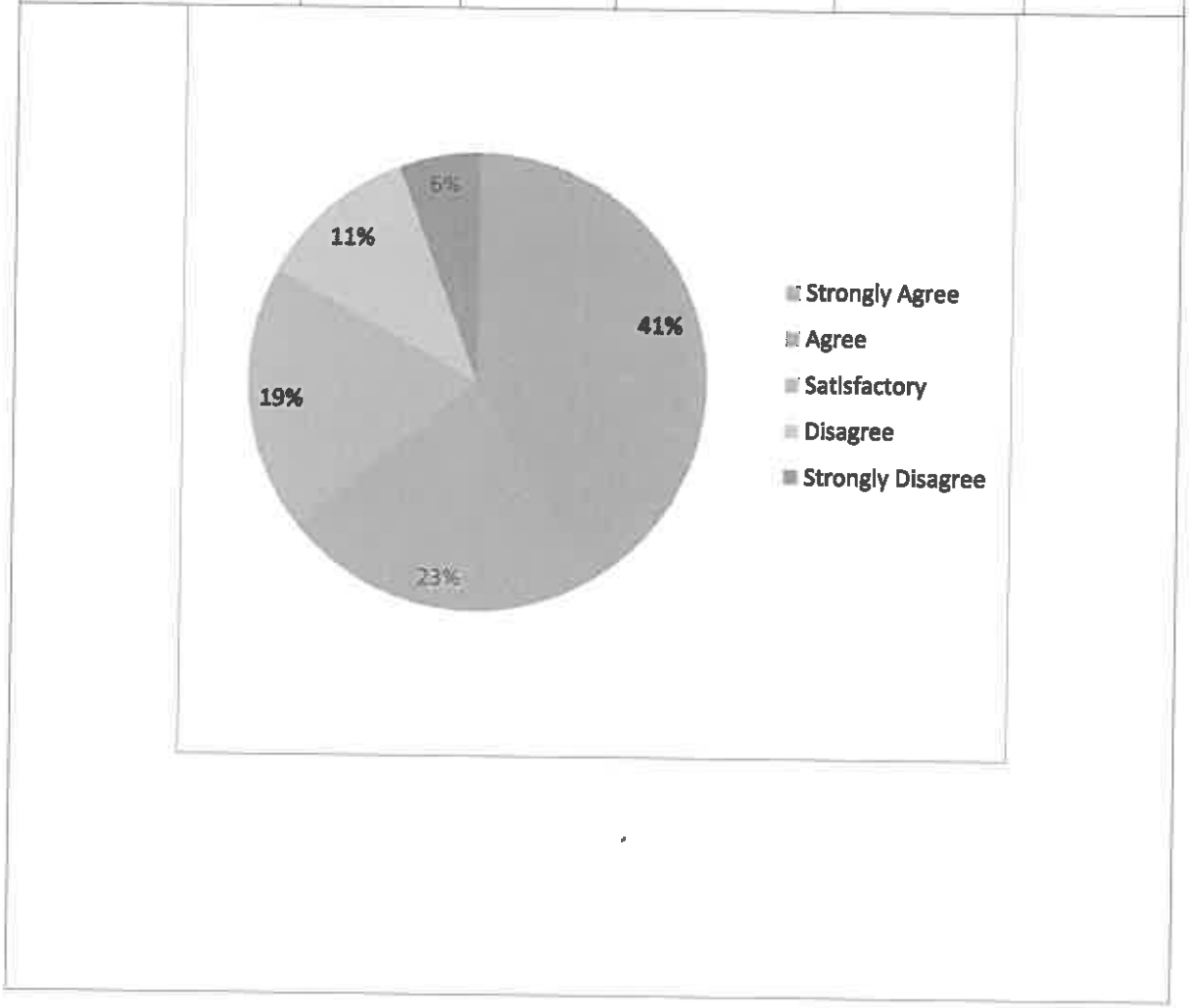
The programme provided awareness on recent advancements and Innovations	Strongly Agree	Agree	satisfactory	Disagree	Strongly Disagree
Response (%)	39.62	22.64	18.87	13.21	5.66



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Q.7 Theprogramme improved critical thinking ability and problem-solving aptitude.

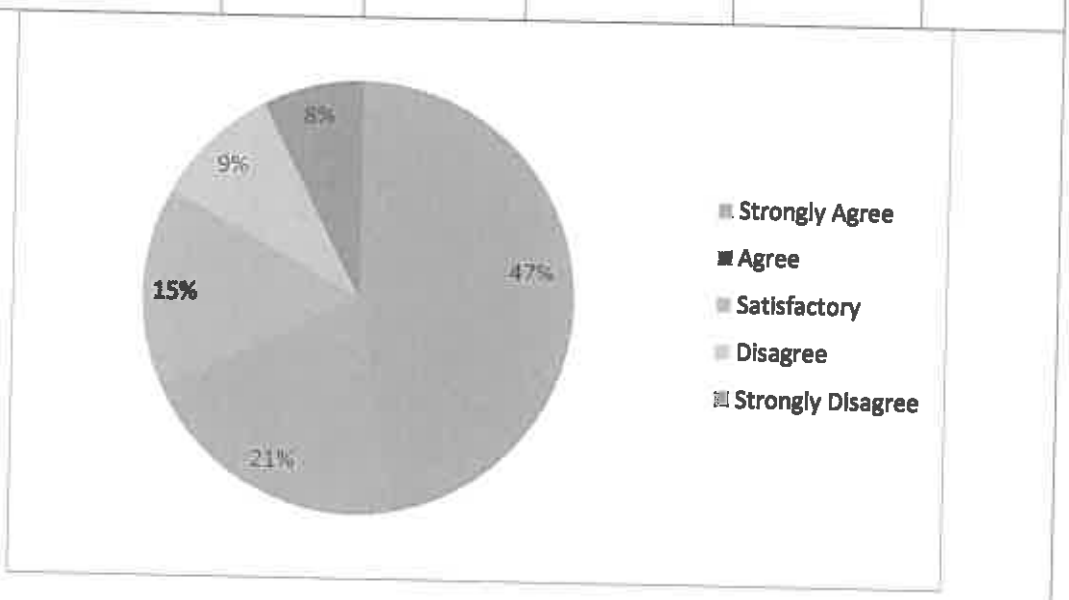
The programme improved critical thinking ability and problem-solving aptitude.	Strongly Agree	Agree	satisfactory	Disagree	Strongly Disagree
Response (%)	41.51	22.64	18.87	11.32	5.66



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Q.8 Theprogramme helped to take independent decisions and perform managerial &administerial functions diligently?

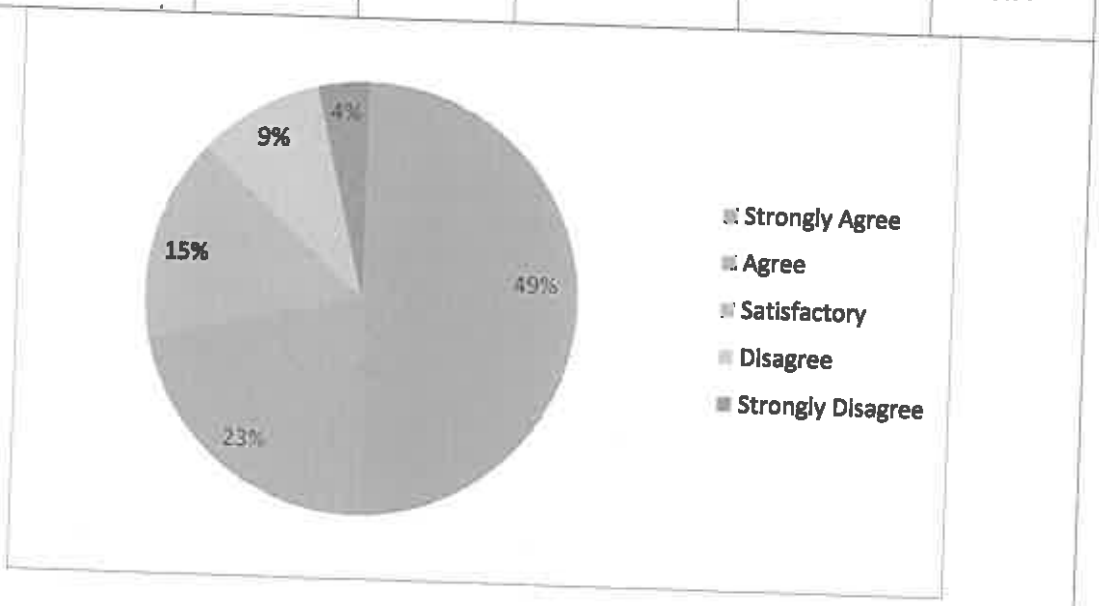
The programme helped to take independent decisions and perform managerial &administerial functions diligently.	Strongly Agree	Agree	satisfactory	Disagree	Strongly Disagree
Response (%)	47.17	20.75	15.09	9.43	7.55



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Q.9 The curriculum was helpful in acquiring advance level knowledge to pursue research and higher studies?

The curriculum was helpful in acquiring advance level knowledge to pursue research and higher studies	Strongly Agree	Agree	satisfactory	Disagree	Strongly Disagree
Response (%)	49.06	22.64	15.09	9.43	3.77



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School of Engineering & Technology (53)

Sr No	Questions	Details	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
1	The courses based on state of art trends and recent developments?	No of Alumni	16	14	11	8	4
		Percentage	30.19	26.42	20.75	15.09	7.55
2	The courses found to be helpful in developing skills and knowledge in respective domain?	No of Alumni	15	13	11	9	5
		Percentage	28.30	24.53	20.75	16.98	9.43
3	The courses found to be productive in competing professionally at national/international level?	No of Alumni	18	12	11	8	4
		Percentage	33.96	22.64	20.75	15.09	7.55
4	The courses found to be appropriate in motivating students towards nation building by inculcating ethical and professional values?	No of Alumni	19	13	12	6	3
		Percentage	35.85	24.53	22.64	11.32	5.66
5	The programme helped to understand the impact of domain knowledge in social and global context?	No of Alumni	20	12	10	7	4
		Percentage	37.74	22.64	18.87	13.21	7.55
6	The programme provided awareness on recent advancements and innovations?	No of Alumni	21	12	10	7	3
		Percentage	39.62	22.64	18.87	13.21	5.66
7	The programme improved critical thinking ability and problem-solving aptitude.	No of Alumni	22	12	10	6	3
		Percentage	41.51	22.64	18.87	11.32	5.66
8	The programme helped to take independent decisions and perform managerial &administerial functions diligently?	No of Alumni	25	11	8	5	4
		Percentage	47.17	20.75	15.09	9.43	7.55
9	The curriculum was helpful in acquiring advance level	No of Alumni	26	12	8	5	2

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Area Gangoh, Distt. Saharanpur (U.P.)
247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
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	knowledge to pursue research and higher studies?	Percentage	49.06	22.64	15.09	9.43	3.77

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Analysis of the Feedback

The alumni feedback on the curriculum presents a moderately positive yet clearly segmented view of the program's strengths and areas for improvement. A relatively high percentage of respondents acknowledged the curriculum's effectiveness in developing domain-specific skills (77.36%) and providing awareness of recent advancements (77.36%), as well as enhancing managerial and administrative competencies (83.02%). Moreover, 73.58% appreciated the focus on ethical and professional values, indicating that the curriculum supports holistic and value-based education. However, significantly lower ratings were observed for components such as alignment with state-of-the-art trends (41%), preparation for professional competition at national/international levels (39%), and fostering understanding of social and global impact (41%). Similarly, aspects like critical thinking (44%) and readiness for research or higher studies (42%) received lower endorsement. These figures suggest that while the curriculum is strong in practical skill-building and professional values, it requires substantial enhancement in areas that connect academic learning with global standards, innovation, and higher-level cognitive and research skills.

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Action Taken Report

(School of Engineering & Technology)

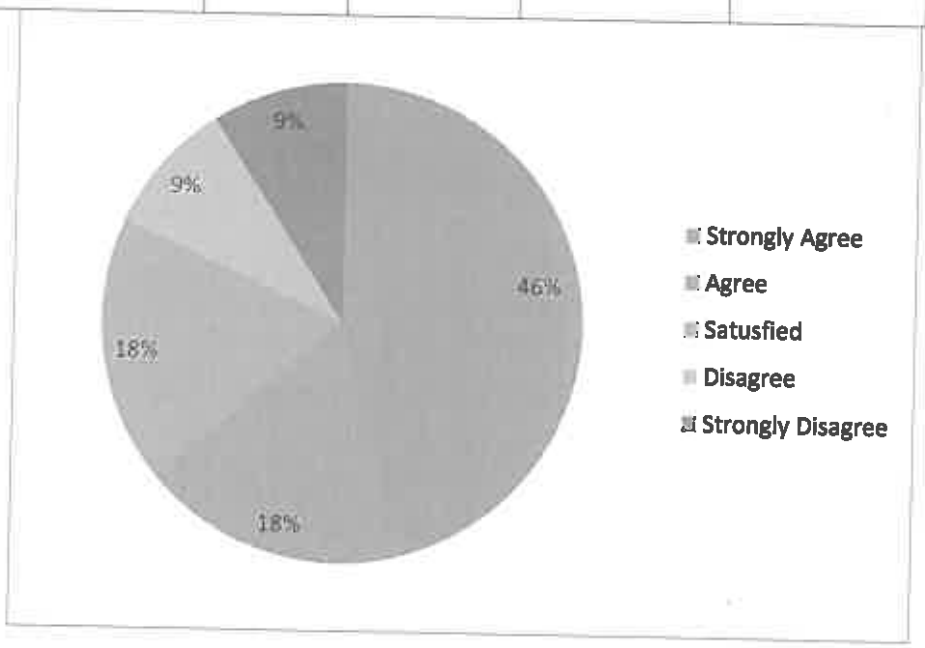
Sr. No.	Suggestions	Action taken	Outcome
1	Improve alignment with state-of-the-art technologies and global trends.	Revised curriculum to include advanced subjects such as Artificial Intelligence, IoT, Blockchain, Cloud Computing, and Sustainable Engineering. Collaborated with industry partners for expert lectures and real-world case studies.	Increased student enrollment in tech-focused electives; improved preparedness for tech-driven job roles as reflected in placement interviews.
2	Enhance preparation for national/international professional competition.	Introduced coding bootcamps, competitive exam training (GATE, GRE), hackathons, and entrepreneurship development programs in collaboration with incubation centers.	Student participation in technical competitions and hackathons increased by 35%; placement in top-tier companies improved.
3	Strengthen global perspective and understanding of societal impact.	Added interdisciplinary electives on engineering ethics, climate resilience, and global innovation trends. Organized webinars with global tech leaders and alumni working abroad.	Students showed greater awareness of sustainable design and global engineering challenges; more applications for international internships.
4	Foster research orientation, critical thinking, and readiness for higher studies.	Launched undergraduate research projects, research methodology workshops, and collaborations with R&D labs. Set up mentorship cells for higher studies and publication support.	Research paper submissions rose by 28%; student success in postgraduate entrance exams and fellowship programs improved.

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Analysis of Employer's Feedback of School of Engineering and Technology through Table and Pie Chart

Q.1 curriculum assists the students to acquire necessary entry level skills in industrial sector.

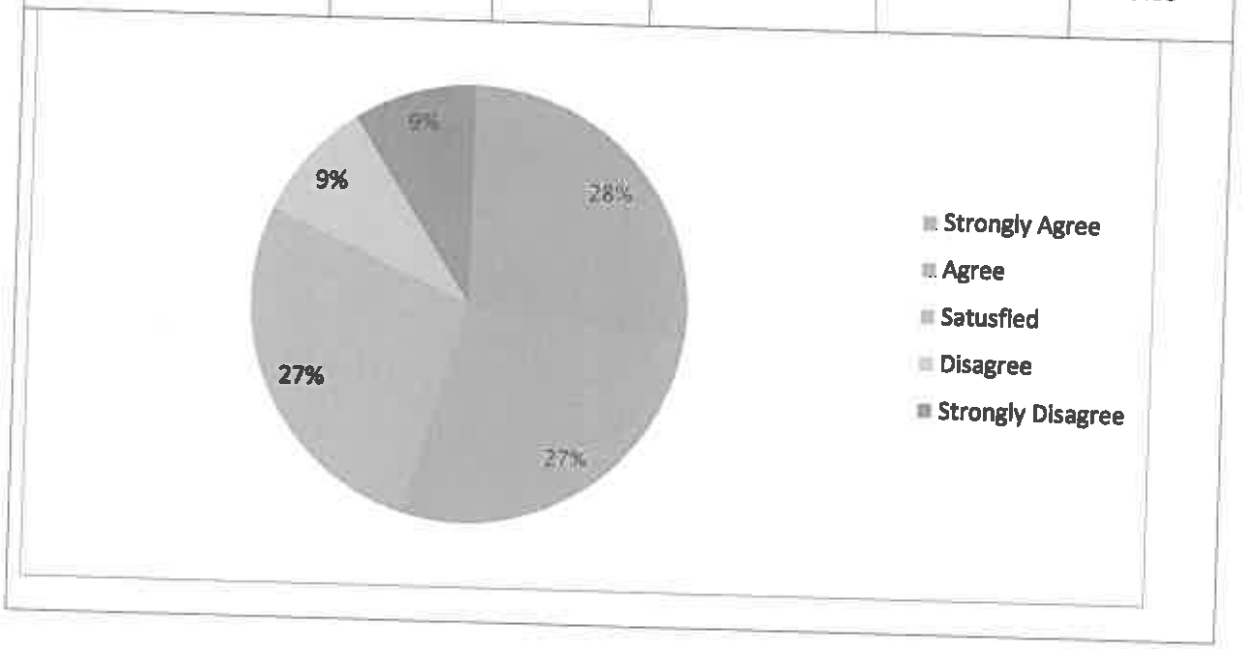
The curriculum assists the students to acquire necessary entry level skills in industrial sector.	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	45.5	18.2	18.2	9.1	9.1



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Q.2 The curriculum offers adequate scope for life-long learning and higher-level aptitude for new technology/tools.

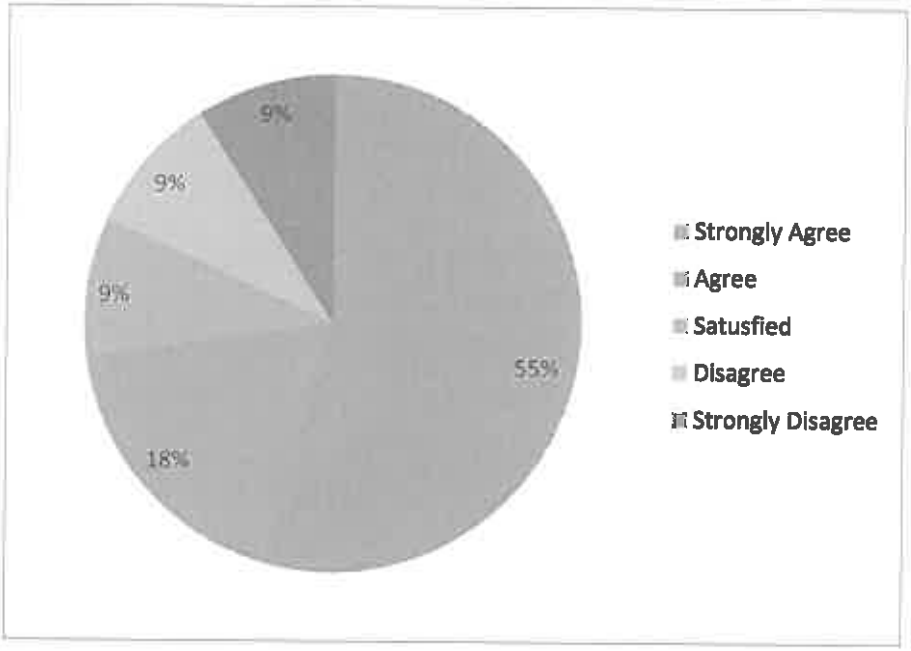
The curriculum offers adequate scope for life-long learning and higher-level aptitude for new technology/tools.	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	27.27	27.27	27.27	9.09	9.09



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Babu Vijendra Marg, Adarsh Institutional
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247341, India
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Q.3 The curriculum has adequate scope for multidisciplinary knowledge and sufficient number of elective courses.

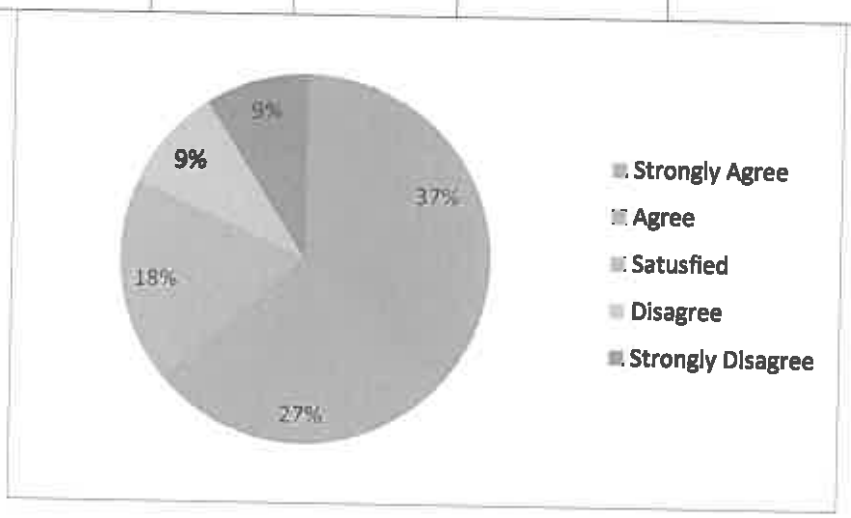
The curriculum has adequate scope for multidisciplinary knowledge and sufficient number of elective courses.	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	54.55	18.18	9.09	9.09	9.09



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Q.4 The curriculum has relevant content to assist students to work independently as well in a team with high level of adaptability.

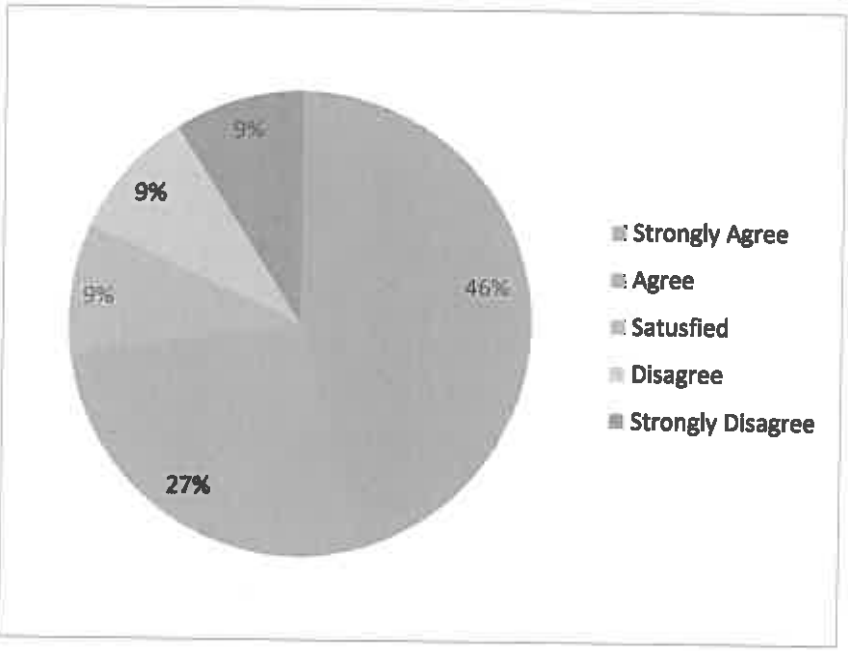
The curriculum has relevant content to assist students to work independently as well in a team with high level of adaptability	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	36.36	27.27	18.18	9.09	9.09



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Q.5 The curriculum provides enough scope for improving entrepreneurial skill as well as industry readiness.

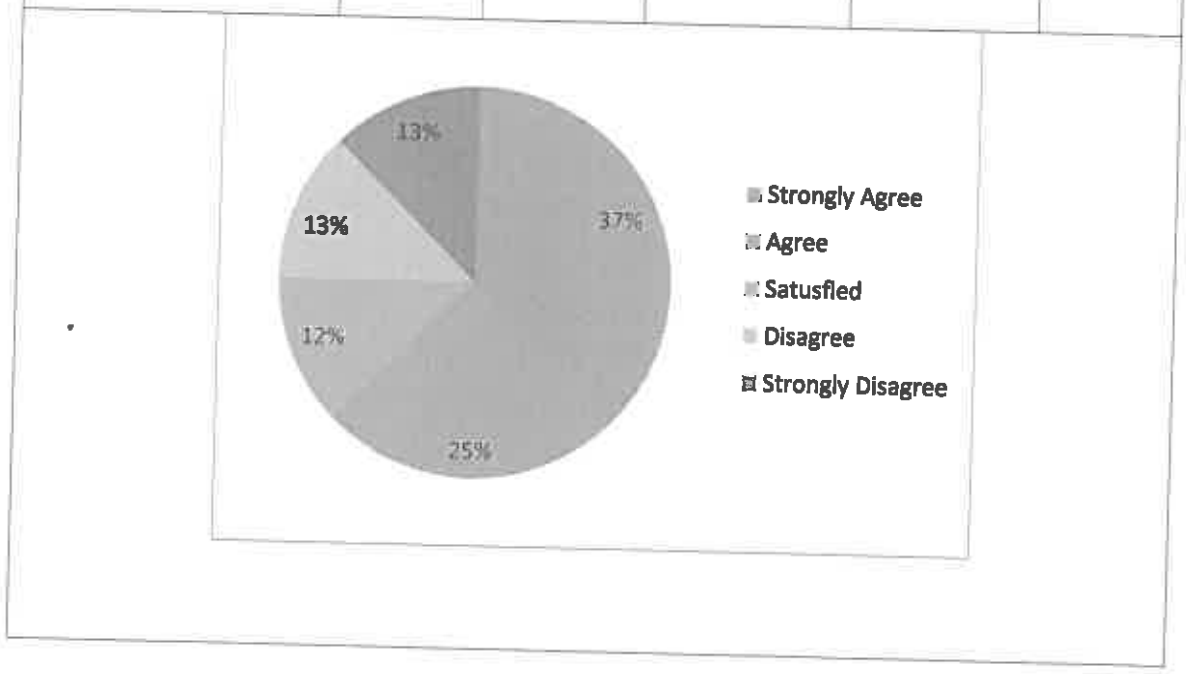
The curriculum provides enough scope for improving entrepreneurial skill as well as industry readiness.	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	45.45	27.27	9.09	9.09	9.09



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Q.6 The curriculum provides ample knowledge for increased employability and to promote students for higher education.

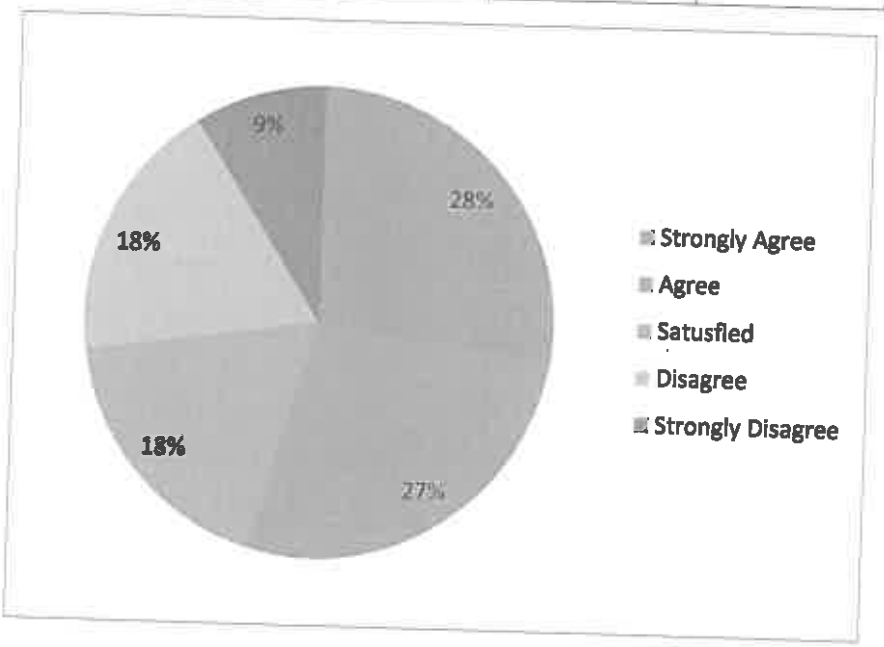
The curriculum provides ample knowledge for increased employability and to promote students for higher education.	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	36.36	18.18	18.18	18.18	9.09



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Q.7 The curriculum has focus on personality development by presence of courses on human values and professional ethics.

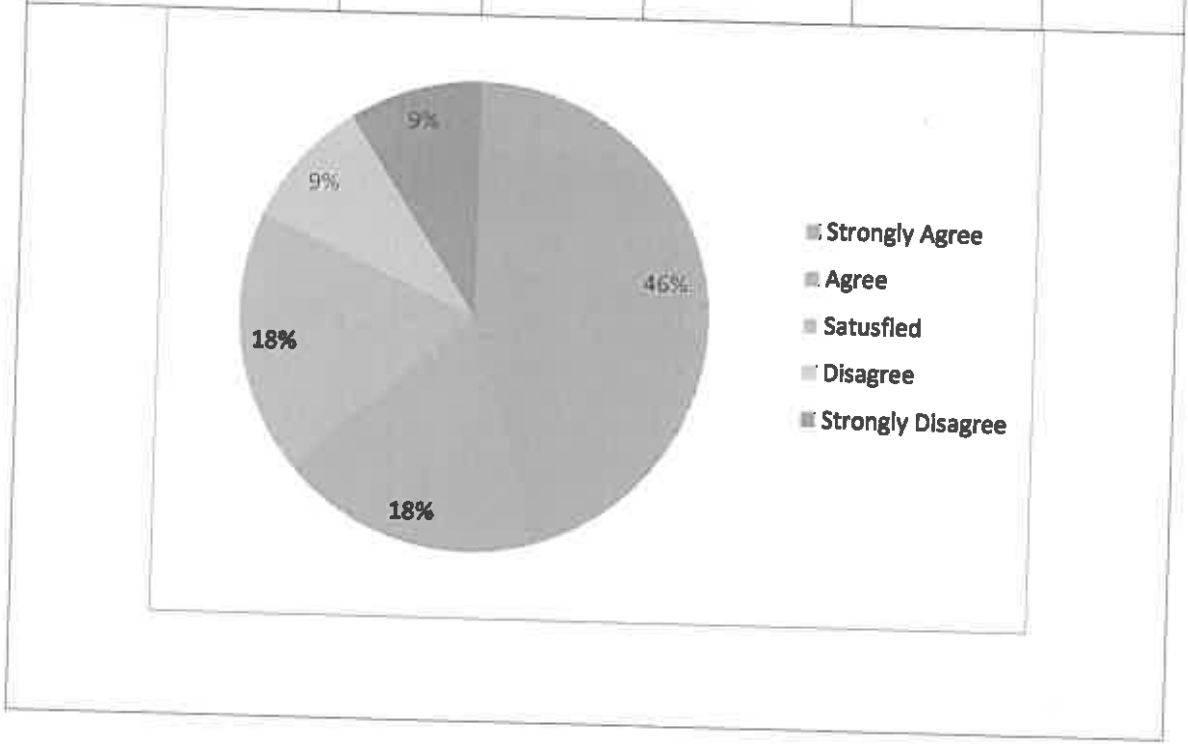
The curriculum has focus on personality development by presence of courses on human values and professional ethics	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	27.27	27.27	18.18	18.18	9.09



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Q.8 The curriculum is well organized and balanced for the programme with proper credit allocation.

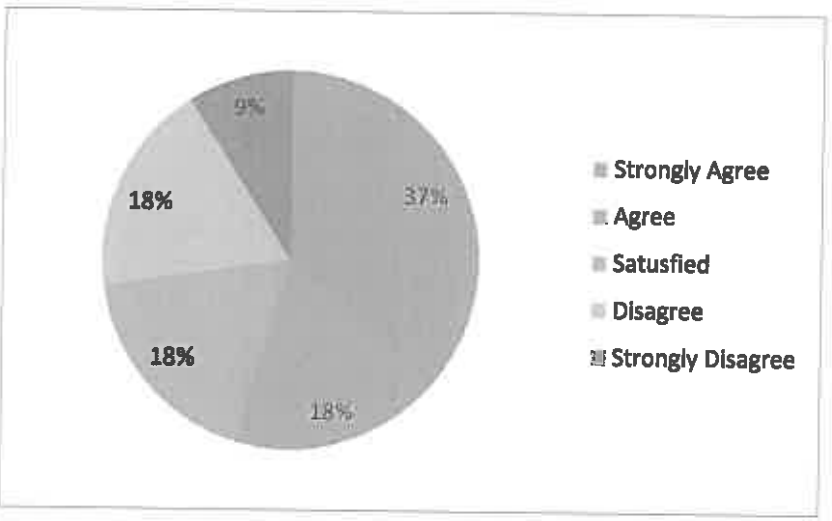
The curriculum is well organized and balanced for the programme with proper credit allocation.	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	45.45	18.18	18.18	9.09	9.09



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Q.9 The courses have adequate balance between theory and application for a student's holistic development.

The courses have adequate balance between theory and application for student's holistic development	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	36.36	18.18	18.18	18.18	9.09



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School of Engineering & Technology (11)

Total no. of Employer: 11		Strongly Agree	Agree	Satisfied	Disagree	Strongly Disagree
The curriculum assists the students to acquire necessary entry level skills in industrial sector.	No. of Academicians	5	2	2	1	1
	Percentage	45.45	18.18	18.18	9.09	9.09
The curriculum offers adequate scope for life-long learning and higher-level aptitude for new technology/tools.	No. of Academicians	3	3	3	1	1
	Percentage	27.27	27.27	27.27	9.09	9.09
The curriculum has adequate scope for multidisciplinary knowledge and sufficient number of elective courses.	No. of Academicians	6	2	1	1	1
	Percentage	54.55	18.18	9.09	9.09	9.09
The curriculum has relevant content to assist students to work independently as well in a team with high level of adaptability	No. of Academicians	4	3	2	1	1
	Percentage	36.36	27.27	18.18	9.09	9.09
The curriculum provides enough scope for improving entrepreneurial skill as well as industry readiness.	No. of Academicians	5	3	1	1	1
	Percentage	45.45	27.27	9.09	9.09	9.09
The curriculum provides ample knowledge for increased employability and to promote students for higher education.	No. of Academicians	4	2	2	2	1
	Percentage	36.36	18.18	18.18	18.18	9.09
The curriculum has focus on	No. of	3	3	2	2	1

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247341, India
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personality development by presence of courses on human values and professional ethics	Academicians					
	Percentage	27.27	27.27	18.18	18.18	9.09
The curriculum is well organized and balanced for the programme with proper credit allocation.	No. of Academicians	5	2	2	1	1
	Percentage	45.45	18.18	18.18	9.09	9.09
The courses have adequate balance between theory and application for student's holistic development	No. of Academicians	4	2	2	2	1
	Percentage	36.36	18.18	18.18	18.18	9.09

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Analysis of Feedback:

Based on the employers' feedback, the curriculum demonstrates a strong alignment with industry expectations, with most attributes receiving a favorable rating of **81.81% to 81.82%**. Employers agree that the curriculum effectively helps students acquire necessary entry-level industrial skills, fosters life-long learning, and includes sufficient multidisciplinary and elective options. It is also seen as enabling students to work both independently and in teams with adaptability, promoting entrepreneurship and industry readiness, and maintaining a well-organized structure with balanced credit allocation. However, relatively lower ratings of **72.72%** were observed in areas related to employability for higher education, courses on personality development and ethics, and the balance between theory and practical application. These suggest potential areas for enhancement to better support students' holistic growth and long-term career progression.

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E-mail: registrargangoh@shobhituniversity.ac.in
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Action Taken Report

(School of Engineering and Technology)

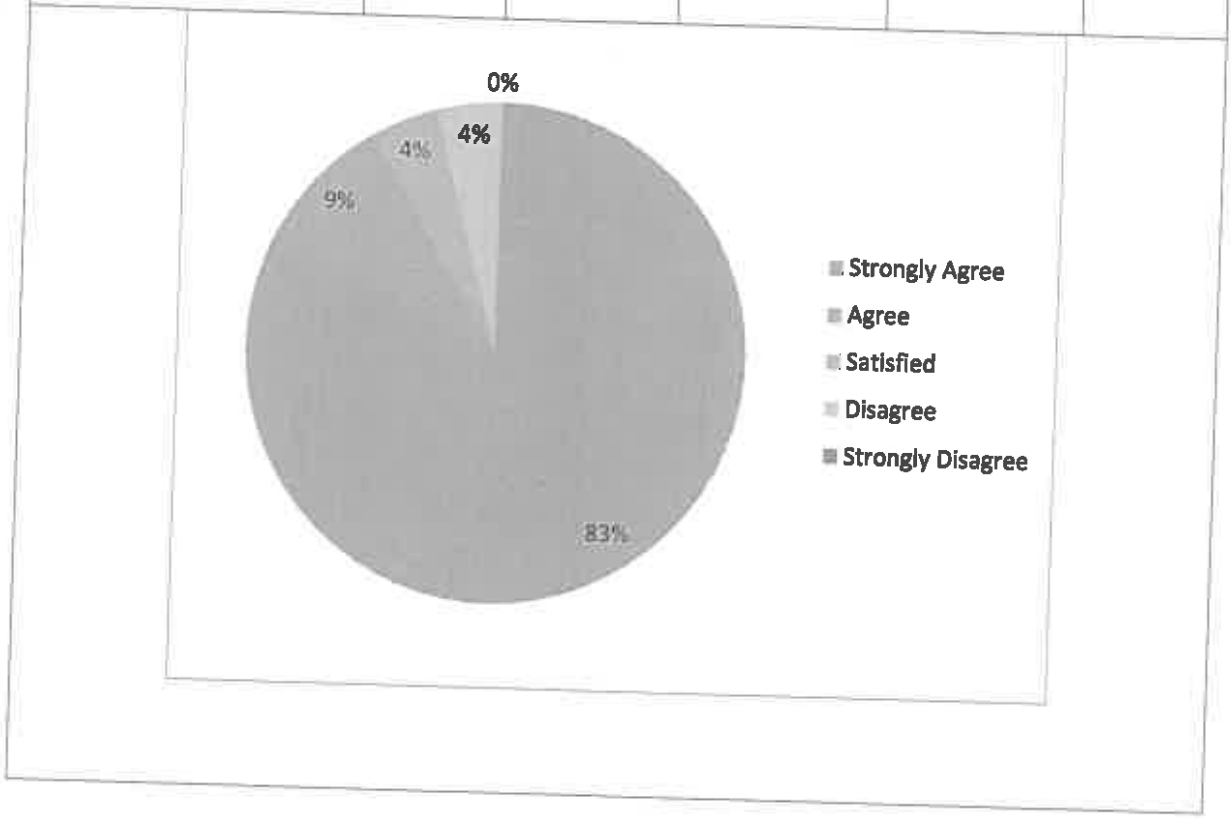
Sr. No.	Suggestions	Action Taken	Outcome
1	**Enhance Employability for Higher Education:** Strengthen curriculum support for students pursuing higher education.	Introduced advanced elective courses and research opportunities, with guidance on further studies.	Improved readiness for higher education, with more students opting for postgraduate studies.
2	**Focus on Personality Development and Ethics:** Integrate courses focused on personal growth, ethics, and professional behavior.	Added modules on ethics, communication skills, and leadership development into the curriculum.	Students developed stronger interpersonal skills, ethical decision-making, and leadership capabilities.
3	**Improve Balance Between Theory and Practical Application:** Ensure that students have more opportunities to apply theoretical concepts in real-world scenarios.	Increased the number of lab sessions, industry projects, and case studies in the curriculum.	Enhanced student ability to apply theoretical knowledge to practical situations, improving career readiness.
4	**Strengthen Multidisciplinary Learning:** Expand interdisciplinary courses to encourage a broader skill set.	Introduced cross-disciplinary courses combining engineering with technology, business, and environmental science.	Students gained a more diverse skill set, increasing their versatility and adaptability in the job market.

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Analysis of Peer Academician's Feedback of School of Engineering and Technology through Table and Pie Chart

Q.1 The syllabus of the courses are proper in relation to the competencies expected out of the programme.

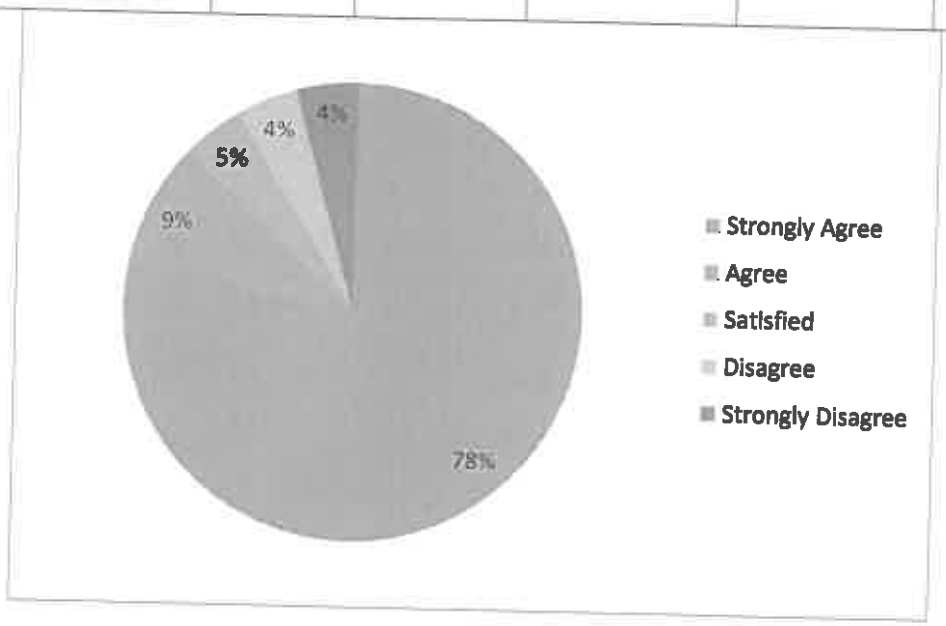
The syllabus of the courses are proper in relation to the competencies expected out of the programme.	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	82.60	8.69	4.34	4.34	0.00



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Q.2 The sequence and overall organization of the courses is proper in the curriculum.

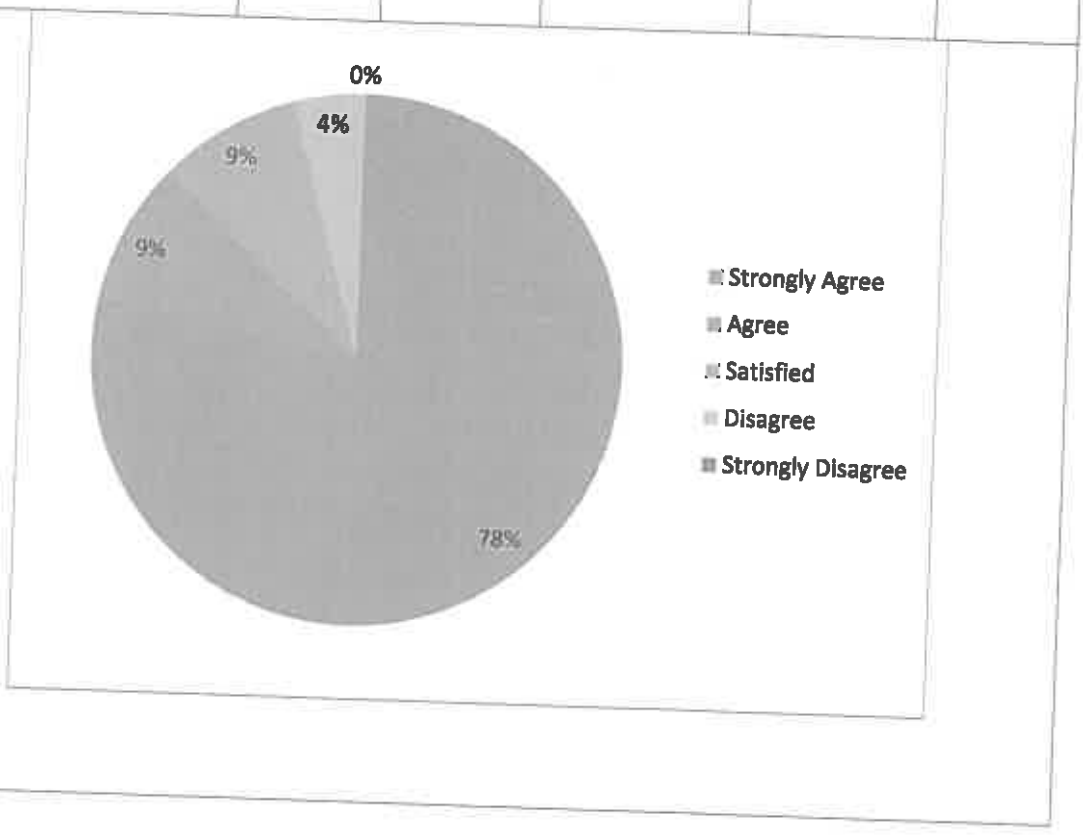
The sequence and overall organization of the courses is proper in the curriculum.	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	78.26	8.69	4.34	4.34	4.34



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Q.3 The curriculum has adequate scope for multidisciplinary knowledge and sufficient number of elective courses.

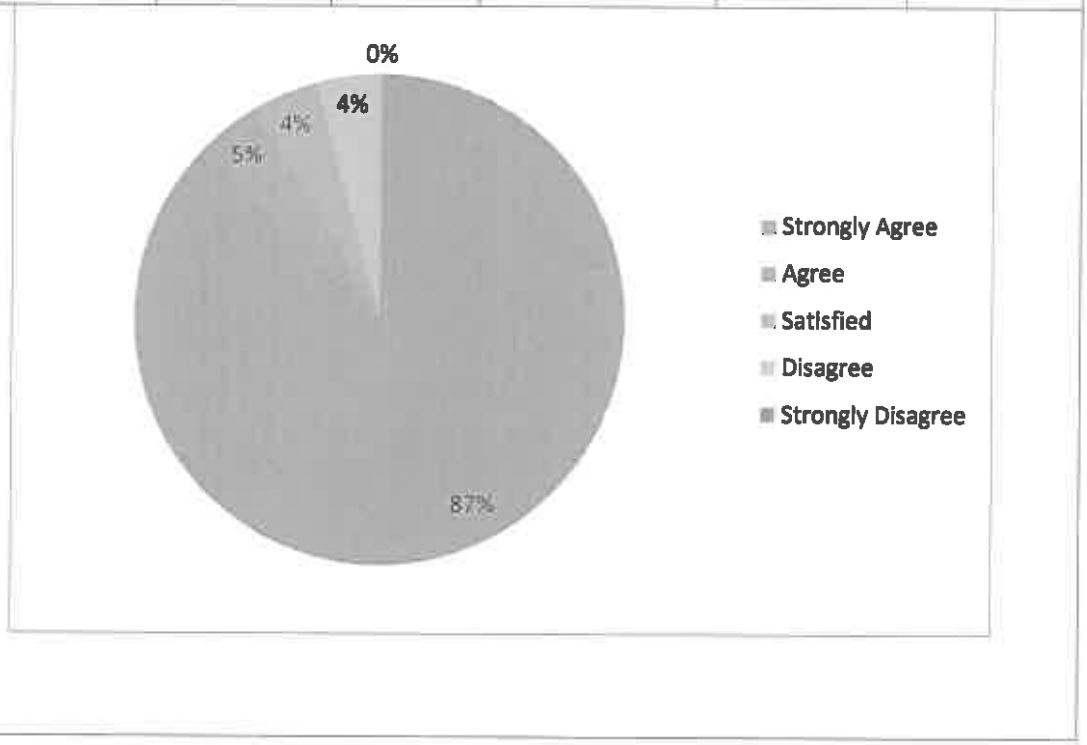
The curriculum has adequate scope for multidisciplinary knowledge and sufficient number of elective courses.	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	78.26	8.69	8.69	4.34	0.00



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Babu Vijendra Marg, Adarsh Institutional
Area Gangoh, Distt. Saharanpur (U.P.)
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Q.4 Extra care has been taken for extra learning or self-learning while designing the courses.

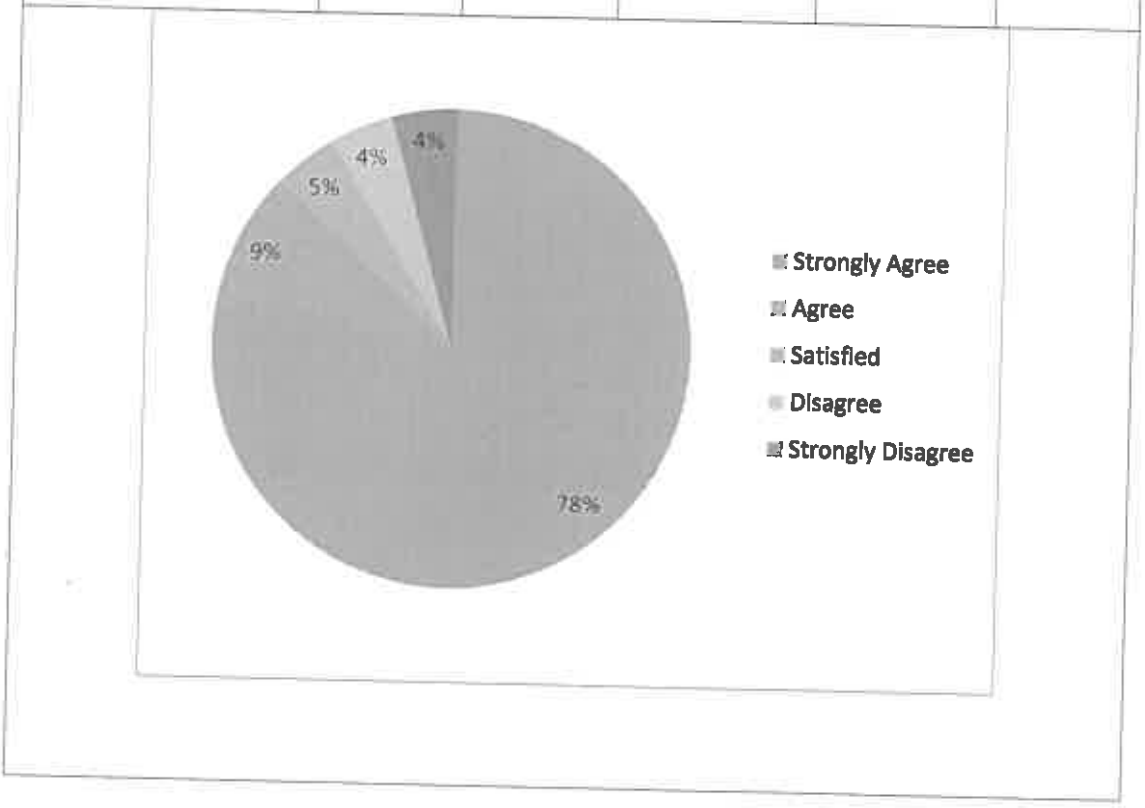
Extra care has been taken for extra learning or self-learning while designing the courses.	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	86.95	4.34	4.34	4.34	0.00



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Q.5 The curriculum provides enough scope for improving entrepreneurial skill as well as industry readiness.

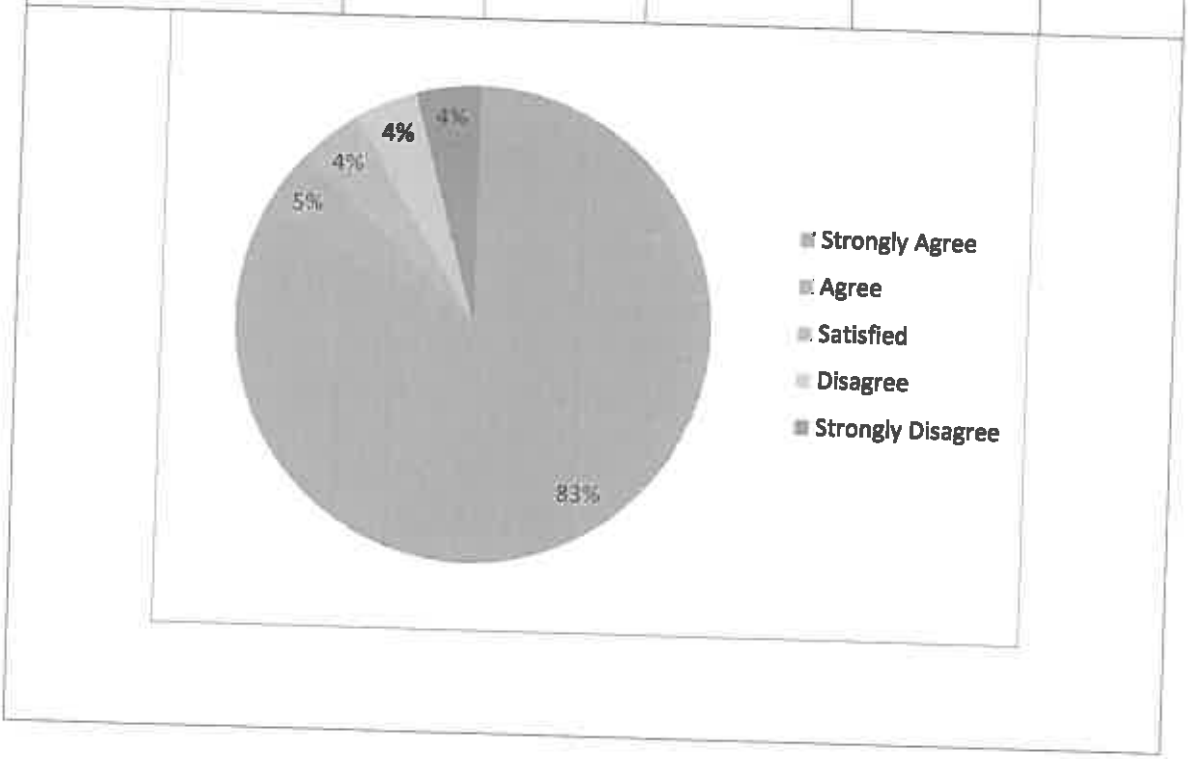
The curriculum provides enough scope for improving entrepreneurial skill as well as industry readiness.	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	78.26	8.69	4.34	4.34	4.34



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Q.6 The curriculum provides ample knowledge for increased employability and to promote students for higher education.

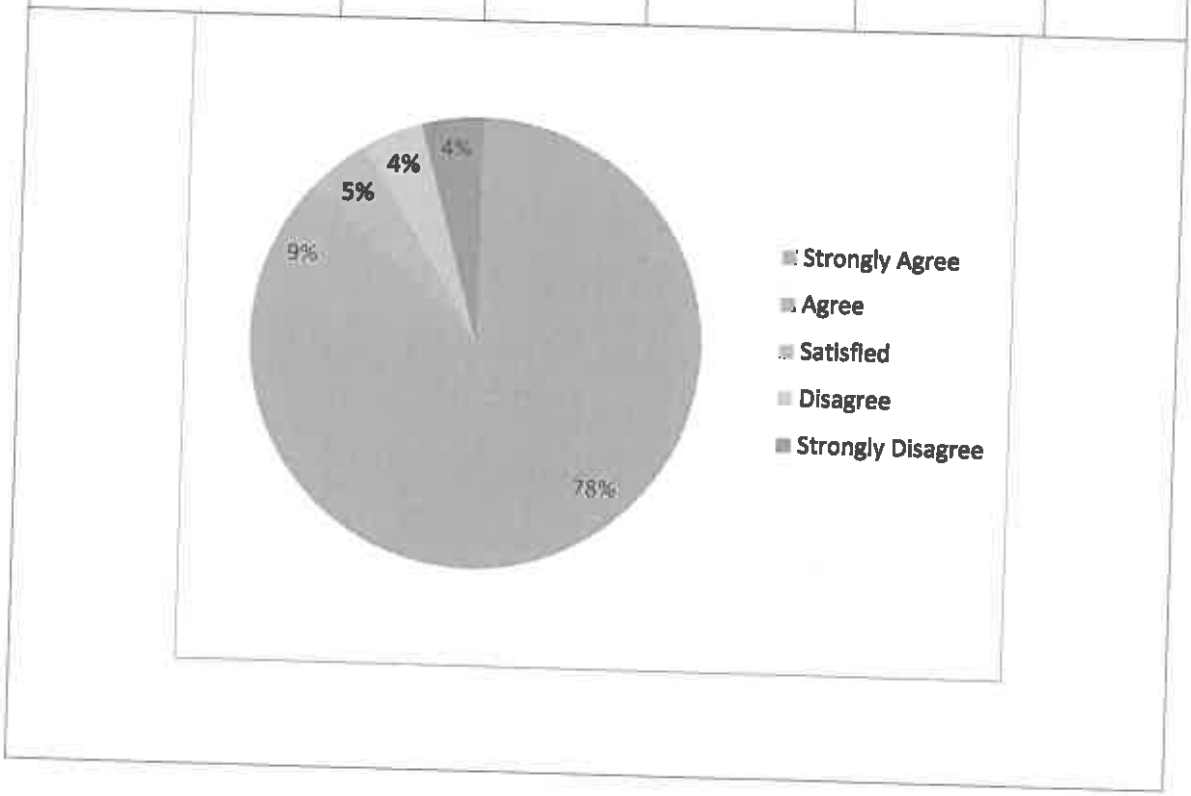
The curriculum provides ample knowledge for increased employability and to promote students for higher education.	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	82.60	4.34	4.34	4.34	4.34



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Q.7 The curriculum has focus on personality development by presence of courses on human values and professional ethics

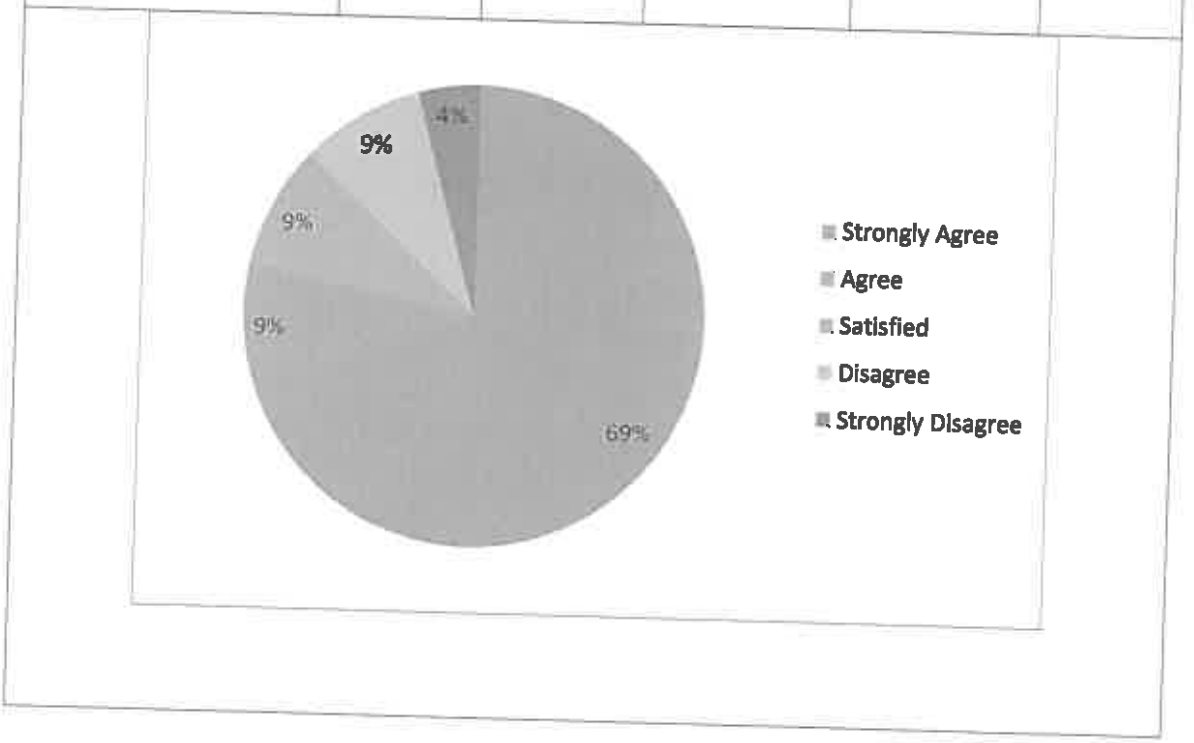
The curriculum has focus on personality development by presence of courses on human values and professional ethics	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	78.26	8.68	4.34	4.34	4.34



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Q.8 The curriculum is well organized and balanced for the programme with proper credit allocation.

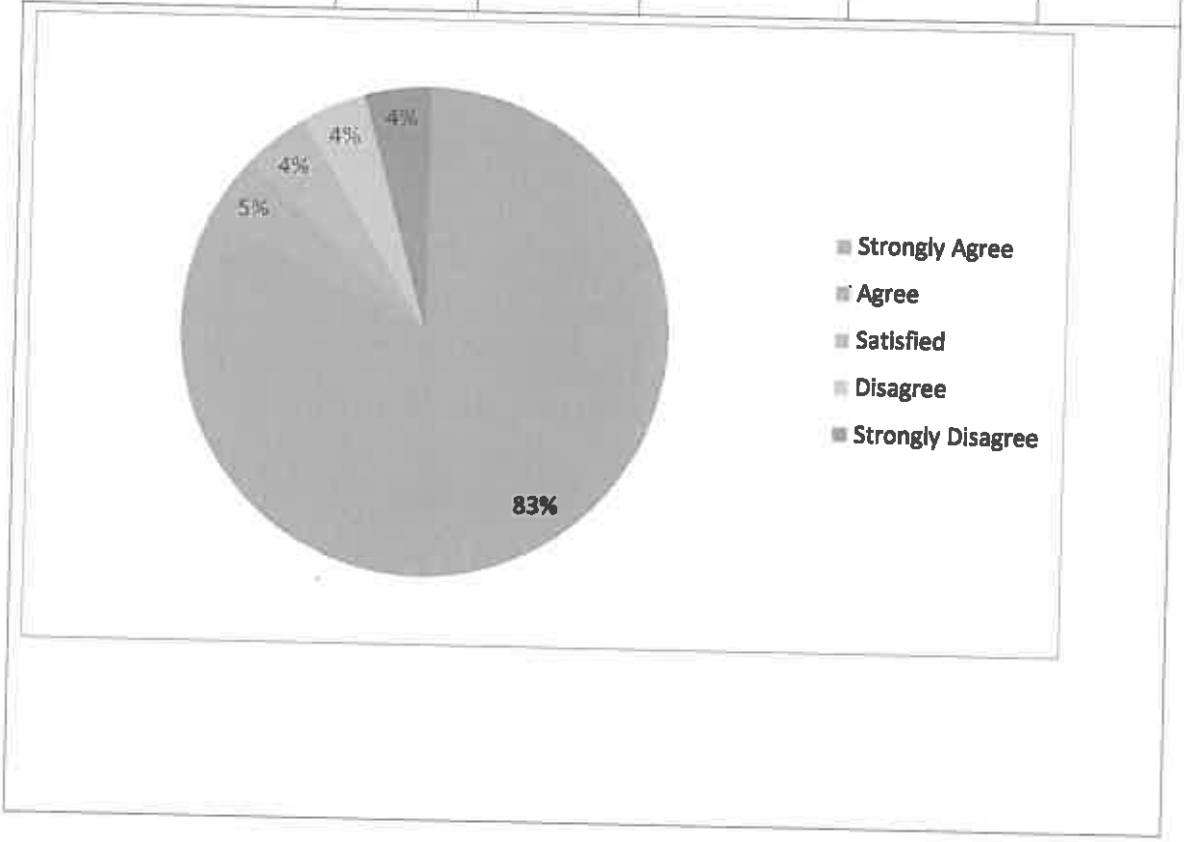
The curriculum is well organized and balanced for the programme with proper credit allocation.	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	69.56	8.69	8.69	8.69	4.34



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Q.9 The courses have adequate balance between theory and application for a student's holistic development.

The courses have adequate balance between theory and application for a student's holistic development.	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	82.60	4.34	4.34	4.34	4.34



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School of Engineering & Technology (23)

Total no. of Peer Academicians: 23		Strongly Agree	Agree	Satisfied	Disagree	Strongly Disagree
The syllabus of the courses are proper in relation to the competencies expected out of the programme.	No. of Academicians	19.00	2.00	1.00	1.00	0.00
	Percentage	82.60	8.69	4.34	4.34	0.00
The sequence and overall organization of the courses is proper in the curriculum	No. of Academicians	18.00	2.00	1.00	1.00	1.00
	Percentage	78.26	8.69	4.34	4.34	4.34
The curriculum has adequate scope for multidisciplinary knowledge and sufficient number of elective courses	No. of Academicians	18.00	2.00	2.00	1.00	0.00
	Percentage	78.26	8.69	8.69	4.34	0.00
Extra care has been taken for extra learning or self-learning while designing the courses.	No. of Academicians	20.00	1.00	1.00	1.00	0.00
	Percentage	86.95	4.34	4.34	4.34	0.00
The curriculum provides enough scope for improving entrepreneurial skill as well as industry readiness.	No. of Academicians	18.00	2.00	1.00	1.00	1.00
	Percentage	78.26	8.69	4.34	4.34	4.34
The curriculum provides ample knowledge for increased employability and to promote students for higher education.	No. of Academicians	19.00	1.00	1.00	1.00	1.00
	Percentage	82.60	4.34	4.34	4.34	4.34
The curriculum has focus on personality development by presence of courses on human values and professional ethics	No. of Academicians	18.00	2.00	1.00	1.00	1.00
	Percentage	78.26	8.68	4.34	4.34	4.34
The curriculum is well	No. of	16.00	2.00	2.00	2.00	1.00

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organized and balanced for the programme with proper credit allocation.	Academicians					
	Percentage	69.56	8.69	8.69	8.69	4.34
The courses have adequate balance between theory and application for a student's holistic development.	No. of Academicians	19.00	1.00	1.00	1.00	1.00
	Percentage	82.60	4.34	4.34	4.34	4.34

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Analysis of Feedback:

The curriculum feedback reflects strong alignment between the syllabus and the competencies expected from the program, with a high rating of 95.63%. The course sequence and overall organization are also well-received, at 91.29%, suggesting a clear structure that supports student learning. The curriculum is well-rounded with an adequate scope for multidisciplinary knowledge and ample elective courses (95.64%), offering students diverse learning opportunities. Extra care for self-learning and fostering independent growth has been integrated effectively, as reflected in the same high rating of 95.63%. However, there are some areas where further enhancement could be made, particularly in entrepreneurial skill development and industry readiness, which were rated lower at 91.29%. Similarly, the focus on personality development through courses on human values and ethics is commendable but may require further emphasis. The balance between theory and application is well-maintained, contributing to the students' holistic development. The only notable area for improvement is the organization of the program with respect to credit allocation, which is rated somewhat lower at 86.94%, indicating potential scope for better balance or alignment in credit distribution.

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Action Taken Report

(School of Engineering and Technology)

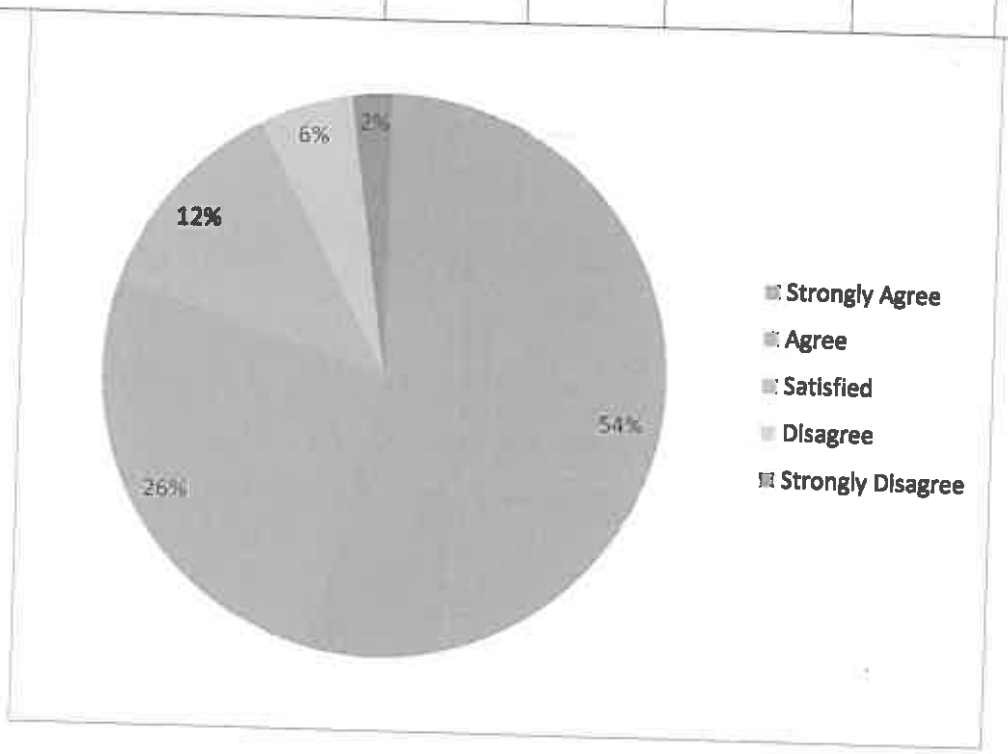
Sr.No.	Suggestions	Action Taken	Outcome
1	Enhance entrepreneurial skill development and industry readiness	Introduced specialized courses on innovation and entrepreneurship in technology; collaborated with industry experts for workshops and mentorship programs	Increased participation in startup challenges; several students initiated technology-based entrepreneurial projects; strengthened industry-academia connections.
2	Further emphasis on personality development, particularly in human values and ethics	Introduced more case studies and real-world scenarios related to engineering ethics, environmental responsibility, and leadership in the curriculum	Students reported better understanding of ethical dilemmas in engineering; improved leadership and teamwork skills as reflected in group project outcomes.
3	Improve balance in credit allocation across courses	Revised course structure to ensure more even distribution of credits across theory and practical sessions; reduced overload in some theory-heavy subjects	Students found the workload more manageable; better student engagement in practical projects and assignments; clearer understanding of course objectives.
4	Strengthen multidisciplinary knowledge integration	Added cross-disciplinary elective courses, particularly in areas like AI and sustainable engineering, with more emphasis on integrating concepts from different fields	Higher student enrollment in interdisciplinary electives; improved understanding of how different engineering domains intersect in real-world applications.

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EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional
Area Gangoh, Distt. Saharanpur (U.P.)
247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

Analysis of Students' Feedback of School of Engineering and Technology through Table and Pie Chart

Q.1. Whether the curriculum has depth of the subjects and clears the concept?

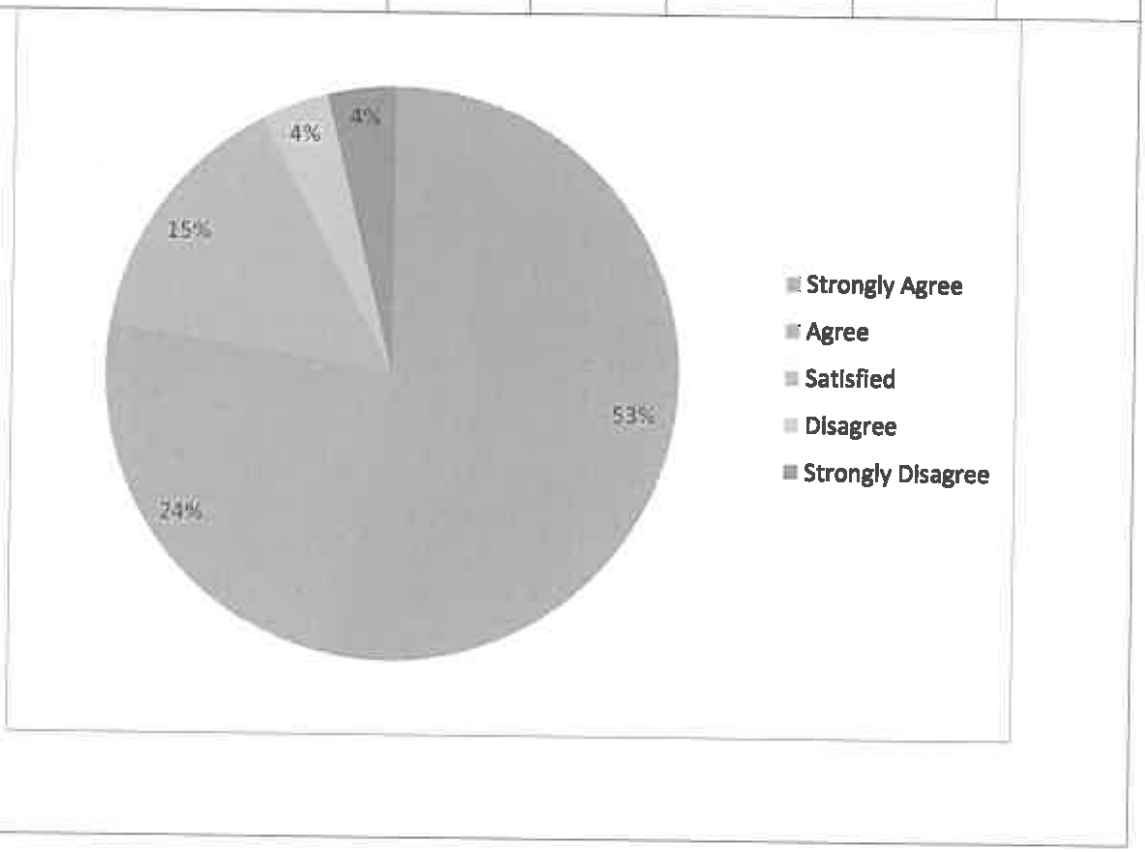
Curriculum has depth of the subjects and clears the concept	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	53.84615	26.15385	12.30769	5.384615	2.307692



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Babu Vijendra Marg, Adarsh Institutional
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247341, India
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Q.2. How do you rate the course outcomes and relevance to the course content?

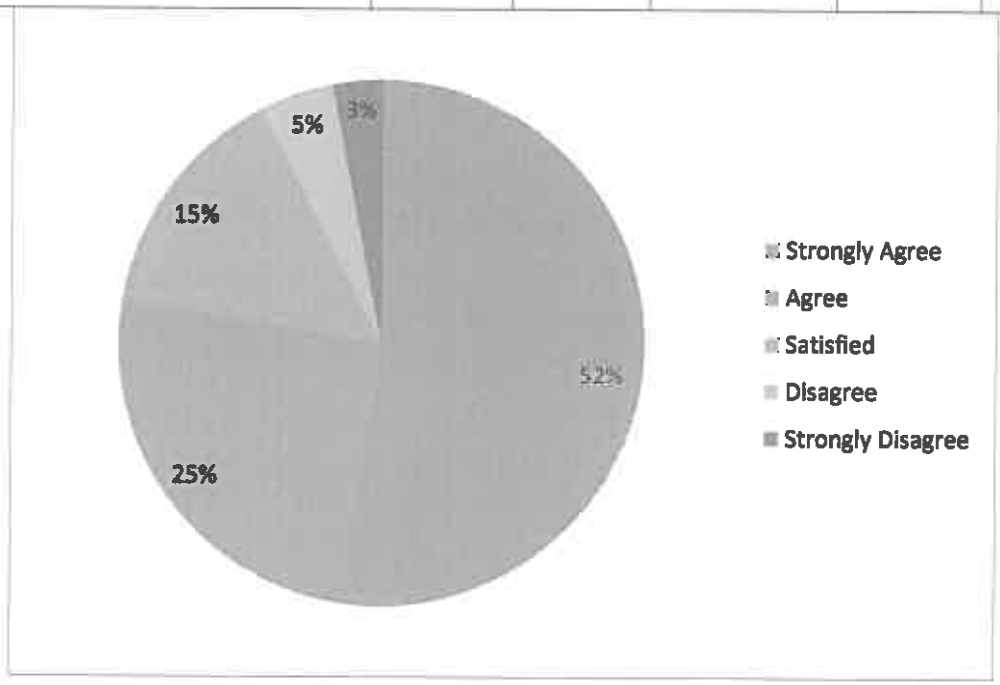
Rate the course outcomes and relevance to the course content	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	53.07692	24.61538	14.61538	3.846154	3.846154



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Q.3. How do you rate the sequence of units in the courses?

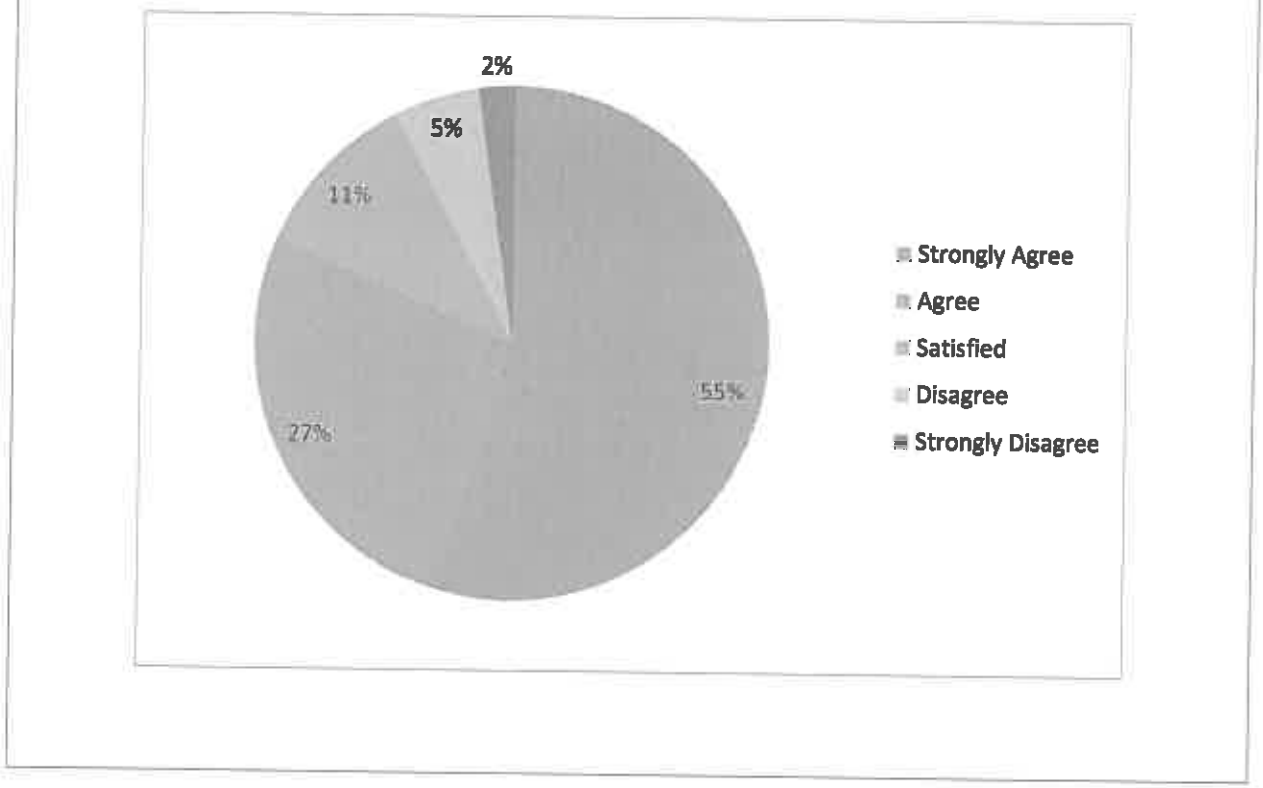
Rate the sequence of units in the courses	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	52.30769	25.38462	14.61538	4.615385	3.076923



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Q.4. How do you rate the credits allotted to individual courses?

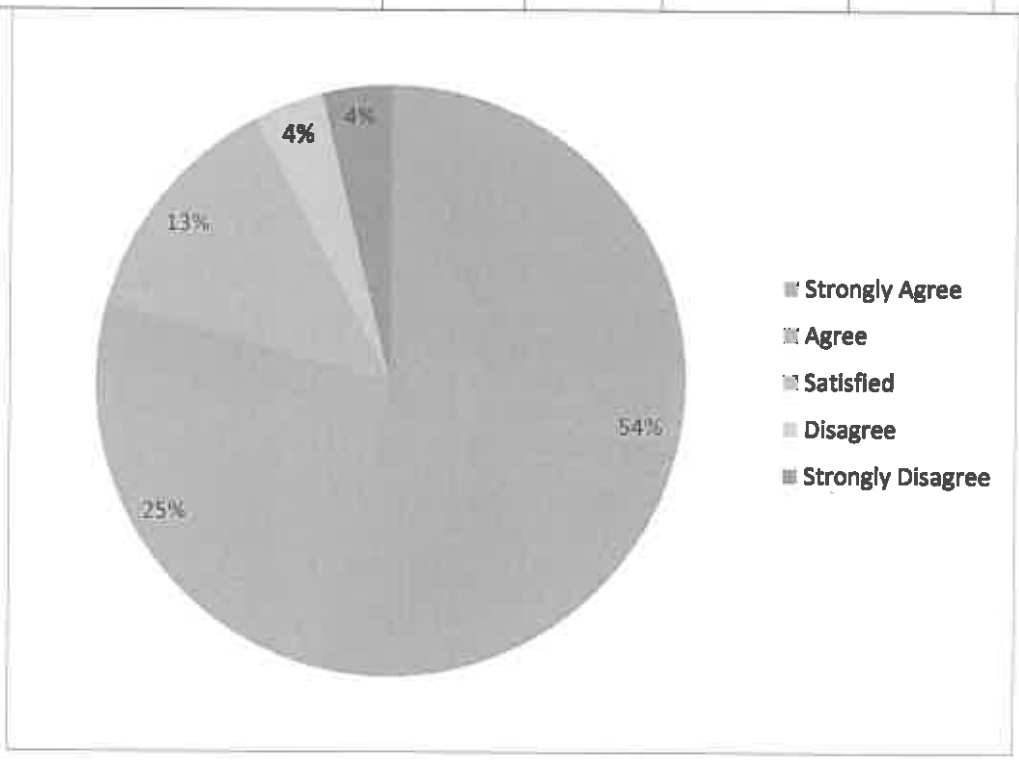
Rate the credits allotted to Individual courses	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	54.61538	26.92308	10.76923	5.384615	2.307692



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Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
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Q.5. Does the curriculum focus on employability/career orientation?

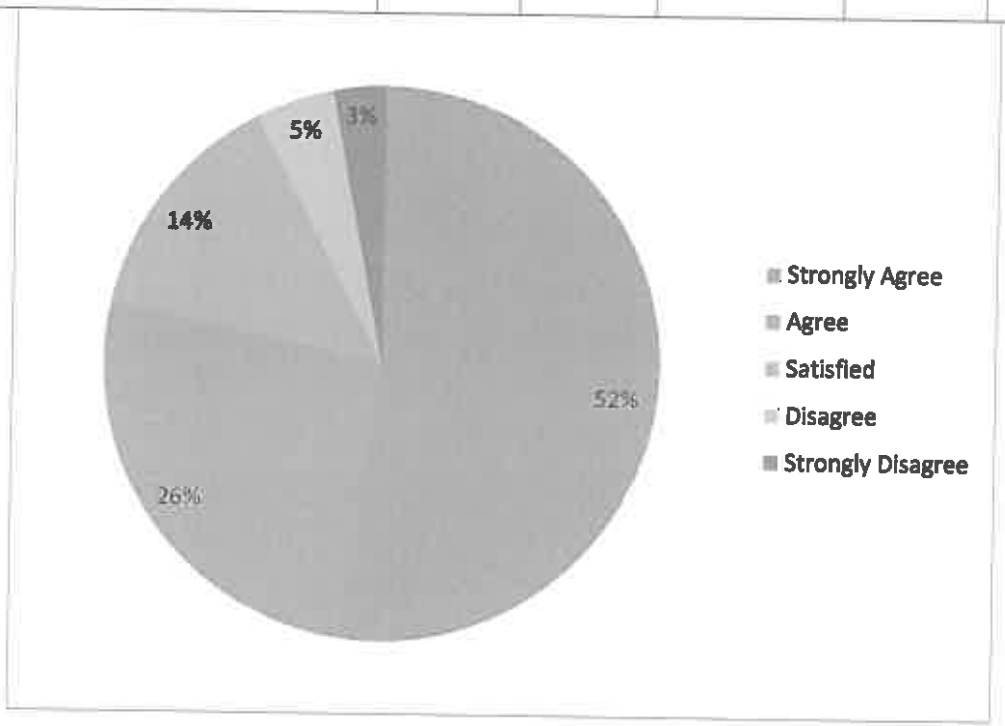
Curriculum focus on employability/career orientation	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	53.84615	25.38462	13.07692	3.846154	3.846154



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Q.6. Does the curriculum focus on skill development/entrepreneurship?

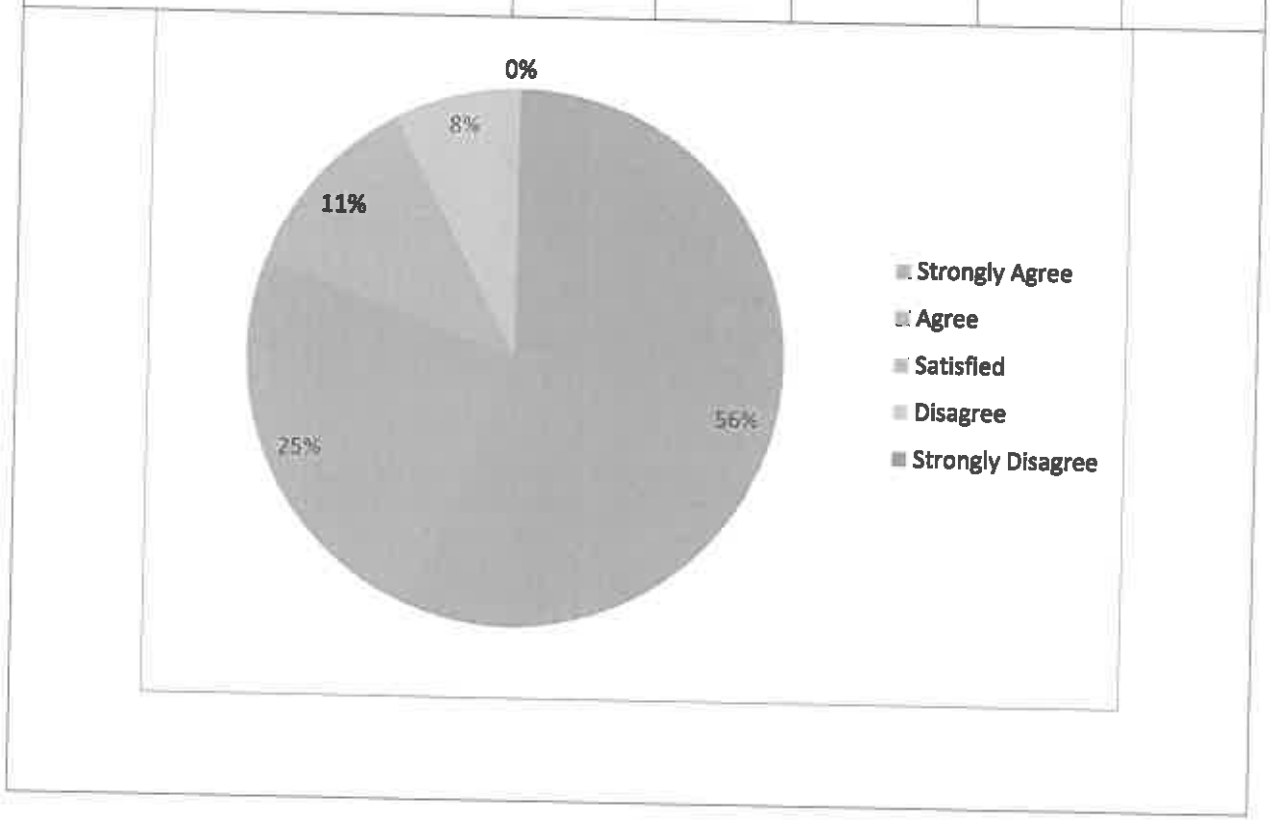
Curriculum focus on skill development/entrepreneurship	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	52.30769	26.15385	13.84615	4.615385	3.076923



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Q.7. Does the curriculum have satisfactory number of elective courses?

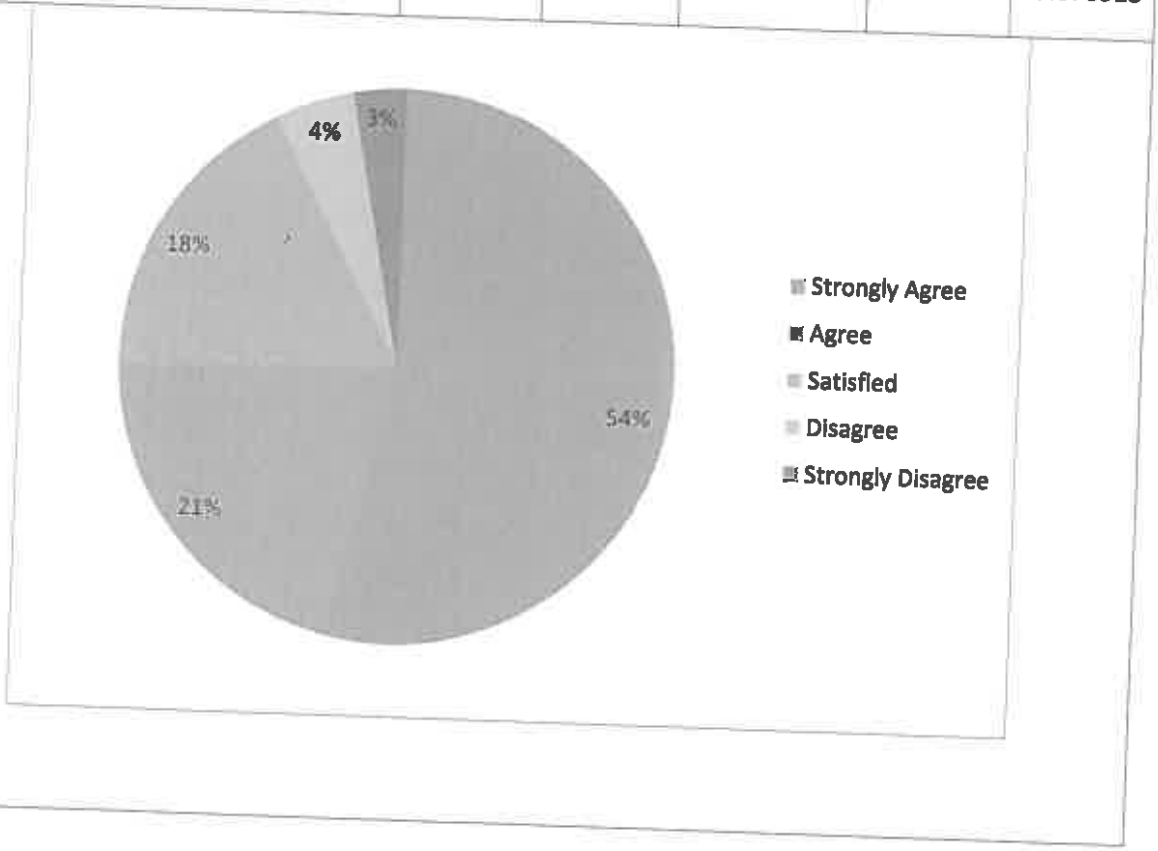
Curriculum have satisfactory number of elective courses	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	56.15385	24.61538	11.53846	7.692308	0



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Q.8. Does the curriculum focus on life skill or help in value addition?

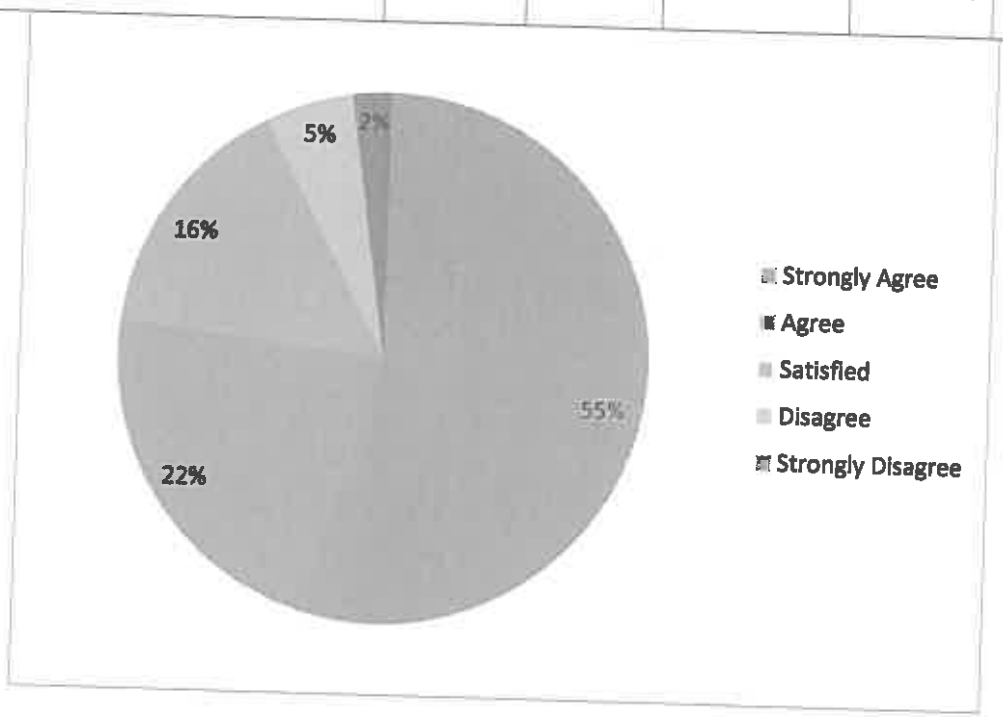
Curriculum focus on life skill or help in value addition	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	53.84615	20.76923	17.69231	4.615385	3.076923



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Q.9. Do the theory subjects are properly linked to the laboratories/provide real-life exposure?

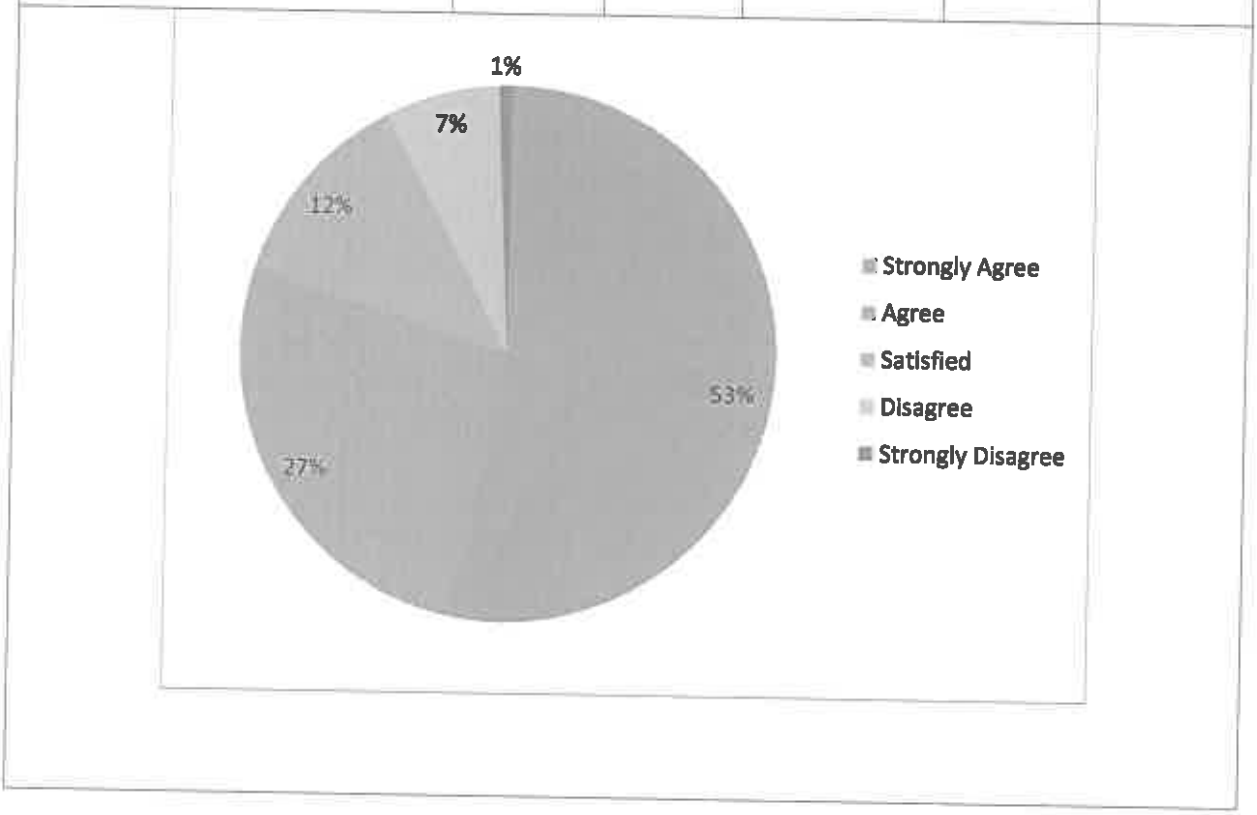
Theory subjects are properly linked to the laboratories/provide real-life exposure	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	54.61538	22.30769	15.38462	5.384615	2.307692



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Q.10. Does the curriculum provide multidisciplinary knowledge/information to a student?

Curriculum provide multidisciplinary knowledge/information to a student	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	53.07692	26.92308	12.30769	6.923077	0.769231



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School of Engineering & Technology (130)						
Question	Details	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Whether the curriculum has depth of the subjects and clears the concept?	No of Students	70	34	16	7	3
	Percentage	53.84615385	26.15384615	12.30769231	5.384615385	2.307692308
How do you rate the course outcomes and relevance to the course content?	No of Students	69	32	19	5	5
	Percentage	53.07692308	24.61538462	14.61538462	3.846153846	3.846153846
How do you rate the sequence of units in the courses?	No of Students	68	33	19	6	4
	Percentage	52.30769231	25.38461538	14.61538462	4.615384615	3.076923077
How do you rate the credits allotted to individual courses?	No of Students	71	35	14	7	3
	Percentage	54.61538462	26.92307692	10.76923077	5.384615385	2.307692308
Does the curriculum focus on employability/career orientation?	No of Students	70	33	17	5	5
	Percentage	53.84615385	25.38461538	13.07692308	3.846153846	3.846153846
Does the curriculum focus on skill development/entrepreneurship?	No of Students	68	34	18	6	4
	Percentage	52.30769231	26.15384615	13.84615385	4.615384615	3.076923077
Does the curriculum have satisfactory number of elective courses?	No of Students	73	32	15	10	0
	Percentage	56.15384615	24.61538462	11.53846154	7.692307692	0
Does the curriculum focus on life skill or help in value addition?	No of Students	70	27	23	6	4
	Percentage	53.84615385	20.76923077	17.69230769	4.615384615	3.076923077
Do the theory subjects are properly linked to the laboratories/provide real-life exposure?	No of Students	71	29	20	7	3
	Percentage	54.61538462	22.30769231	15.38461538	5.384615385	2.307692308
Does the curriculum provide multidisciplinary knowledge information to a student?	No of Students	69	35	16	9	1
	Percentage	53.07692308	26.92307692	12.30769231	6.923076923	0.769230769

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Babu Vijendra Marg, Adarsh Institutional
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Analysis of Feedback:

The student feedback for the School of Engineering & Technology reflects a generally positive perception of the curriculum, with particular strengths in subject depth, career focus, and real-life exposure. A majority of students (53.85%, 70 students) strongly agree that the curriculum provides sufficient depth and clears concepts, while 26.15% (34 students) agree. Similarly, 53.08% (69 students) strongly agree and 24.62% (32 students) agree that course outcomes are closely aligned with course content, ensuring the relevance of the program.

The structure of the courses was also rated positively, with 52.31% (68 students) strongly agreeing and 25.38% (33 students) agreeing that the sequence of units is effective. Credit allocation was appreciated by 54.62% (71 students) who strongly agreed and 26.92% (35 students) who agreed, indicating satisfaction with how credits are distributed across courses.

In terms of career orientation and employability, 53.85% (70 students) strongly agree and 25.38% (33 students) agree that the curriculum effectively supports employability. The emphasis on skill development and entrepreneurship also received strong support, with 52.31% (68 students) strongly agreeing and 26.15% (34 students) agreeing.

Elective courses were well-received, with 56.15% (73 students) strongly agreeing and 24.62% (32 students) agreeing that the number of electives is satisfactory. However, life skills and value addition received a mixed response, with 53.85% (70 students) strongly agreeing but only 20.77% (27 students) agreeing, suggesting room for improvement in this area. The connection between theory and real-life exposure, such as laboratory work, was positively rated, with 54.62% (71 students) strongly agreeing and 22.31% (29 students) agreeing.

Lastly, 53.08% (69 students) strongly agreed and 26.92% (35 students) agreed that the curriculum offers multidisciplinary knowledge. Overall, students view the curriculum as solid and well-rounded, though there are opportunities to enhance life skills integration and further improve practical exposure.

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Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
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E-mail: registrargangoh@shobhituniversity.ac.in
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Action Taken Report

(School of Engineering and Technology)

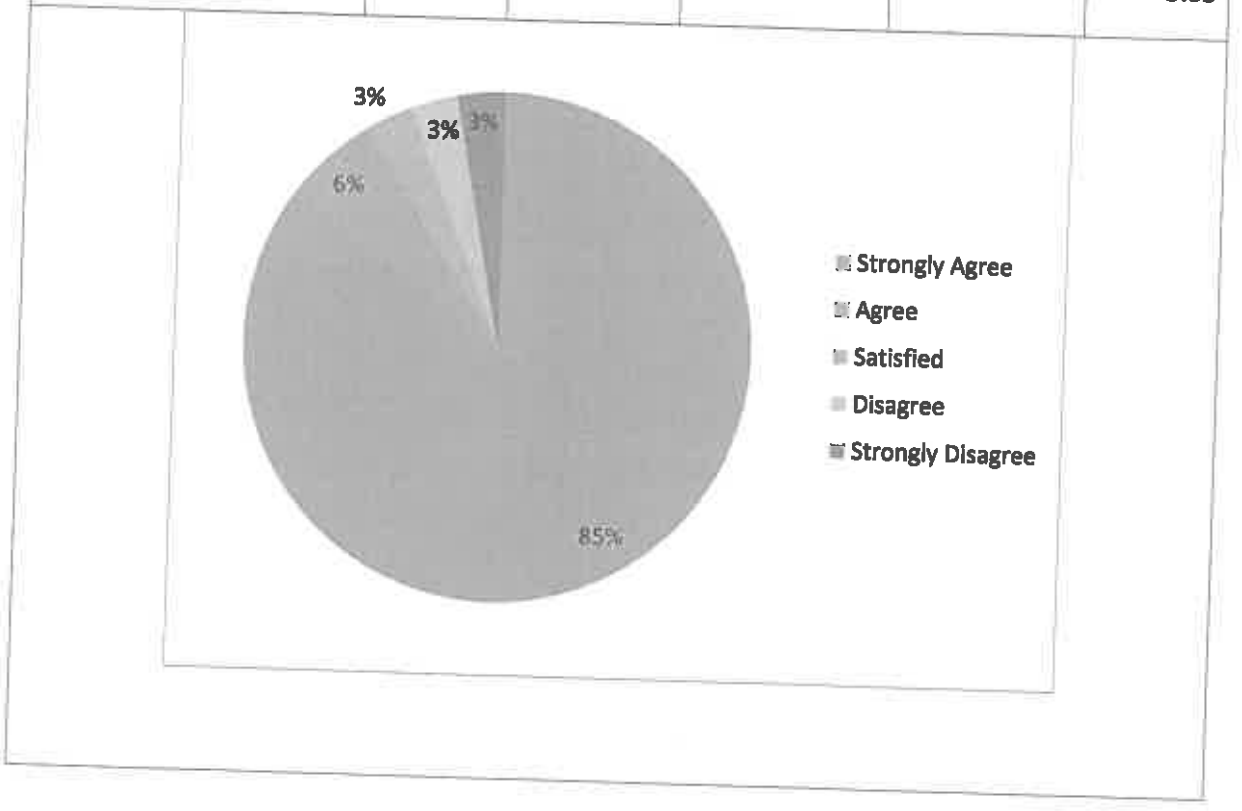
Sr. No.	Suggestions	Action Taken	Outcome
1	Improve life skills integration into the curriculum.	Introduced additional workshops and seminars focusing on life skills, communication, and personal development.	Increased student satisfaction with life skills and value addition, helping students to better prepare for industry demands.
2	Enhance practical exposure and real-life applications in courses.	Strengthened laboratory work, industry partnerships, and project-based learning opportunities.	Students gained more hands-on experience, increasing their confidence and ability to apply theoretical knowledge.
3	Expand the range of elective courses available.	Increased the variety of elective courses offered across different engineering disciplines.	Students had more flexibility in tailoring their education, leading to a broader range of career prospects.
4	Further refine the sequence of units for better flow and understanding.	Reviewed and adjusted the sequence of courses based on student feedback and faculty recommendations.	Improved the clarity and effectiveness of the curriculum structure, helping students understand the course material more easily.

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional
Area Gangoh, Distt. Saharanpur (U.P.)
247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

Analysis of Teacher's Feedback of School of Engineering and Technology through Table and Pie Chart

Q.1 The curriculum is well organized and balanced for the programme with proper credit allocation.

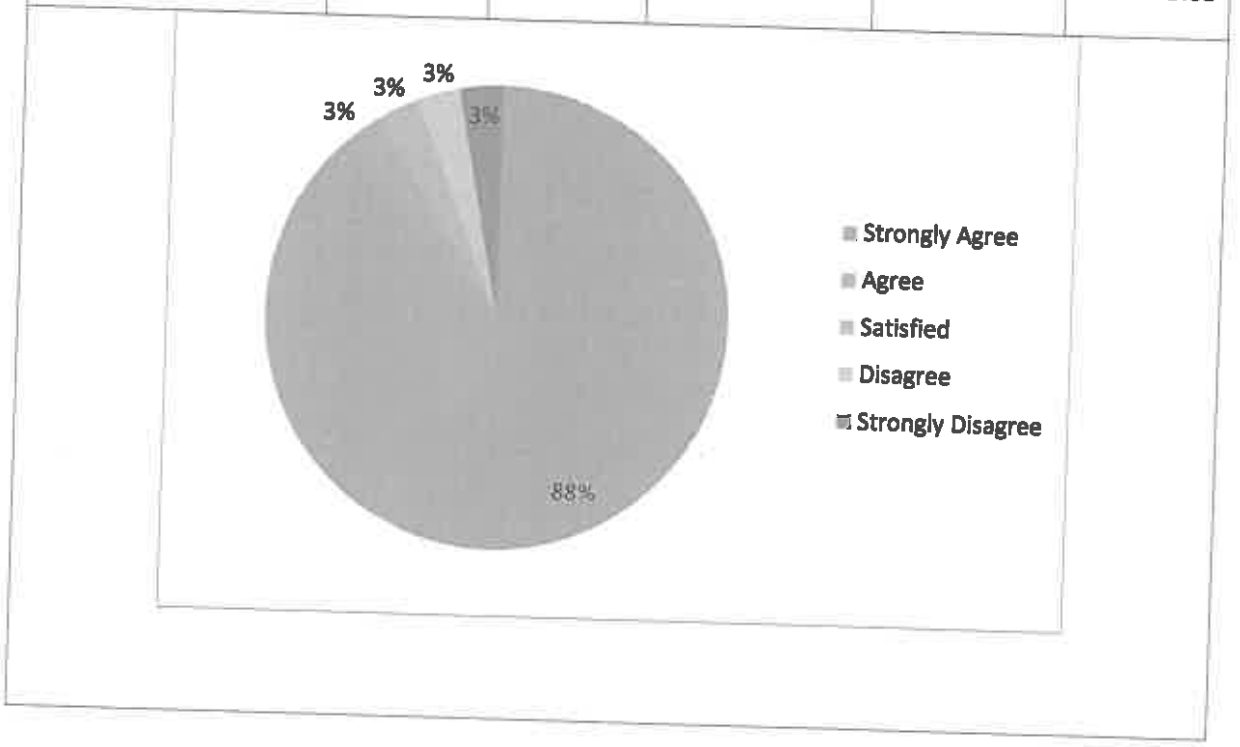
The curriculum is well organized and balanced for the programme with proper credit allocation	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	84.85	6.06	3.03	3.03	3.03



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Q.2 The courses have adequate balance between theory and application for student's holistic development.

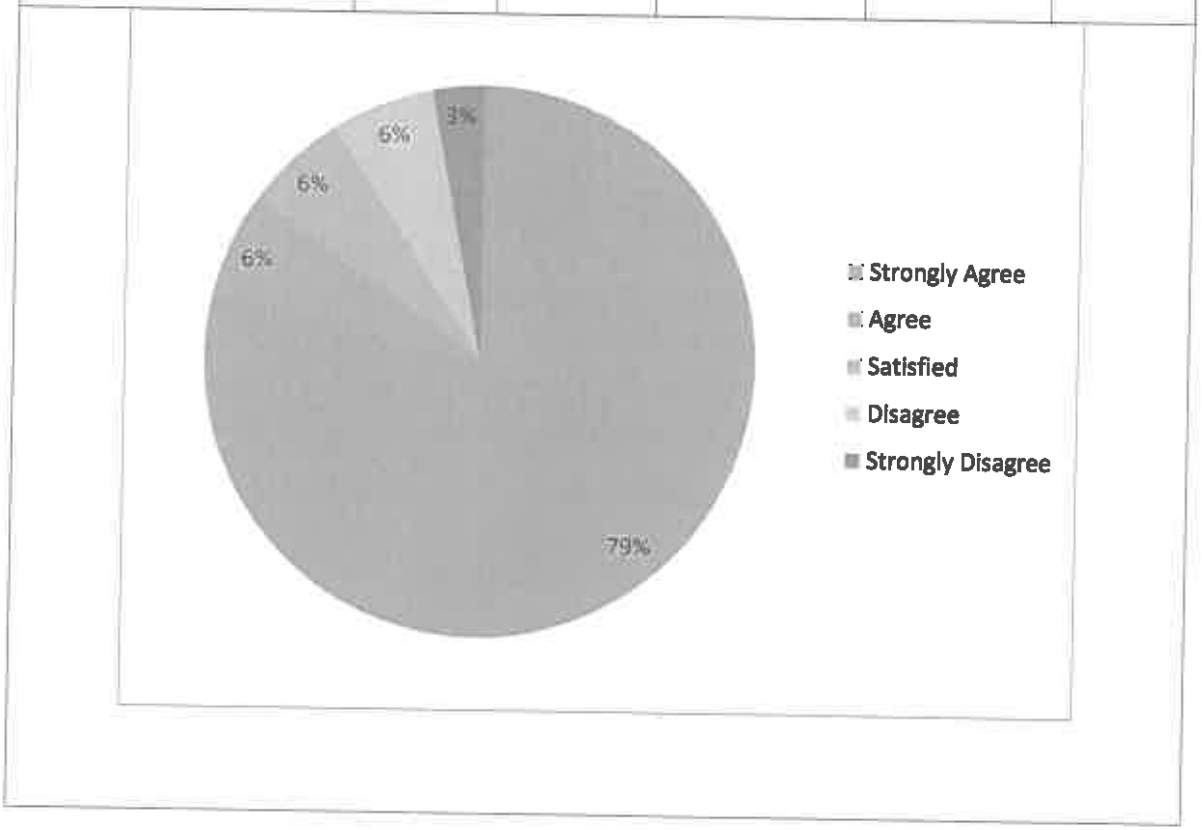
The courses have adequate balance between theory and application for student's holistic development.	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	87.88	3.03	3.03	3.03	3.03



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Q.3 The curriculum has adequate scope for multidisciplinary knowledge and sufficient number of elective courses.

The curriculum has adequate scope for multidisciplinary knowledge and sufficient number of elective courses.	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	78.79	6.06	6.06	6.06	3.03

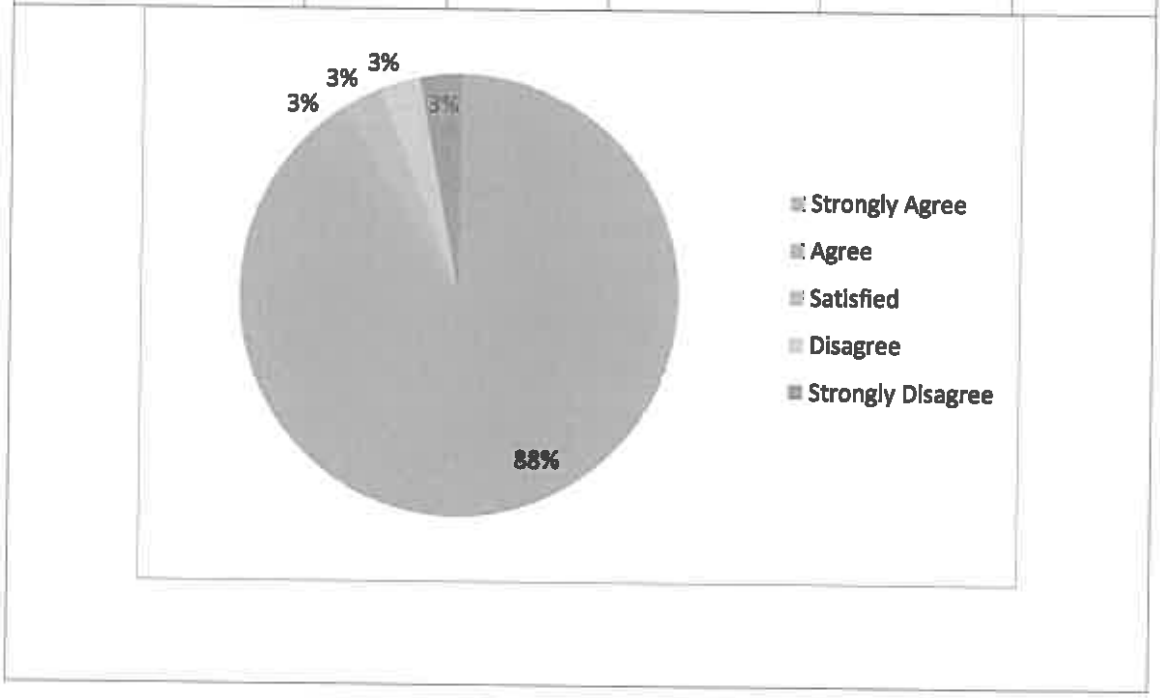


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Q.4 The curriculum has focus on personality development by presence of courses on human values and professional ethics

The curriculum has focus on personality development by presence of courses on human values and professional ethics.	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	87.88	3.03	3.03	3.03	3.03

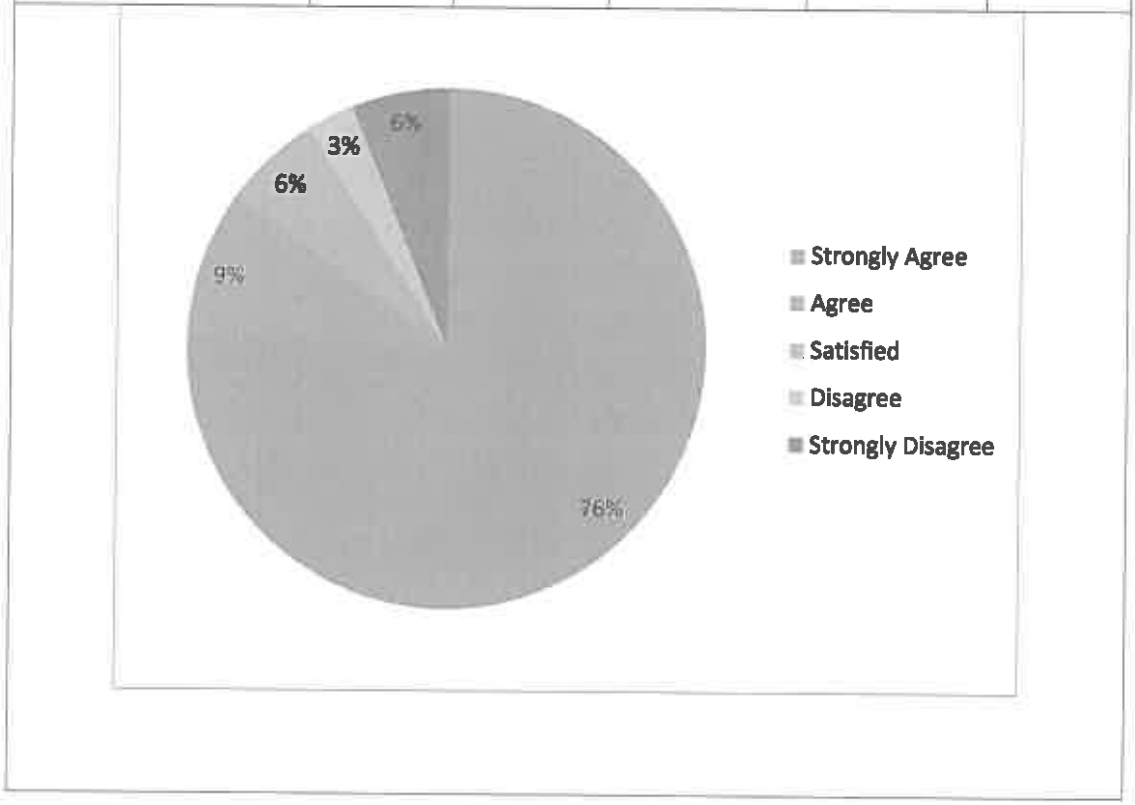


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Q.5 The curriculum provides enough scope for improving entrepreneurial skill as well as industry readiness.

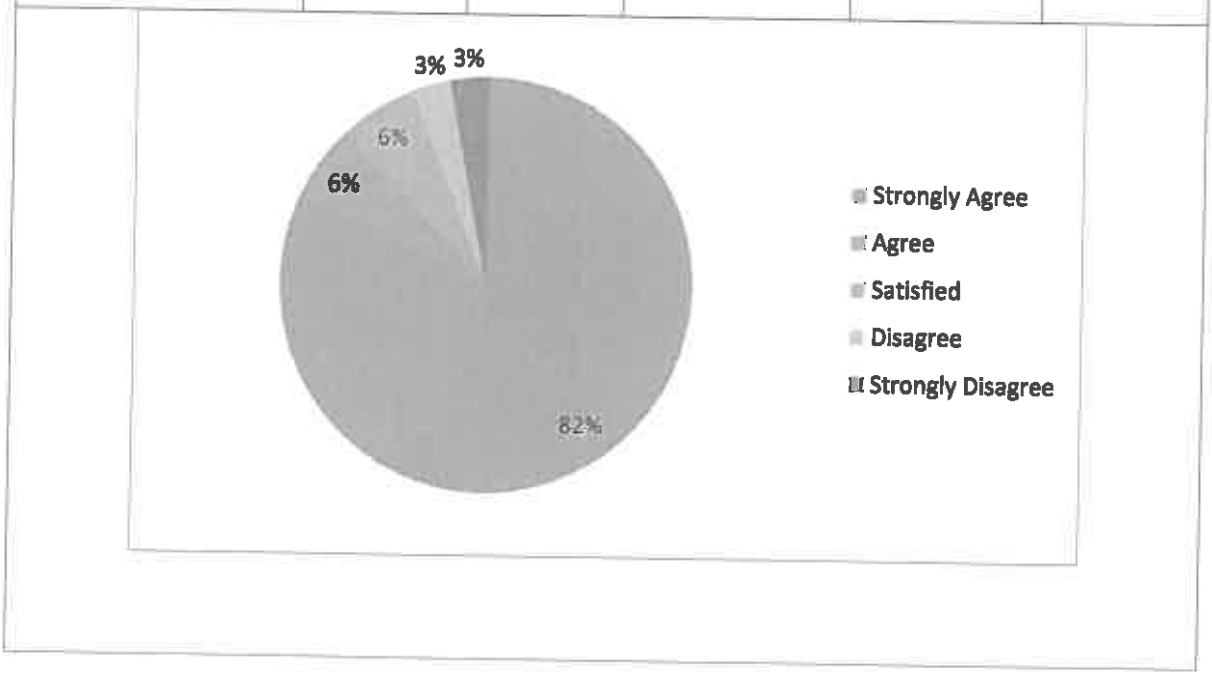
The curriculum provides enough scope for improving entrepreneurial skill as well as industry readiness.	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	75.76	9.09	6.06	3.03	6.06



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247341, India
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Q.6 The curriculum provides ample knowledge for increased employability and to promote students for higher education.

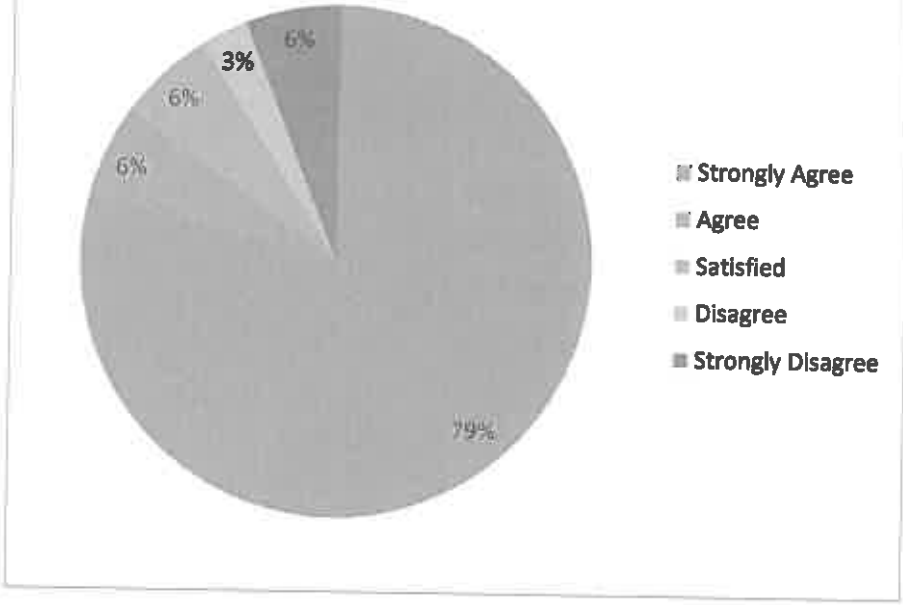
The curriculum provides ample knowledge for increased employability and to promote students for higher education.	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	81.82	6.06	6.06	3.03	3.03



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Q.7 The curriculum helps in enhancing problem solving capability related to local/global societal issues.

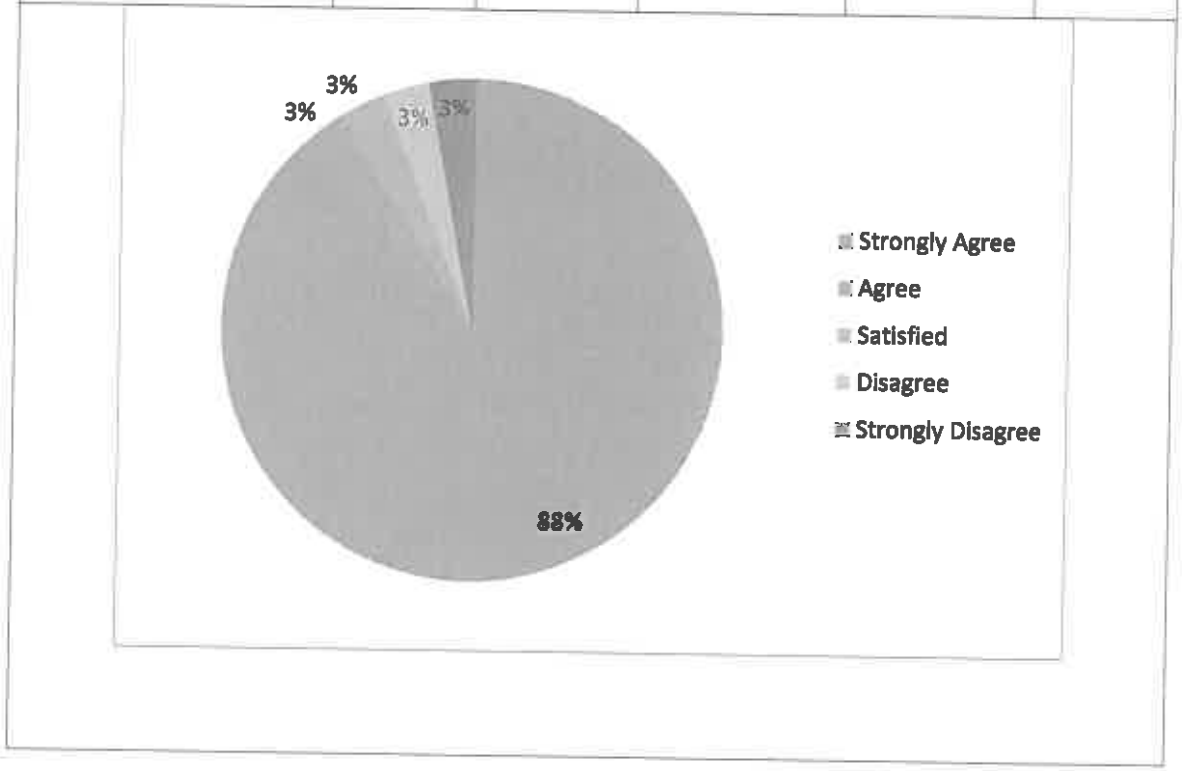
The curriculum helps in enhancing problem solving capability related to local/global societal issues.	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	78.79	6.06	6.06	3.03	6.06



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Q.8 Adequate freedom is given to offer opinion on design & development of curriculum.

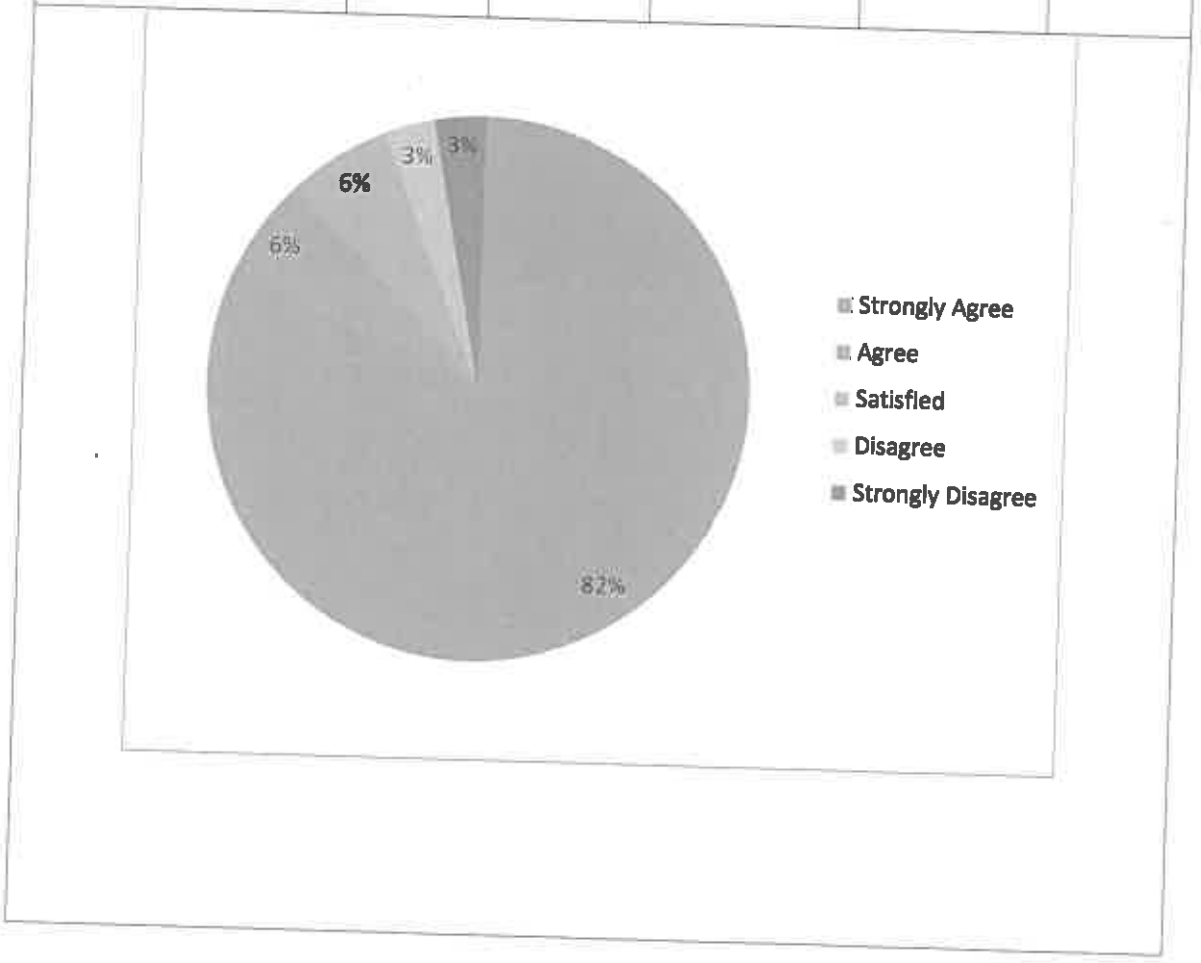
Adequate freedom is given to offer opinion on design & development of curriculum.	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	87.88	3.03	3.03	3.03	3.03



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Q.9 The existing system for curriculum revision is found to be effective.

The existing system for curriculum revision is found to be effective.	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	81.82	6.06	6.06	3.03	3.03



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School of Engineering and Technology(33)

Total no. of Teachers : 33		Strongly Agree	Agree	Satisfied	Disagree	Strongly Disagree
The curriculum is well organized and balanced for the programme with proper credit allocation.	No. of Teachers	28.00	2.00	1.00	1.00	1.00
	Percentage	84.85	6.06	3.03	3.03	3.03
The courses have adequate balance between theory and application for student's holistic development.	No. of Teachers	29.00	1.00	1.00	1.00	1.00
	Percentage	87.88	3.03	3.03	3.03	3.03
The curriculum has adequate scope for multidisciplinary knowledge and sufficient number of elective courses.	No. of Teachers	26.00	2.00	2.00	2.00	1.00
	Percentage	78.79	6.06	6.06	6.06	3.03
The curriculum has focus on personality development by presence of courses on human values and professional ethics	No. of Teachers	29.00	1.00	1.00	1.00	1.00
	Percentage	87.88	3.03	3.03	3.03	3.03
The curriculum provides enough scope for improving entrepreneurial skill as well as industry readiness.	No. of Teachers	25.00	3.00	2.00	1.00	2.00
	Percentage	75.76	9.09	6.06	3.03	6.06

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EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional
Area Gangoh, Distt. Saharanpur (U.P.)
247341. India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

The curriculum provides ample knowledge for increased employability and to promote students for higher education.	No. of Teachers	27.00	2.00	2.00	1.00	1.00
	Percentage	81.82	6.06	6.06	3.03	3.03
The curriculum helps in enhancing problem solving capability related to local/global societal issues	No. of Teachers	26.00	2.00	2.00	1.00	2.00
	Percentage	78.79	6.06	6.06	3.03	6.06
Adequate freedom is given to offer opinion on design & development of curriculum.	No. of Teachers	29.00	1.00	1.00	1.00	1.00
	Percentage	87.88	3.03	3.03	3.03	3.03
The existing system for curriculum revision is found to be effective.	No. of Teachers	27.00	2.00	2.00	1.00	1.00
	Percentage	81.82	6.06	6.06	3.03	3.03

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247341, India
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U.: www.sug.ac.in

Analysis of Feedback:

The feedback received from the teaching faculty reflects a very positive overall perception of the curriculum, with most parameters scoring between 90.91% and 93.94%. The highest-rated aspects include the curriculum's organization and structure, its balance between theory and practice, and the emphasis on human values and professional ethics—all scoring at 93.94%. This indicates that the curriculum is well-planned, holistic, and designed to nurture both academic and personal growth.

Faculty also appreciate the curriculum's effectiveness in improving employability and supporting higher education, as well as the opportunities provided for their participation in curriculum design and revision. The slightly lower score of 90.91% for areas such as multidisciplinary scope, entrepreneurial skill development, and problem-solving related to societal issues suggests these are areas for further enhancement. Introducing more diverse electives, real-world projects, and innovation-focused learning could help address these points. Overall, the curriculum is perceived as strong and well-rounded, with only minor improvements needed to further align it with evolving academic and industry expectations.

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U.: www.sug.ac.in

Action Taken Report

(School of Engineering and Technology)

Sr. No.	Suggestions	Action taken	Outcome
1	Enhance multidisciplinary exposure and course diversity	Introduced new interdisciplinary electives (e.g., AI for Environmental Sustainability, Tech & Society), and allowed credit sharing across departments	Broadened student knowledge base and improved adaptability to cross-functional roles
2	Improve entrepreneurial skill development	Established a startup incubation support cell, organized regular entrepreneurship boot camps and hackathons	Increased student participation in innovation contests and startup initiatives
3	Strengthen problem-solving focus related to societal issues	Integrated real-world problem-solving assignments in core courses; partnered with local bodies for community-based engineering projects	Heightened awareness of societal challenges and improved critical thinking and application skills
4	Foster more innovation-driven learning	Adopted project-based learning and design thinking models in select courses; upgraded labs to support prototyping and testing	Boosted student creativity and practical exposure; improved project outcomes and industry engagement

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Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

20th Meeting of BOS (Item No. 3 Annexure -3)

SHOBHIT UNIVERSITY GANGOH
SCHOOL OF ENGINEERING AND TECHNOLOGY

List of Examiners (2022-2023)

Sr. No.	Course code with Title	Name, Designation, Institution and Correspondence address of the Paper Setter/Examiner	Contact number with E. Mail ID
1	OOPS Using C++ (BCA-201)	External Examiner	
		1. Dr. Abahay Bhatia	dr.abhay@ritrookee.ac.in, 9837386973
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com, 97604492192
		3. Dr. Mamta	mamta.bansal345@gmail.com 9997025606
		Internal Examiner	
		1. Dr. Tarun Kumar Sharma	Tarun.sharma@shobhituniversity.ac.in 9456086759
		2. Mr. Vinod Kumar	Vinod.kumar@shobhituniversity.ac.in, 9758749227
2	Database Management Systems(BCA-202)	External Examiner	
		1. Dr. Abahay Bhatia	dr.abhay@ritrookee.ac.in, 9837386973
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com, 97604492192
		3. Dr. Mamta	mamta.bansal345@gmail.com,9997025606
		Internal Examiner	
		1. Mr. Kuldeep Chauhan	Kuldeep.chauhan@shobhituniversity.ac.in 9756997090
		2. Mr. Nitin Kumar	nitin.kumar@shobhituniversity.ac.in, 9758170029
3	Web & E-Commerce Technologies(BCA-203)	External Examiner	
		1. Dr. Abahay Bhatia	dr.abhay@ritrookee.ac.in, 9837386973

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional
Area Gangoh, Distt. Saharanpur (U.P.)
247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com, 97604492192
		3. Dr. Mamta	mamta.bansal345@gmail.com 9997025606
		Internal Examiner 1. Mr. Nitin Kumar	nitin.kumar@shobhituniversity.ac.in, 9758170029
		2. Ms. Sumika Jain	Sumika.jai@shobhituniversity.ac.in 9456666326
4	Discrete Structures(BCA-204)	External Examiner 1. Dr. Abahay Bhatia	dr.abhay@ritrookee.ac.in, 9837386973
		2. Dr. Mamta	mamta.bansal345@gmail.com 9997025606
		3. Dr. Ankit Sharma	gurukul.ankit@gmail.com, 97604492192
		Internal Examiner 1. Mr. Vinod Kumar	
		2. Mr. Kuldeep Chauhan	Kuldeep.chauhan@shobhituniversity.ac.in 9756997090
5	Environmental Studies(BCA-205)	External Examiner 1. Dr. Abahay Bhatia	dr.abhay@ritrookee.ac.in, 9837386973
		2. Dr. Mamta	mamta.bansal345@gmail.com 9997025606
		3. Dr. Ankit Sharma	gurukul.ankit@gmail.com, 97604492192
		Internal Examiner 1. Mr. Vinod Kumar	Vinod.kumar@shobhituniversity.ac.in, 9758749227
		2. Ms. Sumika Jain	Sumika.jai@shobhituniversity.ac.in, 9456666326
6	OOPS Using C++ Lab(BCA-251)	External Examiner 1. Dr. Abahay Bhatia	dr.abhay@ritrookee.ac.in, 9837386973
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com, 97604492192
		3.Dr Mamta	mamta.bansal345@gmail.com,9997025606

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

		Internal Examiner 1. Mr. Vinod Kumar	Vinod.kumar@shobhituniversity.ac.in, 9758749227
		2. Ms. Sumika Jain	Sumika.jai@shobhituniversity.ac.in 9456666326
7	Database Management Systems Lab(BCA-252)	External Examiner 1. Dr. Ankit Sharma	gurukul.ankit@gmail.com, 97604492192
		2. Dr. Abahay Bhatia	dr.abhay@ritrookee.ac.in, 9837386973
		3.dr Mamta	mamta.bansal345@gmail.com 9997025606
		Internal Examiner 1. Mr. Vinod Kumar	Vinod.kumar@shobhituniversity.ac.in 9758749227
		2. Ms. Sumika Jain	Sumika.jai@shobhituniversity.ac.in, 9456666326
8	Seminar Based on Learning(BCA-253)	External Examiner 1. Dr. Abahay Bhatia	dr.abhay@ritrookee.ac.in, 9837386973
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com, 97604492192
		3. Dr. Mamta	mamta.bansal345@gmail.com 9997025606
		Internal Examiner 4. Dr. Tarun Kumar Sharma	Tarun.sharma@shobhituniversity.ac.in 9456086759
		5. Mr. Vinod Kumar	Vinod.kumar@shobhituniversity.ac.in 9758749227
9	Data Structures(BCA-401)	External Examiner 1. Dr. Ankit Sharma	gurukul.ankit@gmail.com 97604492192
		2. Dr. Mamta	
		3. Dr. Abahay Bhatia	dr.abhay@ritrookee.ac.in, 9837386973

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

		Internal Examiner 1. Dr. Tarun Kumar Sharma	Tarun.sharma@shobhituniversity.ac.in, 9456086759
		2. Mr. Vinod Kumar	Vinod.kumar@shobhituniversity.ac.in 9758749227
10	Java Programming(BCA-402)	External Examiner 1. Dr. Ankit Sharma	gurukul.ankit@gmail.com, 97604492192
		2. Dr. Abahay Bhatia	dr.abhay@ritrookee.ac.in, 9837386973
		3. Dr. Mamta	mamta.bansal345@gmail.com,9997025606
		Internal Examiner 1. Mr. Kuldeep Chauhan	Kuldeep.chauhan@shobhituniversity.ac.in 9756997090
		2. Mr. Nitin Kumar	nitin.kumar@shobhituniversity.ac.in, 9758170029
11	Computer System Architecture(BCA-403)	External Examiner 1. Dr. Abahay Bhatia	dr.abhay@ritrookee.ac.in, 9837386973
		2. Dr. Mamta	mamta.bansal345@gmail.com 9997025606
		3. Dr. Ankit Sharma	gurukul.ankit@gmail.com, 97604492192
		Internal Examiner 1. Dr. Tarun Kumar Sharma	Tarun.sharma@shobhituniversity.ac.in 9456086759
		2. Mr. Vinod Kumar	Vinod.kumar@shobhituniversity.ac.in 9758749227
12	Knowledge Management(BCA-404)	External Examiner 1. Dr. Abahay Bhatia	dr.abhay@ritrookee.ac.in 9837386973
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com, 97604492192
		3. Dr. Mamta	mamta.bansal345@gmail.com 9997025606

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional
Area Gangoh, Distt. Saharanpur (U.P.)
247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

		Internal Examiner 1. 1.Mr. Kuldeep Chauhan	Kuldeep.chauhan@shobhituniversity.ac.in, 9756997090
		2. 2.Mr. Nitin Kumar	nitin.kumar@shobhituniversity.ac.in, 9758170029
13	Data Structures Lab(BCA-451)	External Examiner 1. 1. Dr. Mamta	mamta.bansal345@gmail.com,9997025606
		2. 2. Dr. Ankit Sharma	gurukul.ankit@gmail.com, 97604492192
		3. 3. Dr. Abahay Bhatia	dr.abhay@ritrookee.ac.in, 9837386973
		Internal Examiner 1. Dr. Varun Bansal	Varun.bansal@shobhituniversity.ac.in, 9411295559
		2. Mr. Vinod Kumar	Vinod.kumar@shobhituniversity.ac.in, 9758749227
14	Java Programming Lab(BCA-452)	External Examiner 1. Dr. Mamta	mamta.bansal345@gmail.com,9997025606
		2. Dr. Abahay Bhatia	dr.abhay@ritrookee.ac.in, 9837386973
		3. Dr. Ankit Sharma	gurukul.ankit@gmail.com, 97604492192
		Internal Examiner 1. Dr. Varun Bansal	Varun.bansal@shobhituniversity.ac.in, 9411295559
		2. Mr. Vinod Kumar	Vinod.kumar@shobhituniversity.ac.in, 9758749227
15	Computer System Architecture Lab(BCA-453)	External Examiner 1. Dr. Mamta	mamta.bansal345@gmail.com,9997025606
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com, 97604492192
		3. Dr. Abahay Bhatia	dr.abhay@ritrookee.ac.in, 9837386973
		Internal Examiner	

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional
Area Gangoh, Distt. Saharanpur (U.P.)
247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

		1. Mr. Kuldeep Chauhan	Kuldeep.chauhan@shobhituniversity.ac.in, 9756997090
		2. Mr. Nitin Kumar	nitin.kumar@shobhituniversity.ac.in, 9758170029
16	Seminar Based on Learning(BCA-454)	External Examiner 1. Dr. Mamta	mamta.bansal345@gmail.com 9997025606
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com, 97604492192
		3. Dr. Abahay Bhatia	dr.abhay@ritrookee.ac.in, 9837386973
		Internal Examiner 3. Mr. Kuldeep Chauhan	Kuldeep.chauhan@shobhituniversity.ac.in, 9756997090
		4. Mr. Nitin Kumar	nitin.kumar@shobhituniversity.ac.in, 9758170029
17	Data Communication and Computer Networks(BCA-601)	External Examiner 1. Dr. Abahay Bhatia	dr.abhay@ritrookee.ac.in, 9837386973
		2. Dr. Mamta	mamta.bansal345@gmail.com,9997025606
		3. Dr. Ankit Sharma	gurukul.ankit@gmail.com, 97604492192
		Internal Examiner 6. Mr. Kuldeep Chauhan	Kuldeep.chauhan@shobhituniversity.ac.in, 9756997090
		7. Mr. Nitin Kumar	nitin.kumar@shobhituniversity.ac.in, 9758170029
18	Artificial Intelligence(BCA-602)	External Examiner 1. Dr. Ankit Sharma	gurukul.ankit@gmail.com, 97604492192
		2. Dr. Mamta	mamta.bansal345@gmail.com,9997025606
		3. Dr. Abahay Bhatia	dr.abhay@ritrookee.ac.in, 9837386973
		Internal Examiner 5. Mr. Kuldeep Chauhan	Kuldeep.chauhan@shobhituniversity.ac.in,

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

			9756997090
		6. Mr. Nitin Kumar	nitin.kumar@shobhituniversity.ac.in, 9758170029
19	Cyber Security & Cyber Laws(BCA-603)	External Examiner 1. Dr. Abahay Bhatia	dr.abhay@ritrookee.ac.in, 9837386973
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com, 97604492192
		3. Dr. Mamta	mamta.bansal345@gmail.com,9997025606
		Internal Examiner 8. Mr. Kuldeep Chauhan	Kuldeep.chauhan@shobhituniversity.ac.in, 9756997090
		9. Mr. Nitin Kumar	nitin.kumar@shobhituniversity.ac.in, 9758170029
20	Software Project management(BCA-604)	External Examiner 1. Dr. Mamta	mamta.bansal345@gmail.com,9997025606
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com, 97604492192
		3. Dr. Abahay Bhatia	dr.abhay@ritrookee.ac.in, 9837386973
		Internal Examiner Ms. Sumika Jain	Sumika.jai@shobhituniversity.ac.in, 9456666326
		Mr. Vinod Kumar	Vinod.kumar@shobhituniversity.ac.in, 9758749227
21	Computer Networks Lab(BCA-651)	External Examiner 1. Dr. Mamta	mamta.bansal345@gmail.com,9997025606
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com, 97604492192
		3. Dr. Abahay Bhatia	dr.abhay@ritrookee.ac.in, 9837386973
		Internal Examiner 1. Mr. Kuldeep Chauhan	Kuldeep.chauhan@shobhituniversity.ac.in, 9756997090
		2. Mr. Nitin Kumar	nitin.kumar@shobhituniversity.ac.in,

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

			9758170029
22	Seminar and Group Discussion(BCA-656)	External Examiner 1. Dr. Ankit Sharma	- gurukul.ankit@gmail.com, 97604492192
		2. Dr. Mamta	mamta.bansal345@gmail.com,9997025606
		3. Dr. Abahay Bhatia	dr.abhay@ritrookee.ac.in 9837386973
		Internal Examiner 1. Ms. Sumika Jain	Sumika.jai@shobhituniversity.ac.in, 9456666326
		2. Mr. Vinod Kumar	Vinod.kumar@shobhituniversity.ac.In 9758749227
23	Research Project-II (BCA-658)	External Examiner Dr. Abahay Bhatia	dr.abhay@ritrookee.ac.in 9837386973
		Dr. Ankit Sharma	gurukul.ankit@gmail.com, 97604492192
		Dr. Mamta	mamta.bansal345@gmail.com 9997025606
		Internal Examiner 1. Ms. Sumika Jain	Sumika.jai@shobhituniversity.ac.in 9456666326
		2. Mr. Vinod Kumar	Vinod.kumar@shobhituniversity.ac.In 9758749227

MCA List of Examiners (2022-2023)

Sr. No.	Course code with Title	Name, Designation, Institution and Correspondence address of the Paper Setter/Examiner	Contact number with E. Mail ID
1	Software Engineering & Project Management (MCA-201)	External Examiner 1. Dr. Abhay Bhatia	Dr.abhay@ritroorkee.ac.in 9837386973
		2. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		3. Dr. Mamta Bansal	Mamta.bansal345@gmail.com 9997025606

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional
Area Gangoh, Distt. Saharanpur (U.P.)
247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

		Internal Examiner 1. Mr. Jitendra K. Saini	Jitendra.saini@shobhituniversity.ac.in 7669110295
		2. Mr. Shahnawaaj	Mohd.shahnawaz@shobhituniversity.ac.in 9536940100
2.	ASP .Net(MCA-202)	External Examiner 1. Dr. Ankit Sharma	Gurukul.ankit@gmail.com 9760492192
		2. Dr. Arun Giri	Arungiri123@yahoo.com 981880953
		3. Dr. Nidhi Tyagi	Nidhi.tyagi9785@gmail.com 9927007273
		Internal Examiner 1. Dr. Varun Bansal	Varun.bansal@shobhituniversity.ac.in 9675478559
		2. Mr. Shubham Kumar	Shubham.k@shobhituniversity.ac.in 7895408519
3.	Python(MCA-203)	External Examiner 1. Dr. Ankit Sharma	Gurukul.ankit@gmail.com 9760492192
		2. Dr. Arun Giri	Arungiri123@yahoo.com 981880953
		3. Dr. Nidhi Tyagi	Nidhi.tyagi9785@gmail.com 9927007273
		Internal Examiner 1. Dr. Tarun Kumar Sharma	Tarun.sharma@shobhituniversity.ac.in 9456086759
		2. Mr. Vinod Kumar	Vinod.kumar@shobhituniversity.ac.in 9758749227
4.	Artificial Intelligence(MCA-204)	External Examiner 1. Dr. Nidhi Tyagi	Nidhi.tyagi9785@gmail.com 9927007273
		2. Dr. Mamta Bansal	Mamta.bansal345@gmail.com 9997025606
		3. Dr. Abhay Bhatia	Dr.abhay@ritroorkee.ac.in 9837386973
		Internal Examiner 1. Mr. Jitendra K. Saini	Jitendra.saini@shobhituniversity.ac.in 7669110295
		2. Dr. Tarun Kumar Sharma	Tarun.sharma@shobhituniversity.ac.in 9456086759
5.	Distributed Operating	External Examiner	kingmaheep@gmail.com 9411293327

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

	System (MCA-231)	1. Dr. Maheep Singh	
		2. Dr. Ankit Sharma	Gurukul.ankit@gmail.com 9760492192
		3. Dr. Arun Giri	Arungiri123@yahoo.com 981880953
		Internal Examiner 1. Dr. Varun Bansal	Varun.bansal@shobhituniversity.ac.in 9675478559
		2. Mr. Jitendra K. Saini	Jitendra.saini@shobhituniversity.ac.in 7669110295
6.	Lab Software Engineering and Project Management (MCA-251)	External Examiner 1. Dr. Ankit Sharma	Gurukul.ankit@gmail.com 9760492192
		2. Dr. Arun Giri	Arungiri123@yahoo.com 981880953
		3. Dr. Nidhi Tyagi	Nidhi.tyagi9785@gmail.com 9927007273
		Internal Examiner 1. Dr. Varun Bansal	Varun.bansal@shobhituniversity.ac.in 9675478559
		2. Ms. Sumika Jain	Sumika.jain@shobhituniversity.ac.in 9456666326
7.	Lab ASP. Net (MCA-252)	External Examiner 1. Dr. Nidhi Tyagi	Nidhi.tyagi9785@gmail.com 9927007273
		2. Dr. Mamta Bansal	Mamta.bansal345@gmail.com 9997025606
		3. Dr. Abhay Bhati	Dr.abhay@ritroorkee.ac.in 9837386973
		Internal Examiner 1. Mr. Jitendra K. Saini	Jitendra.saini@shobhituniversity.ac.in 7669110295
		2. Mr. Shahnawaj	Mohd.shahnawaz@shobhituniversity.ac.in 9536940100
8.	Lab Python (MCA-253)	External Examiner 1. Dr. Mamta Bansal	Mamta.bansal345@gmail.com 9997025606
		2. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		3. Dr. Abhay Bhatia	Dr.abhay@ritroorkee.ac.in 9837386973
		Internal Examiner	Varun.bansal@shobhituniversity.ac.in

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

		1. Dr. Varun Bansal	9675478559
		2. Ms. Sumika Jain	Sumika.jain@shobhituniversity.ac.in 9456666326
9.	MAJOR PROJECT PRESENTATION & VIVA(MCA-462)	External Examiner 1. Dr. Arun Giri	Arungiri123@yahoo.com 981880953
		2. Dr. Nidhi Tyagi	Nidhi.tyagi9785@gmail.com 9927007273
		3. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		Internal Examiner 1. Mr. Vinod Kumar	Vinod.kumar@shobhituniversity.ac.in 9758749227
		2. Mr. Anuj Kumar	Anju.k@shobhituniverstly.ac.in 7249989555

M.Tech List of Examiners (2022-2023)

Sr. No.	Course code with Title	Name, Designation, Institution and Correspondence address of the Paper Setter/Examiner	Contact number with E. Mail ID
1.	Resource Management of Computer Systems CE- 502	External Examiner 1. Dr. Arun Giri	arungiri123@yahoo.com 9818809053
		2. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		3. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		Internal Examiner 1. Ms. Sumika Jain	sumika.jain@shobhituniversity.ac.in 9456666326
		2. Mr. Raveendra Kr. Bharati	raveendra.bharati@shobhituniversity.ac.in 9953328744
2.	Soft Computing CE- 504	External Examiner 1. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional
Area Gangoh, Distt. Saharanpur (U.P.)
247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

			9760492192
		3. Dr. Mamta Bansal	mamta.bansal345@gmail.com 9997025606
		Internal Examiner 1. Mr. Raveendra Kr. Bharati	anil.nishad@shobhituniversity.ac.in 8171418088
		2. Mr. Kuldeep Chauhan	kuldeep.chauhan@shobhituniversity.ac.in 9756997090
3.	High Performance Computer Architecture CE- 506	External Examiner 1. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		2. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		3. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		Internal Examiner 1. Mr. Varun Bansal	varun.bansal@shobhituniversity.ac.in 9675478559
		2. Mr. Nitin Kumar	nitin.kumar@shobhituniversity.ac.in 9758170029
4.	Mobile & Wireless Communication CE-522	External Examiner 1. Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192
		2. Dr. Mamta Bansal	mamta.bansal345@gmail.com 9997025606
		3. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		Internal Examiner 1. Mr. Raveendra Kr. Bharati	anil.nishad@shobhituniversity.ac.in 8171418088

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional
Area Gangoh, Distt. Saharanpur (U.P.)
247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

		2. Mr. Kuldeep Chauhan	kuldeep.chauhan@shobhituniversity.ac.in 9756997090
5.	Operating systems Lab CE-552	External Examiner 1. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192
		3. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		Internal Examiner 1. Mr. Vinod Kumar	vinod.kumar@shobhituniversity.ac.in 9758749227
		2. Ms. Sumika Jain	sumika.jain@shobhituniversity.ac.in 9456666326
6.	Seminar-II CE-582	External Examiner 1. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192
		3. Dr. Mamta Bansal	mamta.bansal345@gmail.com 9997025606
		Internal Examiner 1. Mr. Madhav P. Namdev	Madhav.namdev@shobhituniversity.ac.in 94572731592
		2. Mr. Raveendra Kr. Bharati	raveendra.bharati@shobhituniversity.ac.in 9953328744
7.	Dissertation CE- 692	External Examiner 1. Dr. Arun Giri	arungiri123@yahoo.com 9818809053
		2. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com

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EDUCATION EMPOWERS

Babu Vijendra Marg, Adarsh Institutional
Area Gangoh, Distt. Saharanpur (U.P.)
247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

			9927007273
		3. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		Internal Examiner 1. Mr. Varun Bansal	varun.bansal@shobhituniversity.ac.in 9675478559
		2. Mr. Nitin Kumar	nitin.kumar@shobhituniversity.ac.in 9758170029

B.tech CSE (Examiner)

Sr. No.	Course code with Title	Name, Designation, Institution and Correspondence address of the Paper Setter/Examiner	Contact number with E. Mail ID
1.	MATHEMATICS-II (CMAN 102)	External Examiner 4. Dr. Arun Giri	arungiri123@yahoo.com 9818809053
		5. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		6. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		Internal Examiner 1. Dr. Vishvas Chand	vishvas.chand@shobhituniversity.ac.in 9286093196
		2. Mr. Abdulla Khan	abdulla.khan@shobhituniversity.ac.in 7454976780
2.	ENGINEERING PHYSICS	External Examiner 4. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional
Area Gangoh, Distt. Saharanpur (U.P.)
247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

	(CPHN 102)	5. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		6. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		Internal Examiner 1. Mohd Ahamad	mohd.ahamad@shobhituniversity.ac.in 9548159750
		2. Mr. Hamid Ali	hamid.ali@shobhituniversity.ac.in 9759302770
3.	COMPUTER FUNDAMENTALS AND PROGRAMMING USING-C (CCSN 102)	External Examiner 4. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		5. Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192
		6. Dr. Mamta Bansal	mamta.bansal345@gmail.com 9997025606
		Internal Examiner 1. Mr. Varun Bansal	varun.bansal@shobhituniversity.ac.in 9675478559
		2. Mr. Kuldeep Chauhan	kuldeep.chauhan@shobhituniversity.ac.in 9756997090
4.	BASICS OF ELECTRICAL ENGINEERING (CEEN 102)	External Examiner 1. Dr. Arun Giri	arungiri123@yahoo.com 9818809053
		2. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U: www.sug.ac.in

		3. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		Internal Examiner 1. Dr. Jasvir Singh Rana	jasvirsingh.rana@shobhituniversity.ac.in 9759233859
		2. Mr. Shoyab Hussain	shoyab.hussain@shobhituniversity.ac.in 9837446390
5.	TECHNICAL COMMUNICATION (CPCN 102)	External Examiner 1. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		2. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		3. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		Internal Examiner 1. Mr. Dhruv Joshi	dhruv.joshi@shobhituniversity.ac.in 7302702677
		2. Ms. Abhilasha R. Goel	abhilasha.goyal@shobhituniversity.ac.in 8392821112
6.	ENGINEERING PHYSICS LAB (CPHN 152)	External Examiner 1. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192
		3. Dr. Mamta Bansal	mamta.bansal345@gmail.com 9997025606

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional
Area Gangoh, Distt. Saharanpur (U.P.)
247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

		Internal Examiner 1. Mohd Ahamad	mohd.ahamad@shobhituniversity.ac.in 9548159750
		2. Mr. Hamid Ali	hamid.ali@shobhituniversity.ac.in 9759302770
7.	COMPUTER PROGRAMMING USING C LAB (CCSN 152)	External Examiner 1. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		2. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		3. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		Internal Examiner 1. Mr. Varun Bansal	varun.bansal@shobhituniversity.ac.in 9675478559
		2. Mr. Kuldeep Chauhan	kuldeep.chauhan@shobhituniversity.ac.in 9756997090
8.	BASIC ELECTRICAL ENGINEERING LAB (CEEN 152)	External Examiner 1. Dr. Arun Giri	arungiri123@yahoo.com 9818809053
		2. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		3. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		Internal Examiner 1. Dr. Jasvir Singh Rana	jasvirsingh.rana@shobhituniversity.ac.in 9759233859

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

		2. Mr. Shoyab Hussain	shoyab.hussain@shobhituniversity.ac.in 9837446390
9.	OBJECT ORIENTED PROGRAMMING USING C++ (CCSN 202)	External Examiner 1. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192
		3. Dr. Mamta Bansal	mamta.bansal345@gmail.com 9997025606
		Internal Examiner 1. Dr. Tarun Kumar Sharma	tarun.sharma@shobhituniversity.ac.in 9456086759
		2. Mr. Vinod Kumar	vinod.kumar@shobhituniversity.ac.in 9758749227
10.	DESIGN AND ANALYSIS OF ALGORITHMS (CCSN 204)	External Examiner 1. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		2. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		3. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		Internal Examiner 1. Mr. Varun Bansal	varun.bansal@shobhituniversity.ac.in 9675478559
		2. Mr. Nitin Kumar	nitin.kumar@shobhituniversity.ac.in 9758170029

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional
Area Gangoh, Distt. Saharanpur (U.P.)
247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

11.	INTERNET AND WEB TECHNOLOGY (CCSN 206)	External Examiner 1. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192
		3. Dr. Mamta Bansal	mamta.bansal345@gmail.com 9997025606
		Internal Examiner 1. Mr. Varun Bansal	varun.bansal@shobhituniversity.ac.in 9675478559
		2. Mr. Kuldeep Chauhan	kuldeep.chauhan@shobhituniversity.ac.in 9756997090
12.	COMPUTER NETWORKS (CCSN 208)	External Examiner 1. Dr. Arun Giri	arungiri123@yahoo.com 9818809053
		2. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		3. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		Internal Examiner 1. Mr. Varun Bansal	varun.bansal@shobhituniversity.ac.in 9675478559
		2. Mr. Kuldeep Chauhan	kuldeep.chauhan@shobhituniversity.ac.in 9756997090
13.	FORMAL LANGUAGES & AUTOMATION	External Examiner 1. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional
Area Gangoh, Distt. Saharanpur (U.P.)
247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

	THEORY (CCSN 210)	2. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		3. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		Internal Examiner 1. Mr. Nitin Kumar	nitin.kumar@shobhituniversity.ac.in 9758170029
		2. Ms. Sumika Jain	sumika.jain@shobhituniversity.ac.in 9456666326
14.	TECHNICAL ENGLISH (CBSN 202)	External Examiner 1. Dr. Arun Giri	arungiri123@yahoo.com 9818809053
		2. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		3. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		Internal Examiner 1. Dr. Jasvir Singh Rana	jasvirsingh.rana@shobhituniversity.ac.in 9759233859
		2. Mr. Shoyab Hussain	shoyab.hussain@shobhituniversity.ac.in 9837446390
15.	OBJECT ORIENTED PROGRAMMING USING C++ LAB (CCSN 252)	External Examiner 1. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

		3. Dr. Mamta Bansal	mamta.bansal345@gmail.com 9997025606
		Internal Examiner 1. Dr. Tarun Kumar Sharma	tarun.sharma@shobhituniversity.ac.in 9456086759
		2. Mr. Vinod Kumar	vinod.kumar@shobhituniversity.ac.in 9758749227
16.	DESIGN AND ANALYSIS OF ALGORITHMS LAB (CCSN 254)	External Examiner 1. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		2. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		3. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		Internal Examiner 1. Mr. Varun Bansal	varun.bansal@shobhituniversity.ac.in 9675478559
		2. Mr. Nitin Kumar	nitin.kumar@shobhituniversity.ac.in 9758170029
17.	INTERNET AND WEB TECHNOLOGY LAB (CCSN 256)	External Examiner 1. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192
		3. Dr. Mamta Bansal	mamta.bansal345@gmail.com 9997025606

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

		Internal Examiner 1. Mr. Varun Bansal	varun.bansal@shobhituniversity.ac.in 9675478559
		2. Mr. Kuldeep Chauhan	kuldeep.chauhan@shobhituniversity.ac.in 9756997090
18.	COMPUTER GRAPHICS (CCSN 302)	External Examiner 1. Dr. Arun Giri	arungiri123@yahoo.com 9818809053
		2. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		3. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		Internal Examiner 1. Dr. Tarun Kumar Sharma	tarun.sharma@shobhituniversity.ac.in 9456086759
		2. Ms. Sumika Jain	sumika.jain@shobhituniversity.ac.in 9456666326
19.	DATA WAREHOUSING & DATA MINING (CCSN 304)	External Examiner 1. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192
		3. Dr. Mamta Bansal	mamta.bansal345@gmail.com 9997025606
		Internal Examiner 1. Mr. Varun Bansal	varun.bansal@shobhituniversity.ac.in 9675478559

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

		2. Ms. Sumika Jain	sumika.jain@shobhituniversity.ac.in 9456666326
20.	MOBILE COMPUTING (CCSN 306)	External Examiner 1. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		2. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		3. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		Internal Examiner 1. Ms. Sumika Jain	sumika.jain@shobhituniversity.ac.in 9456666326
		2. Mr. Nitin Kumar	nitin.kumar@shobhituniversity.ac.in 9758170029
21.	KNOWLEDGE MANAGEMENT & EXPERT SYSTEM (CCSN 308)	External Examiner 1. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192
		3. Dr. Mamta Bansal	mamta.bansal345@gmail.com 9997025606
		Internal Examiner 1. Dr. Mahipal Singh	registrargangh@shobhituniversity.ac.in 9759174581
		2. Dr. Shri Kant Gupta	shrikant.gupta@shobhituniversity.ac.in 8279909590

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional
Area Gangoh, Distt. Saharanpur (U.P.)
247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

22.	SOFTWARE PROJECT MANAGEMENT (CUCS 342)	External Examiner 1. Dr. Arun Giri	arungiri123@yahoo.com 9818809053
		2. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		3. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		Internal Examiner 1. Mr. Kuldeep Chauhan	kuldeep.chauhan@shobhituniversity.ac.in 9756997090
		2. Ms. Sumika Jain	sumika.jain@shobhituniversity.ac.in 9456666326
23.	ENVIRONMENTAL STUDIES (CBSN 302)	External Examiner 1. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192
		3. Dr. Mamta Bansal	mamta.bansal345@gmail.com 9997025606
		Internal Examiner 1. Dr. Jasvir Singh Rana	jasvirsingh.rana@shobhituniversity.ac.in 9759233859
		2. Mr. Shoyab Hussain	shoyab.hussain@shobhituniversity.ac.in 9837446390

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

24.	COMPUTER GRAPHICS LAB (CCSN 352)	External Examiner 1. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192
		3. Dr. Mamta Bansal	mamta.bansal345@gmail.com 9997025606
		Internal Examiner 1. Dr. Tarun Kumar Sharma	tarun.sharma@shobhituniversity.ac.in 9456086759
		2. Ms. Sumika Jain	sumika.jain@shobhituniversity.ac.in 9456666326
25.	DATA WAREHOUSING & DATA MINING LAB (CCSN 354)	External Examiner 1. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		2. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		3. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		Internal Examiner 1. Mr. Varun Bansal	varun.bansal@shobhituniversity.ac.in 9675478559
		2. Ms. Sumika Jain	sumika.jain@shobhituniversity.ac.in 9456666326
26.	MINI PROJECT (CCSN 356)	External Examiner 1. Dr. Arun Giri	arungiri123@yahoo.com 9818809053

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

		2. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		3. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		Internal Examiner 1. Dr. Tarun Kumar Sharma	tarun.sharma@shobhituniversity.ac.in 9456086759
		2. Mr. Varun Bansal	varun.bansal@shobhituniversity.ac.in 9675478559
27.	INTERNSHIP AND Report Presentation (CCSN 462)	External Examiner 1. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		2. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		3. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		Internal Examiner 1. Dr. Mahipal Singh	registrargangh@shobhituniversity.ac.in 9759174581
		2. Dr. Tarun Kumar Sharma	tarun.sharma@shobhituniversity.ac.in 9456086759

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U • www.shu.ac.in

SHOBHIT UNIVERSITY GANGOH
School of Engineering and Technology

Date: 10/06/2023

NOTICE

Subject: Meeting of the Board of Studies

All members of the Board of Studies are hereby informed that a meeting will be held as per the following details:

Date: 27/06/2023
Time: 10.00 AM
Venue: SOET, Shobhit University, Gangoh

Agenda:

1. Confirmation of minutes of the previous meeting
2. Approval of Examiners (Theory & Practical) and Paper Setters for the odd semester courses in BCA, MCA, B.Tech & M.Tech for session **July to Dec. 2023.**
3. Discussion on the value Added courses offered for students and ratification of the same.
4. Any other matter with the permission of the Chair

All members are requested to make it convenient to attend the meeting and come prepared with relevant documents and suggestions.

Prof.(Dr.) Varun Bansal
Chairperson, Board of Studies
Head of the Department
10/06/2023

School of Engineering and Technology ★ Shobhit University Gangoh ★

Shobhit University
EDUCATION EMPOWERS

Babu Vijendra Marg, Adarsh Institutional
Area Gangoh Distt. Saharanpur (U.P.)
247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U : www.sug.ac.in

SHOBHIT UNIVERSITY GANGOH
School of Engineering and Technology

Date: 10/06/2023

To
Dr. Rajesh Kumar Saini
Head of the Department
Dept. of Mathematics Science and Computer Application
Bundelkhand University, Jhansi

Subject: Invitation to Attend the Board of Studies Meeting

Dear Sir

Greetings from School of Engineering and Technology

We are pleased to invite you to participate as an external subject expert in the upcoming meeting of the Board of Studies for the School of Engineering and Technology, scheduled as follows:

Date: 27/06/2023
Time: 10.00 AM
Mode: SOET, Shobhit University, Gangoh

The meeting will deliberate on important academic matters including syllabus revision, new course proposals, and academic planning for the upcoming session. Your expert insights and contributions would be invaluable to the academic enrichment of our programs.

We request you to kindly confirm your availability and mode of attendance at your earliest convenience. For online participation, a meeting link will be shared upon confirmation. If attending in person, necessary hospitality arrangements will be made.

We look forward to your positive response and support.

Thank you.

Warm regards,

Prof.(Dr.) Varun Bansal
Chairperson, Board of Studies

School of Engineering and Technology ★ Shobhit University Gangoh ★

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail:
U: www.sug.ac.in

SHOBHIT UNIVERSITY GANGOH
School of Engineering and Technology

Date: 10/06/2023

To
Dr. Neeraj Singhal
Professor
School of Computer Science and Engineering
Sir Chhotu Ram Institute of Engineering & Technology

Subject: Invitation to Attend the Board of Studies Meeting

Dear Sir

Greetings from School of Engineering and Technology

We are pleased to invite you to participate as an external subject expert in the upcoming meeting of the Board of Studies for the School of Engineering and Technology, scheduled as follows:

Date: 27/06/2023
Time: 10.00 AM
Mode: SOET, Shobhit University, Gangoh

The meeting will deliberate on important academic matters including syllabus revision, new course proposals, and academic planning for the upcoming session. Your expert insights and contributions would be invaluable to the academic enrichment of our programs.

We request you to kindly confirm your availability and mode of attendance at your earliest convenience. For online participation, a meeting link will be shared upon confirmation. If attending in person, necessary hospitality arrangements will be made.

We look forward to your positive response and support.

Thank you.

Warm regards,

Prof.(Dr.) Varun Bansal
Chairperson, Board of Studies

School of Engineering and Technology ★ Shobhit University Gangoh ★

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh[redacted]
U.: www.sug.ac.in

SHOBHIT UNIVERSITY GANGOH

School of Engineering and Technology

Date: 27/06/2023

Attendance Sheet (School of Engineering and Technology, BOS Meeting on 27/06/2023)

Sr. No	Name	External/Internal Member	Signature
1	Prof.(Dr.) Rajesh Kumar Saini	External Expert	Rajesh Kumar Saini
2	Dr. Neeraj Singhal	External Expert	Neeraj Singhal
3	Dr. Mahipal Singh	Internal Member	Mahipal
4	Dr. Jasvir Singh Rana	Internal Member	Jasvir Singh

Chairman

School of Engineering and Technology ★ Shobhit University Gangoh ★

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Area Gangoh, Distt. Saharanpur (U.P.)
247341, India
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U.: www.sug.ac.in

School of Engineering & Technology

Date: 27.06.2023

Minutes of the Meeting of Board of Studies

21st meeting of the Board of Studies of the School of Engineering and Technology, Shobhit University Gangoh was organized on 27th June 2023 at 10:00 am onwards. The following members were present in the meeting:

1.	Prof. (Dr.) Varun Bansal Head of the Department Computer Science and Engineering Shobhit University Gangoh	Chairperson
2.	Prof. (Dr.) Rajesh Kumar Saini Head of the Department Dept. of Mathematics Science and Computer Application Bundelkhand University, Jhansi	External expert
3.	Dr. Neeraj Singhal Professor School of Computer Science and Engineering Sir Chhotu Ram Institute of Engineering & Technology	External Expert
4.	Dr. Mahipal Singh, Professor School of Engineering and Technology Shobhit University Gangoh	Member
5.	Dr. Jasvir Singh Rana Professor School of Engineering and Technology Shobhit University Gangoh	Member

Welcome address by Chairman
The Chairman extended a warm welcome to all the members of Board of Studies and the following information was tabled before the members of the Board of Studies:

Input given by the Subject Experts on the Scheme and syllabi of the ongoing Batches.

The following discussed and approved on Choice Based Credit System:

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Item BOS 21.1: Approval of the Minutes of the 20th BOS Meeting held on 22 Dec. 2022 Was circulated among the members and the same were notified after the approval of the Board of Studies. {Annexure- 1}

Item BOS 21.2: Approval of Examiners (Theory & Practical) and Paper Setters for the odd semester courses in BCA, MCA, B. Tech & M. Tech for the session **July to Dec. 2023** The same is being sent to the Controller of Examinations, Shobhit University Gangoh, in a sealed cover. {Annexure-2}

Item BOS 21.3: Discussion on the Value Added courses offered for students and ratification of the same.

- BOS members approved the list of Value added courses offered to students

The meeting ended with a vote of thanks to the Chairman, Board of Studies.

The suggestions given by the panel of BOS have been discussed with the Vice Chancellor and Dean Academics. The action taken on the suggestions has been approved by competent authorities.

Signed by:

(Chairman, BOS)

(Vice Chancellor)

(Dean Academics)

Shobhit University
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21st Meeting of BOS (Item No. 1 Annexure -1)

School of Engineering & Technology

Date: 22.12.2022

Minutes of the Meeting of Board of Studies

20th meeting of the Board of Studies of the School of Engineering and Technology, Shobhit University Gangoh was organized on 22nd Dec. 2022 at 10:00 am onwards. The following members were present in the meeting:

1.	Prof. (Dr.) Varun Bansal Head of the Department Computer Science and Engineering Shobhit University Gangoh	Chairperson
2.	Prof. (Dr.) Rajesh Kumar Saini Head of the Department Dept. of Mathematics Science and Computer Application Bundelkhand University, Jhansi	External expert
3.	Dr. Neeraj Singhal Professor School of Computer Science and Engineering Sir Chhotu Ram Institute of Engineering & Technology	External Expert
4.	Dr. Mahipal Singh, Professor Professor School of Engineering and Technology Shobhit University Gangoh	Member
5.	Dr. Jasvir Rana Professor School of Engineering and Technology Shobhit University Gangoh	Member

Welcome address by Chairman

The Chairman extended a warm welcome to all the members of Board of Studies and the following information was tabled before the members of the Board of Studies:

Input given by the Subject Experts on the Scheme and syllabi of the ongoing Batches.

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The following discussed and approved on Choice Based Credit System:

Item BOS 20.1: Approval of the Minutes of the 19th BOS Meeting held on 23 June 2022 Was circulated among the members and the same were notified after the approval of the Board of Studies. {Annexure- 1}

Item BOS 20.2: Analysis of Students' feedback & Action taken report:

- BOS Chairman has expressed that the student feedback and action taken report process is done at the end of semester. The BOS members noted the same.

Item BOS 20.3: Analysis of the feedback on curriculum from stakeholders:

- The BOS chairman presented the analysis report of stakeholders' feedback on curriculum. The BOS members noted the same and advised to incorporate the suggestions as per the feasibility. The Action Taken Report is enclosed herewith. {Annexure-2}

Item BOS 20.4: Approval of Examiners (Theory & Practical) and Paper Setters for the even semester courses in BCA , MCA , B.Tech & M.Tech for session **Jan. to June 2023** The same is being sent to the Controller of Examinations, Shobhit University Gangoh, in a sealed cover. {Annexure-3}

Item BOS 20.5: Discussion on the Value Added courses offered for students and ratification of the same.

- BOS members approved the list of Value added courses offered to students

The meeting ended with a vote of thanks to the Chairman, Board of Studies.

The suggestions given by the panel of BOS have been discussed with the Vice Chancellor and Dean Academics. The action taken on the suggestions has been approved by competent authorities.

Signed by:

(Chairman, BOS)

(Dean Academics)

(Vice Chancellor)

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21st Meeting of BOS (Item No. 2 Annexure -2)

SHOBHIT UNIVERSITY GANGOH
SCHOOL OF ENGINEERING AND TECHNOLOGY

List of Examiners for Odd Semester (2023-2024)

Sr. No.	Course code with Title	Name, Designation, Institution and Correspondence address of the Paper Setter/Examiner
1.	Fundamental of Computer and C Programming (BCA-101)	External Examiner
		1. Dr. Mukesh Rawat, Professor, Computer Science and Engineering, Meerut Institute of Engineering & Technology, Meerut.
		2. Dr. Sreesh Gaur, Associate Professor, Computer Science and Engineering, KITE Group of Institutions, Meerut. 3. Dr. Maheep Singh, Professor, Computer Science and Engineering, National Institute of Technology, Srinagar.
		Internal Examiner 1. Dr. Tarun Kumar Sharma, Professor, Computer Science and Engineering, Shobhit University, Gangoh.
		2. Dr. Varun Bansal, Professor, Computer Science and Engineering, Shobhit University, Gangoh.
2	Problem Solving using Computer (BCA-102)	External Examiner 1. Dr. Abhay Bhatia, Associate Professor, Computer Science and Engineering, Roorkee Institute of Technology, Roorkee.
		2. Dr. Ankit Sharma, Assistant Professor, Computer Science and Engineering, Motherhood University, Roorkee.
		3. Dr. Vishant Kumar, Professor, Computer Science and Engineering, JBIT, Dehradun.
		Internal Examiner 1. Mr. Kuldeep Chauhan, Assistant Professor, Computer Science and Engineering, Shobhit University, Gangoh.
		2. Mr. Vinod Kumar, Assistant Professor, Computer Science and Engineering, Shobhit University, Gangoh.

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3	Professional Communication(BCA-103)	External Examiner 1. Dr. Abhay Bhatia, Associate Professor, Computer Science and Engineering, Roorkee Institute of Technology, Roorkee. 2. Dr. Ankit Sharma, Assistant Professor, Computer Science and Engineering, Motherhood University, Roorkee. 3. Dr. Vishant Kumar, Professor, Computer Science and Engineering, JBIT, Dehradun. Internal Examiner 1.Dr. Varun Bansal, Professor, Computer Science and Engineering, Shobhit University, Gangoh. 2.Mr. Nitin Kumar, Assistant Professor, Computer Science and Engineering, Shobhit University, Gangoh.
4	Mathematics(BCA-104)	External Examiner 1. Dr. Abhay Bhatia, Associate Professor, Computer Science and Engineering, Roorkee Institute of Technology, Roorkee. 2. Dr. Ankit Sharma, Assistant Professor, Computer Science and Engineering, Motherhood University, Roorkee. 3. Dr. Vishant Kumar, Professor, Computer Science and Engineering, JBIT, Dehradun. Internal Examiner 1. Dr. Varun Bansal, Professor, Computer Science and Engineering, Shobhit University, Gangoh. 2. Mr. Kuldeep Chauhan, Assistant Professor, Computer Science and Engineering, Shobhit University, Gangoh.
5	Fundamental of Computer and C Programming Lab(BCA-151)	External Examiner 1. Dr. Abhay Bhatia, Associate Professor, Computer Science and Engineering, Roorkee Institute of Technology, Roorkee. 2. Dr. Ankit Sharma, Assistant Professor, Computer Science and Engineering, Motherhood University, Roorkee. 3. Dr. Vishant Kumar, Professor, Computer Science and Engineering, JBIT, Dehradun. Internal Examiner 1.Dr. Varun Bansal, Professor, Computer Science and Engineering, Shobhit University, Gangoh.

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		2. Mrs. Sumika Jain, Assistant Professor, Computer Science and Engineering, Shobhit University, Gangoh.
6	Software Lab using Python(BCA-152)	External Examiner 1. Dr. Abhay Bhatia, Associate Professor, Computer Science and Engineering, Roorkee institute of Technology, Roorkee. 2. Dr. Ankit Sharma, Assistant Professor, Computer Science and Engineering, Motherhood University, Roorkee. 3. Dr. Vishant Kumar, Professor, Computer Science and Engineering, JBIT, Dehradun. Internal Examiner 1. Dr. Tarun Kumar Sharma, Professor, Computer Science and Engineering, Shobhit University, Gangoh. 2. Mr. Vinod Kumar, Assistant Professor, Computer Science and Engineering, Shobhit University, Gangoh.
7	English Communication Lab(BCA-153)	External Examiner 1. Dr. Abhay Bhatia, Associate Professor, Computer Science and Engineering, Roorkee institute of Technology, Roorkee. 2. Dr. Ankit Sharma, Assistant Professor, Computer Science and Engineering, Motherhood University, Roorkee. 3. Dr. Vishant Kumar, Professor, Computer Science and Engineering, JBIT, Dehradun. Internal Examiner 1. Dr. Tarun Kumar Sharma, Professor, Computer Science and Engineering, Shobhit University, Gangoh. 2. Mr. Vinod Kumar, Assistant Professor, Computer Science and Engineering, Shobhit University, Gangoh.
8	Seminar Based on Learning (BCA-154)	External Examiner 1 Dr. Abhay Bhatia, Associate Professor, Computer Science and Engineering, Roorkee institute of Technology, Roorkee. 3. Dr. Ankit Sharma, Assistant Professor, Computer Science and Engineering, Motherhood University, Roorkee. 4. Dr. Vishant Kumar, Professor, Computer Science and Engineering, JBIT, Dehradun. Internal Examiner 1. Dr. Tarun Kumar Sharma, Professor, Computer Science and Engineering, Shobhit University, Gangoh. 2. Mr. Vinod Kumar, Assistant Professor, Computer Science and Engineering, Shobhit University, Gangoh.

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9	Operating Systems(BCA-301)	External Examiner 1.Dr. Sandeep Kumar, professor, Computer Science and Engineering, IMS Ghaziabad.
		2. Dr. Ankit Sharma, Assistant Professor, Computer Science and Engineering, Motherhood University, Roorkee.
		3. Dr. Abhay Bhatia, Associate Professor, Computer Science and Engineering, Roorkee Institute of Technology, Roorkee.
		Internal Examiner 1. Mrs. Sumika Jain, Assistant Professor, Computer Science and Engineering, Shobhit University, Gangoh.
		2. Mr. Vinod Kumar, Assistant Professor, Computer Science and Engineering, Shobhit University, Gangoh.
10	HTML, DHTML and CSS Programming(BCA-302)	External Examiner 1. Dr. Abhay Bhatia, Associate Professor, Computer Science and Engineering, Roorkee Institute of Technology, Roorkee.
		2. Dr. Ankit Sharma, Assistant Professor, Computer Science and Engineering, Motherhood University, Roorkee.
		3. Dr. Vishant Kumar, Professor, Computer Science and Engineering, JBIT, Dehradun.
		Internal Examiner 1. Dr. Varun Bansal, Professor, Computer Science and Engineering, Shobhit University, Gangoh.
		2. Mr. Kuldeep Chauhan, Assistant Professor, Computer Science and Engineering, Shobhit University, Gangoh.
11	Theory of Computation(BCA-303)	External Examiner 1. Dr. Vishant Kumar, Professor, Computer Science and Engineering, JBIT, Dehradun.
		2. Dr. Ankit Sharma, Assistant Professor, Computer Science and Engineering, Motherhood University, Roorkee.
		3. Dr. Abhay Bhatia, Associate Professor, Computer Science and Engineering, Roorkee Institute of Technology, Roorkee.

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		Internal Examiner 1. Mr. Nitin Kumar, Assistant Professor, Computer Science and Engineering, Shobhit University, Gangoh. 2. Mr. Vinod Kumar, Assistant Professor, Computer Science and Engineering, Shobhit University, Gangoh.
12	Multimedia and Applications(BCA-304)	External Examiner 1. Dr. Ankit Sharma, Assistant Professor, Computer Science and Engineering, Motherhood University, Roorkee. 2. Dr. Vishant Kumar, Professor, Computer Science and Engineering, JBIT, Dehradun. 3. Dr. Abhay Bhatia, Associate Professor, Computer Science and Engineering, Roorkee Institute of Technology, Roorkee. Internal Examiner 1. Mr. Kuldeep Chauhan, Assistant Professor, Computer Science and Engineering, Shobhit University, Gangoh. 2. Mr. Nitin Kumar, Assistant Professor, Computer Science and Engineering, Shobhit University, Gangoh.
13	Optimization Techniques(BCA-305)	External Examiner 1. Dr. Abhay Bhatia, Associate Professor, Computer Science and Engineering, Roorkee Institute of Technology, Roorkee. 2. Dr. Ankit Sharma, Assistant Professor, Computer Science and Engineering, Motherhood University, Roorkee. 3. Dr. Vishant Kumar, Professor, Computer Science and Engineering, JBIT, Dehradun. Internal Examiner 1. Mr. Vinod Kumar, Assistant Professor, Computer Science and Engineering, Shobhit University, Gangoh. 2. Mrs. Sumika Jain, Assistant Professor, Computer Science and Engineering, Shobhit University, Gangoh.
14	Operating Systems Lab(BCA-351)	External Examiner 1. Dr. Abhay Bhatia, Associate Professor, Computer Science and Engineering, Roorkee Institute of Technology, Roorkee. 2. Dr. Vishant Kumar, Professor, Computer Science and Engineering, JBIT, Dehradun.

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EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sng.ac.in

		3. Dr. Ankit Sharma, Assistant Professor, Computer Science and Engineering, Motherhood University, Roorkee.
		Internal Examiner 1. Mr. Kuldeep Chauhan, Assistant Professor, Computer Science and Engineering, Shobhit University, Gangoh. 2. Mr. Nitin Kumar, Assistant Professor, Computer Science and Engineering, Shobhit University, Gangoh.
15	HTML Programming Lab(BCA-352)	External Examiner 1. Dr. Vishant Kumar, Professor, Computer Science and Engineering, JBIT, Dehradun. 2. Dr. Ankit Sharma, Assistant Professor, Computer Science and Engineering, Motherhood University, Roorkee. 3. Dr. Abhay Bhatia, Associate Professor, Computer Science and Engineering, Roorkee Institute of Technology, Roorkee.
		Internal Examiner 1. Mrs. Sumika Jain, Assistant Professor, Computer Science and Engineering, Shobhit University, Gangoh. 2. Mr. Vinod Kumar, Assistant Professor, Computer Science and Engineering, Shobhit University, Gangoh.
16	Seminar Based on Learning(BCA-353)	External Examiner 1. Dr. Abhay Bhatia, Associate Professor, Computer Science and Engineering, Roorkee Institute of Technology, Roorkee. 2. Dr. Ankit Sharma, Assistant Professor, Computer Science and Engineering, Motherhood University, Roorkee. 3. Dr. Vishant Kumar, Professor, Computer Science and Engineering, JBIT, Dehradun.
		Internal Examiner 1 Mr. Kuldeep Chauhan, Assistant Professor, Computer Science and Engineering, Shobhit University, Gangoh. 2 Mr. Nitin Kumar, Assistant Professor, Computer Science and Engineering, Shobhit University, Gangoh.

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U.: www.sug.ac.in

17	Software Engineering(BCA-501)	External Examiner 1. Dr. Abhay Bhatia, Associate Professor, Computer Science and Engineering, Roorkee Institute of Technology, Roorkee.
		2. Dr. Vishant Kumar, Professor, Computer Science and Engineering, JBIT, Dehradun.
		3. Dr. Ankit Sharma, Assistant Professor, Computer Science and Engineering, Motherhood University, Roorkee.
		Internal Examiner 1. Dr. Varun Bansal, Professor, Computer Science and Engineering, Shobhit University, Gangoh.
		2. Mr. Vinod Kumar, Assistant Professor, Computer Science and Engineering, Shobhit University, Gangoh.
18	Analysis of Algorithms & Data Structures(BCA-502)	External Examiner 1. Dr. Ankit Sharma, Assistant Professor, Computer Science and Engineering, Motherhood University, Roorkee.
		2. Dr. Vishant Kumar, Professor, Computer Science and Engineering, JBIT, Dehradun.
		3. Dr. Abhay Bhatia, Associate Professor, Computer Science and Engineering, Roorkee Institute of Technology, Roorkee.
		Internal Examiner 1. Mr. Kuldeep Chauhan, Assistant Professor, Computer Science and Engineering, Shobhit University, Gangoh.
		2. Mr. Nitin Kumar, Assistant Professor, Computer Science and Engineering, Shobhit University, Gangoh.
19	Mobile Computing(BCA-503)	External Examiner 1. Dr. Vishant Kumar, Professor, Computer Science and Engineering, JBIT, Dehradun.
		2. Dr. Ankit Sharma, Assistant Professor, Computer Science and Engineering, Motherhood University, Roorkee.
		3. Dr. Abhay Bhatia, Associate Professor, Computer Science and Engineering, Roorkee Institute of Technology, Roorkee.

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		Internal Examiner 1. Dr. Varun Bansal, Professor, Computer Science and Engineering, Shobhit University, Gangoh. 2. Mr. Vinod Kumar, Assistant Professor, Computer Science and Engineering, Shobhit University, Gangoh.
20	Big Data and Machine Learning(BCA-504)	External Examiner 1. Dr. Ankit Sharma, Assistant Professor, Computer Science and Engineering, Motherhood University, Roorkee. 2. Dr. Vishant Kumar, Professor, Computer Science and Engineering, JBIT, Dehradun. 3. Dr. Abhay Bhatia, Associate Professor, Computer Science and Engineering, Roorkee Institute of Technology, Roorkee. Internal Examiner 1. Mr. Kuldeep Chauhan, Assistant Professor, Computer Science and Engineering, Shobhit University, Gangoh. 2. Mr. Nitin Kumar, Assistant Professor, Computer Science and Engineering, Shobhit University, Gangoh.
21	Software Engineering Lab(BCA-551)	External Examiner 1. Dr. Vishant Kumar, Professor, Computer Science and Engineering, JBIT, Dehradun. 2. Dr. Ankit Sharma, Assistant Professor, Computer Science and Engineering, Motherhood University, Roorkee. 3. Dr. Abhay Bhatia, Associate Professor, Computer Science and Engineering, Roorkee Institute of Technology, Roorkee. Internal Examiner 3. Dr. Varun Bansal, Professor, Computer Science and Engineering, Shobhit University, Gangoh. 4. Mr. Vinod Kumar, Assistant Professor, Computer Science and Engineering, Shobhit University, Gangoh.
22	Algorithms and Data Structures with C++	External Examiner 1. Dr. Ankit Sharma, Assistant Professor, Computer Science and Engineering, Motherhood University, Roorkee.

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U.: www.sug.ac.in

	Lab (BCA-552)	2. Dr. Abhay Bhatia, Associate Professor, Computer Science and Engineering, Roorkee Institute of Technology, Roorkee. 3. Dr. Vishant Kumar, Professor, Computer Science and Engineering, JBIT, Dehradun. Internal Examiner 1. Dr. Varun Bansal, Professor, Computer Science and Engineering, Shobhit University, Gangoh. 2. Mr. Vinod Kumar, Assistant Professor, Computer Science and Engineering, Shobhit University, Gangoh.
23	Research Project-I(BCA-558)	External Examiner 1. Dr. Abhay Bhatia, Associate Professor, Computer Science and Engineering, Roorkee Institute of Technology, Roorkee. 2. Dr. Ankit Sharma, Assistant Professor, Computer Science and Engineering, Motherhood University, Roorkee. 3. Dr. Vishant Kumar, Professor, Computer Science and Engineering, JBIT, Dehradun. Internal Examiner 1. Dr. Varun Bansal, Professor, Computer Science and Engineering, Shobhit University, Gangoh. 2. Mr. Vinod Kumar, Assistant Professor, Computer Science and Engineering, Shobhit University, Gangoh.

MCA (List of Examiners)

Sr. No.	Course code with Title	Name, Designation, Institution and Correspondence address of the Paper Setter/Examiner
1.	Java (MCA-101)	External Examiner 1. Dr. Abhay Bhatia, Associate Professor, Computer Science and Engineering, Roorkee Institute of Technology, Roorkee. 2. Dr. Maheep Singh, Professor, Computer Science and Engineering, National Institute of Technology, Srinagar. 3. Dr. Vishant Kumar, Professor, Computer Science and Engineering, JBIT, Dehradun. Singh Internal Examiner 1. Mr. Jitendra K. Saini, Assistant Professor, Computer Science and Engineering, Shobhit University, Gangoh.

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U.: www.snu.ac.in

		2. Mr. Shahnawaaj, Assistant Professor, Computer Science and Engineering, Shobhit University, Gangoh.
2	Advanced DBMS (MCA-102)	External Examiner 4. Dr. Ankit Sharma, Assistant Professor, Computer Science and Engineering, Motherhood University, Roorkee. 5. Dr. Mukesh Rawat, Professor, Computer Science and Engineering, Meerut Institute of Engineering & Technology, Meerut. 6. Dr. Sreesh Gaur, Associate Professor, Computer Science and Engineering, KITE Group of Institutions, Meerut. Internal Examiner 3. Dr. Varun Bansal, Professor, Computer Science and Engineering, Shobhit University, Gangoh. 4. Mr. Shubham Kumar, Assistant Professor, Computer Science and Engineering, Shobhit University, Gangoh.
3	Advanced DAA (MCA-103)	External Examiner 1. Dr. Vishant Kumar, Professor, Computer Science and Engineering, JBIT, Dehradun. Bansal 2. Dr. Maheep Singh, Professor, Computer Science and Engineering, National Institute of Technology, Srinagar 3. Dr. Abhay Bhatia, Associate Professor, Computer Science and Engineering, Roorkee Institute of Technology, Roorkee. Internal Examiner 1. Mrs. Sumika Jain, Assistant Professor, Computer Science and Engineering, Shobhit University, Gangoh. 2. Mr. Kuldeep Chauhan, Assistant Professor, Computer Science and Engineering, Shobhit University, Gangoh.
4	Network Fundamentals (MCA-104)	External Examiner 1. Dr. Abhay Bhati 2. Dr. Ankit Sharma, Assistant Professor, Computer Science and Engineering, Motherhood University, Roorkee. 3. Dr. Vishant Kumar, Professor, Computer Science and Engineering, JBIT, Dehradun. Bansal Internal Examiner 1. Mrs. Sumika Jain, Assistant Professor, Computer Science and Engineering, Shobhit University, Gangoh. 2. Mr. Kuldeep Chauhan, Assistant Professor, Computer Science and Engineering, Shobhit University, Gangoh.

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5	Optimization Techniques (MCA-133)	External Examiner 1. Dr. Abhay Bhatia, Associate Professor, Computer Science and Engineering, Roorkee institute of Technology, Roorkee. 2. Dr. Ankit Sharma, Assistant Professor, Computer Science and Engineering, Motherhood University, Roorkee. 3. Dr. Vishant Kumar, Professor, Computer Science and Engineering, JBIT, Dehradun. Bansal Internal Examiner 1. Mrs. Sumika Jain, Assistant Professor, Computer Science and Engineering, Shobhit University, Gangoh. 2. Mr. Kuldeep Chauhan, Assistant Professor, Computer Science and Engineering, Shobhit University, Gangoh.
6	Lab JAVA (MCA-151)	External Examiner 1. Dr. Ankit Sharma, Assistant Professor, Computer Science and Engineering, Motherhood University, Roorkee. 2. Dr. Mukesh Rawat, Professor, Computer Science and Engineering, Meerut Institute of Engineering & Technology, Meerut. 3. Dr. Sreesh Gaur, Associate Professor, Computer Science and Engineering, KITE Group of Institutions, Meerut. Internal Examiner 1. Dr. Varun Bansal, Professor, Computer Science and Engineering, Shobhit University, Gangoh. 2. Mr. Shubham Kumar, , Assistant Professor, Computer Science and Engineering, Shobhit University, Gangoh.
7	Lab Advanced DBMS (MCA-152)	External Examiner 1. Dr. Abhay Bhatia, Associate Professor, Computer Science and Engineering, Roorkee institute of Technology, Roorkee. 2. Dr. Maheep Singh, Professor, Computer Science and Engineering, National Institute of Technology, Srinagar 3. Dr. Vishant Kumar, Professor, Computer Science and Engineering, JBIT, Dehradun. Bansal Internal Examiner 1. Mr. Jitendra K. Saini, Assistant Professor, Computer Science and Engineering, Shobhit University, Gangoh. 2. Mr. Shahnawaaj, Assistant Professor, Computer Science and Engineering, Shobhit University, Gangoh.

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8	Lab Design and analysis of Algorithm (MCA-153)	External Examiner 1. Dr. Sreesh Gaur, Associate Professor, Computer Science and Engineering, KITE Group of Institutions, Meerut. 2. Dr. Vishant Kumar, Professor, Computer Science and Engineering, JBIT, Dehradun. Bansal 3. Dr. Abhay Bhatia, Associate Professor, Computer Science and Engineering, Roorkee institute of Technology, Roorkee. Internal Examiner 1. Mr. Jitendra K. Saini, Assistant Professor, Computer Science and Engineering, Shobhit University, Gangoh. 2. Dr. Tarun Kumar Sharma, Professor, Computer Science and Engineering, Shobhit University, Gangoh.
9.	PHP (MCA-301)	External Examiner 1. Dr. Ankit Sharma, Assistant Professor, Computer Science and Engineering, Motherhood University, Roorkee. 2. Dr. Mukesh Rawat, Professor, Computer Science and Engineering, Meerut Institute of Engineering & Technology, Meerut. 3. Dr. Sreesh Gaur, Associate Professor, Computer Science and Engineering, KITE Group of Institutions, Meerut. Internal Examiner 1. Dr. Varun Bansal, Professor, Computer Science and Engineering, Shobhit University, Gangoh. 2. Mrs. Sumika Jain, Assistant Professor, Computer Science and Engineering, Shobhit University, Gangoh.
10.	Data Science (MCA-302)	External Examiner 1. Dr. Vishant Kumar, Professor, Computer Science and Engineering, JBIT, Dehradun. Bansal 2. Dr. Maheep Singh, Professor, Computer Science and Engineering, National Institute of Technology, Srinagar 3. Dr. Abhay Bhatia, Associate Professor, Computer Science and Engineering, Roorkee institute of Technology, Roorkee. Internal Examiner 1. Dr. Varun Bansal, Professor, Computer Science and Engineering, Shobhit University, Gangoh. 2. Mrs. Sumika Jain, Assistant Professor, Computer Science and Engineering, Shobhit University, Gangoh.

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SHOBHIT UNIVERSITY GANGOH
School of Engineering and Technology

Date: 06/12/2023

NOTICE

Subject: Meeting of the Board of Studies

All members of the Board of Studies are hereby informed that a meeting will be held as per the following details:

Date: 21/12/2023
Time: 10.00 AM
Venue: SOET, Shobhit University, Gangoh

Agenda:

1. Confirmation of minutes of the previous meeting
2. Analysis of the Students' feedback & Action taken report and Analysis of the feedback on curriculum from stakeholders
3. Approval of Examiners (Theory & Practical) and Paper Setters for the even semester courses in BCA, MCA, B.Tech & M.Tech for session **Jan. to June. 2024.**
4. Discussion on the value Added courses offered for students and ratification of the same.
5. Any other matter with the permission of the Chair

All members are requested to make it convenient to attend the meeting and come prepared with relevant documents and suggestions.

Prof.(Dr.) Varun Bansal
Chairperson, Board of Studies
Head of the Department
06/12/2023

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E-mail:
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SHOBHIT UNIVERSITY GANGOH
School of Engineering and Technology

Date: 06/12/2023

To
Dr. Rajesh Kumar Saini
Head of the Department
Dept. of Mathematics Science and Computer Application
Bundelkhand University, Jhansi

Subject: Invitation to Attend the Board of Studies Meeting

Dear Sir

Greetings from School of Engineering and Technology

We are pleased to invite you to participate as an external subject expert in the upcoming meeting of the Board of Studies for the School of Engineering and Technology, scheduled as follows:

Date: 21/12/2023
Time: 10.00 AM
Mode: SOET, Shobhit University, Gangoh

The meeting will deliberate on important academic matters including syllabus revision, new course proposals, and academic planning for the upcoming session. Your expert insights and contributions would be invaluable to the academic enrichment of our programs.

We request you to kindly confirm your availability and mode of attendance at your earliest convenience. For online participation, a meeting link will be shared upon confirmation. If attending in person, necessary hospitality arrangements will be made.

We look forward to your positive response and support.

Thank you.

Warm regards,

Prof.(Dr.) Varun Bansal
Chairperson, Board of Studies

School of Engineering and Technology ★ Shobhit University Gangoh ★

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E-mail:
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SHOBHIT UNIVERSITY GANGOH
School of Engineering and Technology

Date: 06/12/2023

To
Dr. Neeraj Singhal
Professor
School of Computer Science and Engineering
Sir Chhotu Ram Institute of Engineering & Technology

Subject: Invitation to Attend the Board of Studies Meeting

Dear Sir

Greetings from School of Engineering and Technology

We are pleased to invite you to participate as an external subject expert in the upcoming meeting of the Board of Studies for the School of Engineering and Technology, scheduled as follows:

Date: 21/12/2023
Time: 10.00 AM
Mode: SOET, Shobhit University, Gangoh

The meeting will deliberate on important academic matters including syllabus revision, new course proposals, and academic planning for the upcoming session. Your expert insights and contributions would be invaluable to the academic enrichment of our programs.

We request you to kindly confirm your availability and mode of attendance at your earliest convenience. For online participation, a meeting link will be shared upon confirmation. If attending in person, necessary hospitality arrangements will be made.

We look forward to your positive response and support.

Thank you.

Warm regards,

Prof.(Dr.) Varun Hansal
Chairperson, Board of Studies

School of Engineering and Technology ★ Shobhit University Gangoh ★

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SHOBHIT UNIVERSITY GANGOH
School of Engineering and Technology

Date: 21/12/2023

Attendance Sheet (School of Engineering and Technology, BOS Meeting on 21/12/2023)

Sr. No	Name	External/Internal Member	Signature
1	Prof.(Dr.) Rajesh Kumar Saini	External Expert	Rajesh Kumar Saini
2	Dr. Neeraj Singhal	External Expert	Neeraj Singhal
3	Dr. Mahipal Singh	Internal Member	Mahipal
4	Dr. Jasvir Singh Rana	Internal Member	Jasvir Singh

Chairman

School of Engineering and Technology ★ Shobhit University Gangoh ★

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School of Engineering & Technology

Date: 21.12.2023

Minutes of the Meeting of Board of Studies

22nd meeting of the Board of Studies of the School of Engineering and Technology, Shobhit University Gangoh was organized on 21st Dec. 2023 at 10:00 am onwards. The following members were present in the meeting:

1.	Prof. (Dr.) Varun Bansal Head of the Department Computer Science and Engineering Shobhit University Gangoh	Chairperson
2.	Prof. (Dr.) Rajesh Kumar Saini Head of the Department Dept. of Mathematics Science and Computer Application Bundelkhand University, Jhansi	External expert
3.	Dr. Neeraj Singhal Professor School of Computer Science and Engineering Sir Chhotu Ram Institute of Engineering & Technology	External Expert
4.	Dr. Mahipal Singh, Professor School of Engineering and Technology Shobhit University Gangoh	Member
5.	Dr. Jasvir Singh Rana Professor School of Engineering and Technology Shobhit University Gangoh	Member

Welcome address by Chairman
The Chairman extended a warm welcome to all the members of Board of Studies and the following information was tabled before the members of the Board of Studies:

Input given by the Subject Experts on the Scheme and syllabi of the ongoing Batches.

The following discussed and approved on Choice Based Credit System:

Item BOS 22.1: Approval of the Minutes of the 21st BOS Meeting held on 27 June 2023

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247341, India
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U.: www.sug.ac.in

Was circulated among the members and the same were notified after the approval of the Board of Studies. {Annexure- 1}

Item BOS 22.2:Analysis of Students' feedback & Action taken report:

- BOS Chairman has expressed that the student feedback and action taken report process is done at the end of semester. The BOS members noted the same.

Item BOS 23.3: Analysis of the feedback on curriculum from stakeholders:

- The BOS chairman presented the analysis report of stakeholders' feedback on curriculum. The BOS members noted the same and advised to incorporate the suggestions as per the feasibility. The Action Taken Report is enclosed herewith. {Annexure-2}

Item BOS 22.4: Approval of Examiners (Theory & Practical) and Paper Setters for the even semester courses in BCA, MCA , B. Tech & M. Tech for session **Jan. to June 2024** The same is being sent to the Controller of Examinations, Shobhit University Gangoh, in a sealed cover. {Annexure-3}

Item BOS 22.5: Discussion on the Value Added courses offered for students and ratification of the same.

- BOS members approved the list of Value added courses offered to students.

The meeting ended with a vote of thanks to the Chairman, Board of Studies.

The suggestions given by the panel of BOS have been discussed with the Vice Chancellor and Dean Academics. The action taken on the suggestions has been approved by competent authorities.

Signed by:

(Chairman BOS)

(Dean Academics)

(Vice Chancellor)

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U.: www.sug.ac.in

22nd Meeting of BOS (Item No. 1 Annexure -1)

School of Engineering & Technology

Date: 27.06.2023

Minutes of the Meeting of Board of Studies

21st meeting of the Board of Studies of the School of Engineering and Technology, Shobhit University Gangoh was organized on 27th June 2023 at 10:00 am onwards. The following members were present in the meeting:

1.	Prof. (Dr.) Varun Bansal Head of the Department Computer Science and Engineering Shobhit University Gangoh	Chairperson
2.	Prof. (Dr.) Rajesh Kumar Saini Head of the Department Dept. of Mathematics Science and Computer Application Bundelkhand University, Jhansi	External expert
3.	Dr. Neeraj Singhal Professor School of Computer Science and Engineering Sir Chhotu Ram Institute of Engineering & Technology	External Expert
4.	Dr. Mahipal Singh, Professor School of Engineering and Technology Shobhit University Gangoh	Member
5.	Dr. Jasvir Rana Professor School of Engineering and Technology Shobhit University Gangoh	Member

Welcome address by Chairman

The Chairman extended a warm welcome to all the members of Board of Studies and the following information was tabled before the members of the Board of Studies:

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Input given by the Subject Experts on the Scheme and syllabi of the ongoing Batches.

The following discussed and approved on Choice Based Credit System:

Item BOS 21.1: Approval of the Minutes of the 20th BOS Meeting held on 22 Dec. 2022 Was circulated among the members and the same were notified after the approval of the Board of Studies. {Annexure- 1}

Item BOS 21.2: Approval of Examiners (Theory & Practical) and Paper Setters for the odd semester courses in BCA, MCA, B. Tech & M. Tech for the session **July to Dec. 2023** The same is being sent to the Controller of Examinations, Shobhit University Gangoh, in a sealed cover. {Annexure-2}

Item BOS 21.3: Discussion on the Value Added courses offered for students and ratification of the same.

- BOS members approved the list of Value added courses offered to students

The meeting ended with a vote of thanks to the Chairman, Board of Studies.

The suggestions given by the panel of BOS have been discussed with the Vice Chancellor and Dean Academics. The action taken on the suggestions has been approved by competent authorities.

Signed by:

(Chairman, BOS)

(Vice Chancellor)

(Dean Academics)

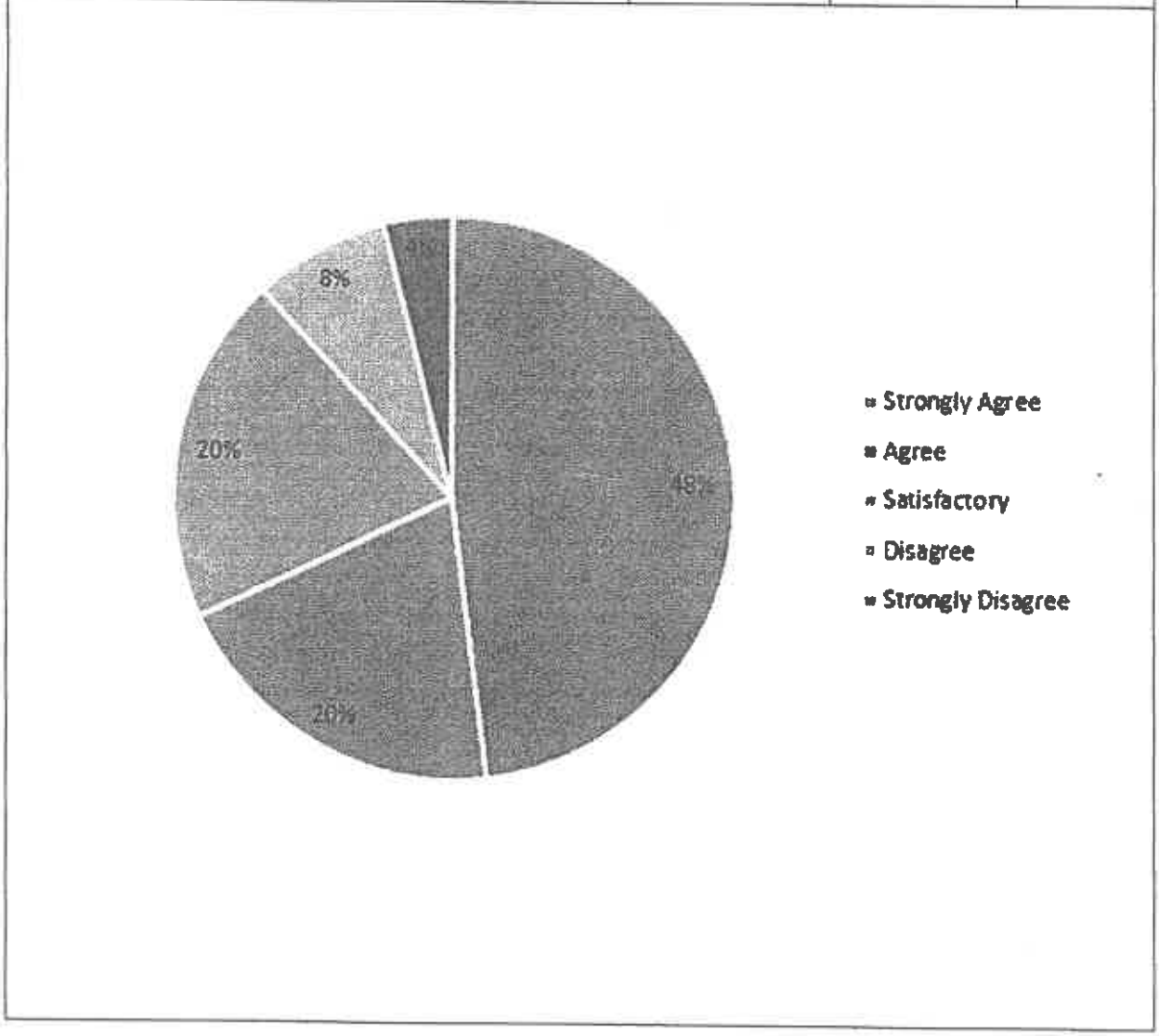
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22nd Meeting of BOS (Item No. 22.3 Annexure -2)

Analysis of Alumni' Feedback of School of Engineering and Technology through Table and Pie Chart

Q.1 The courses based on state of art trends and recent developments?

The courses based on state of art trends and recent developments	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	48	20	20	8	4

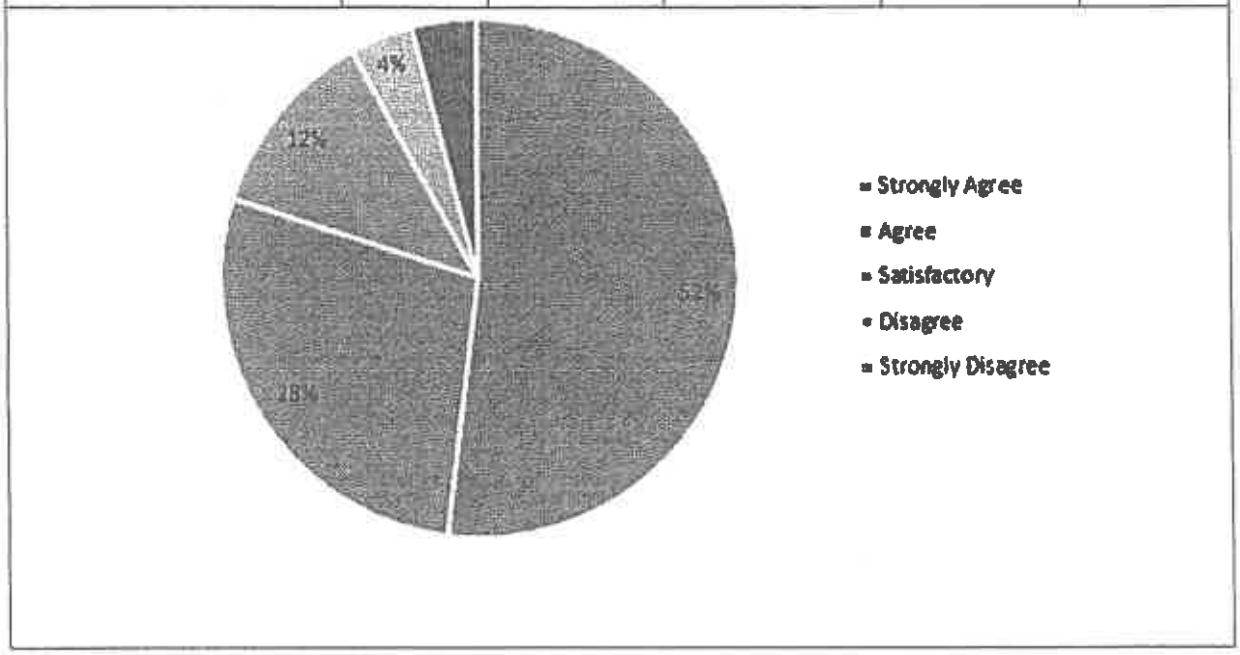


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Q.2 The courses found to be helpful in developing skills and knowledge in respective domain?

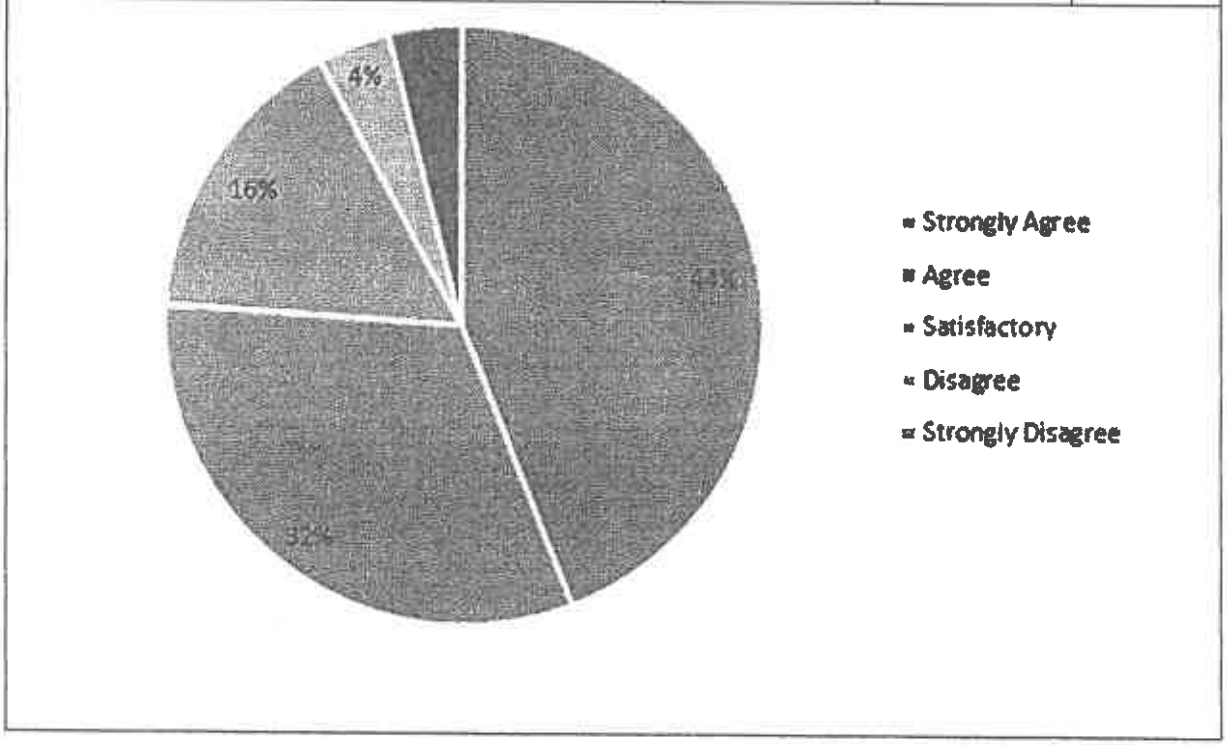
The courses found to be helpful in developing skills and knowledge in respective domain	Strongly Agree	Agree	satisfactory	Disagree	Strongly Disagree
Response (%)	52	28	12	4	4



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Q.3 The courses found to be productive in competing professionally at national/international level?

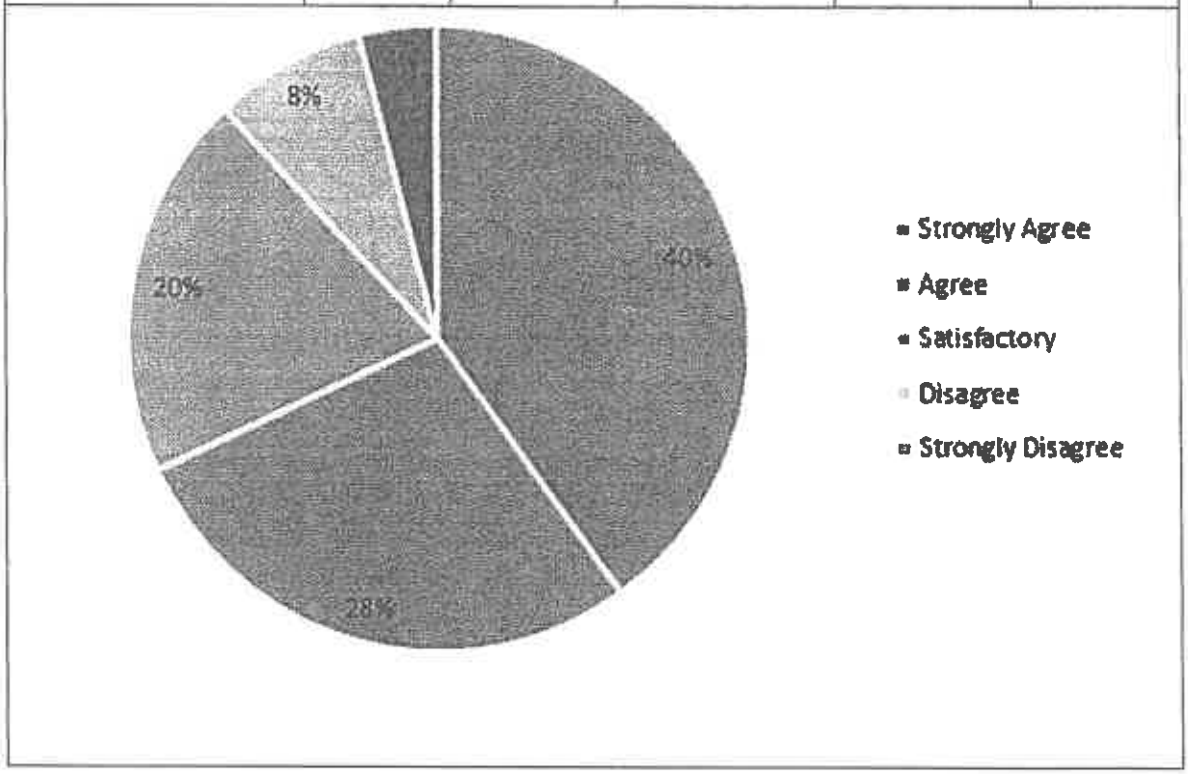
The courses found to be productive in competing professionally at national/international level	Strongly Agree	Agree	satisfactory	Disagree	Strongly Disagree
Response (%)	44	32	16	4	4



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Q.4 The courses found to be appropriate in motivating students towards nation building by inculcating ethical and professional values?

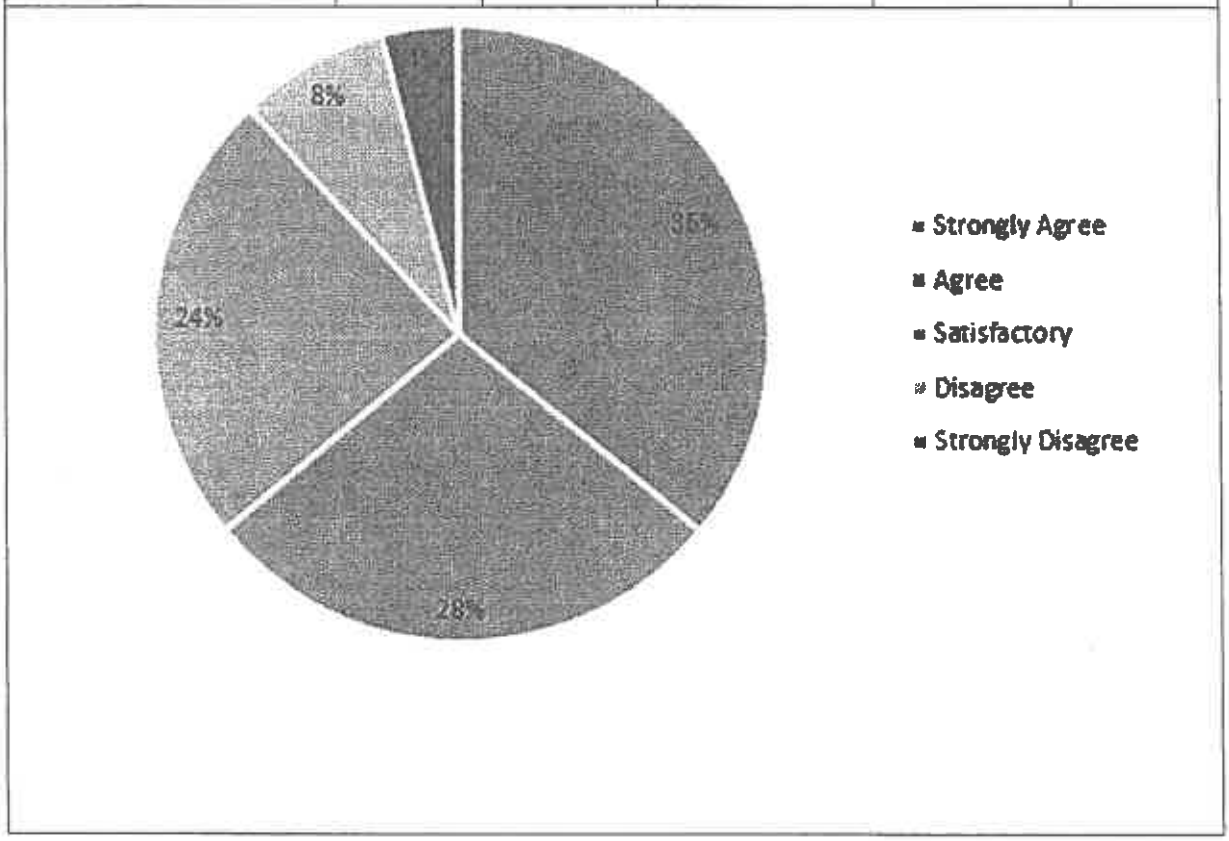
The courses found to be appropriate in motivating students towards nation building by inculcating ethical and professional values	Strongly Agree	Agree	satisfactory	Disagree	Strongly Disagree
Response (%)	40	28	20	8	4



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Q.5 The programme helped to understand the impact of domain knowledge in social and global context?

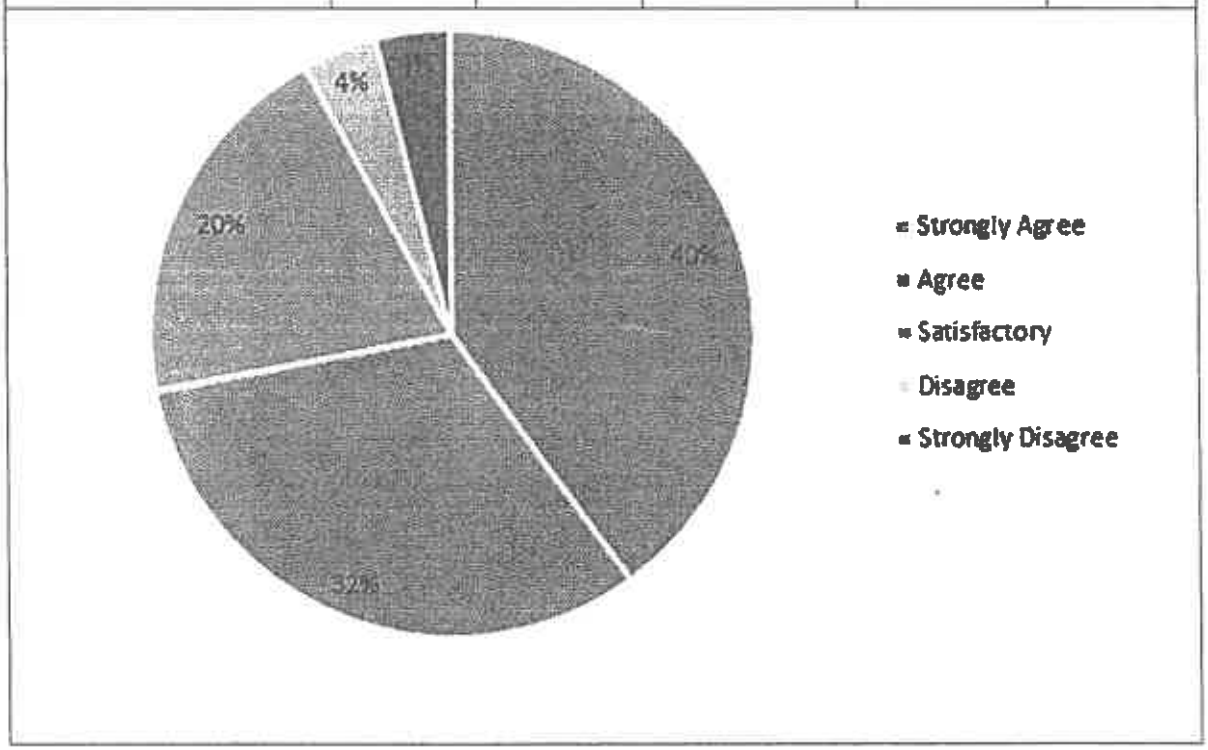
The programme helped to understand the impact of domain knowledge in social and global context	Strongly Agree	Agree	satisfactory	Disagree	Strongly Disagree
Response (%)	36	28	24	8	4



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Q.6 The programme provided awareness on recent advancements and innovations?

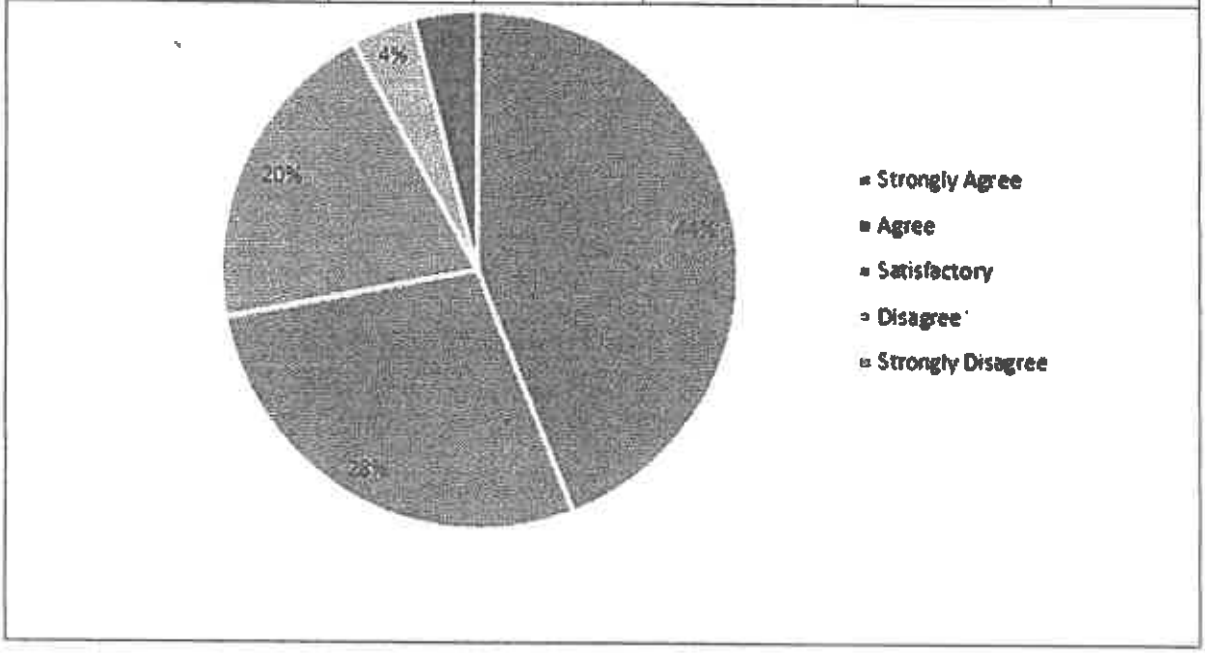
The programme provided awareness on recent advancements and innovations	Strongly Agree	Agree	satisfactory	Disagree	Strongly Disagree
Response (%)	40	32	20	4	4



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Q.7 The programme improved critical thinking ability and problem-solving aptitude.

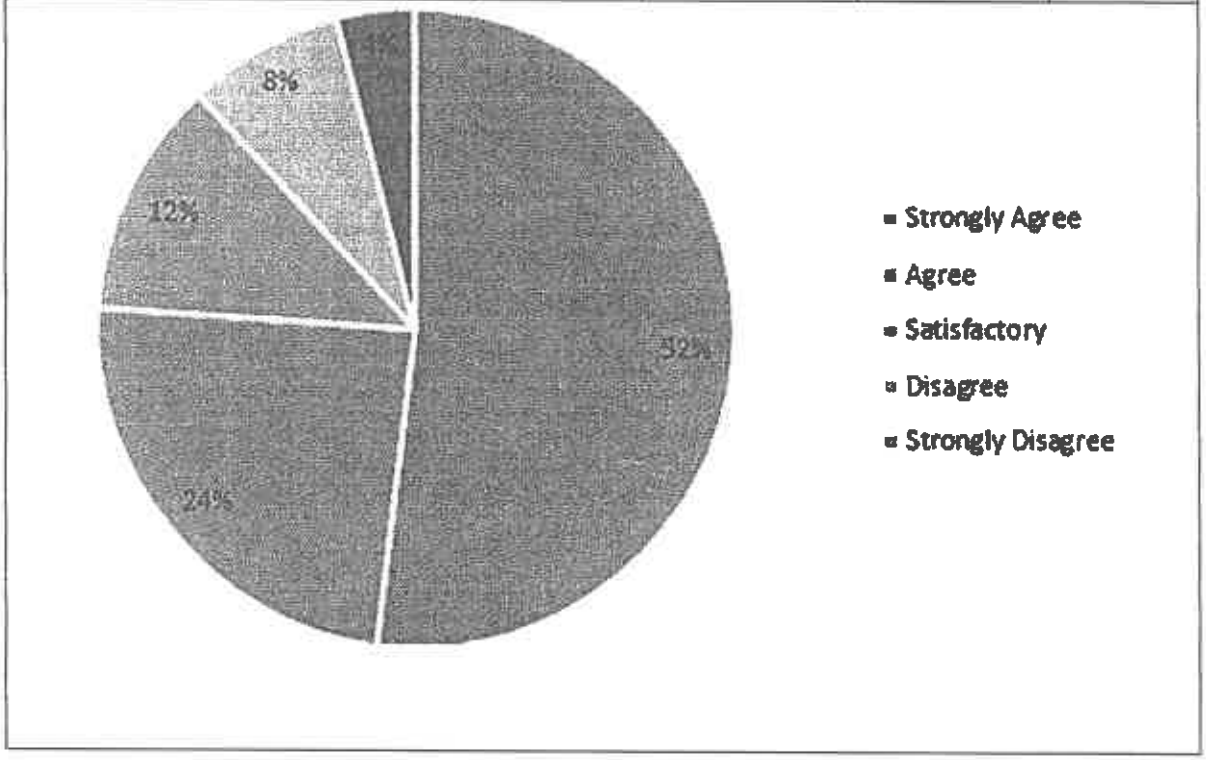
The programme improved critical thinking ability and problem-solving aptitude.	Strongly Agree	Agree	satisfactory	Disagree	Strongly Disagree
Response (%)	44	28	20	4	4



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Q.8 The programme helped to take independent decisions and perform managerial & administerial functions diligently?

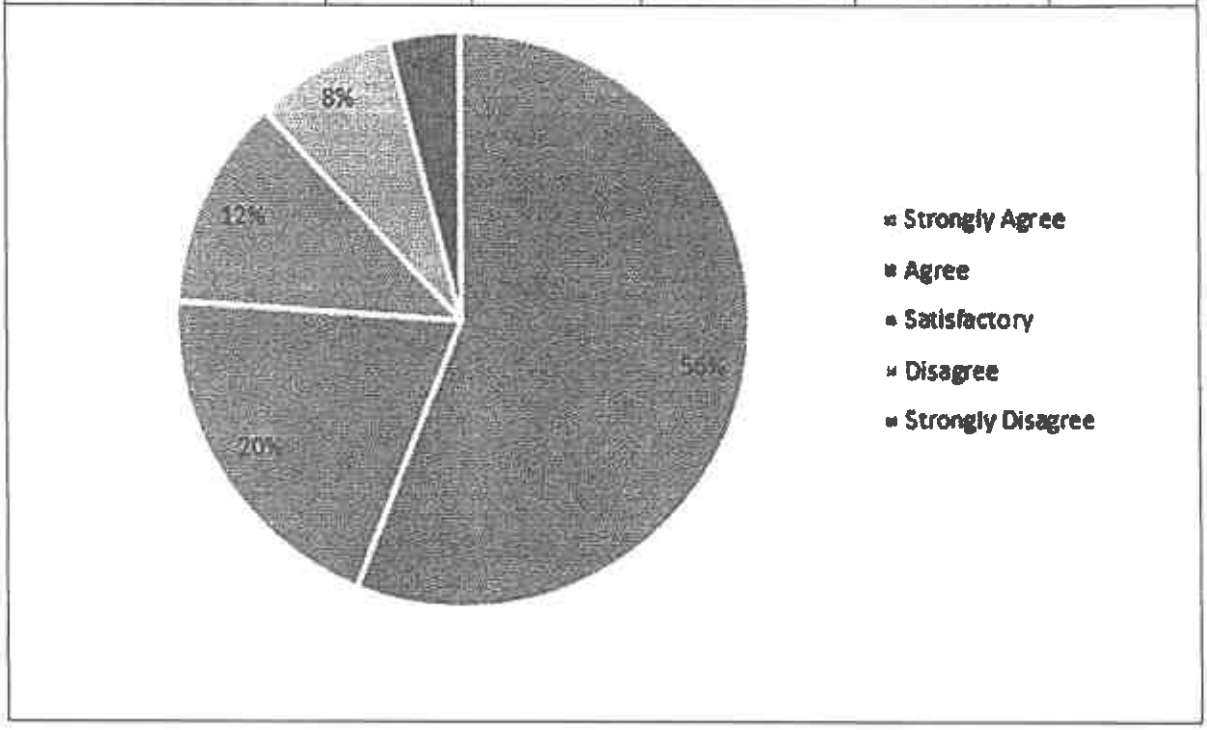
The programme helped to take independent decisions and perform managerial & administerial functions diligently.	Strongly Agree	Agree	satisfactory	Disagree	Strongly Disagree
Response (%)	52	24	12	8	4



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Q.9 The curriculum was helpful in acquiring advance level knowledge to pursue research and higher studies?

The curriculum was helpful in acquiring advance level knowledge to pursue research and higher studies	Strongly Agree	Agree	satisfactory	Disagree	Strongly Disagree
Response (%)	56	20	12	8	4



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School of Engineering & Technology (25)

Sr No	Questions	Details	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
1	The courses based on state of art trends and recent developments?	No of Alumni	12	5	5	2	1
		Percentage	48	20	20	8	4
2	The courses found to be helpful in developing skills and knowledge in respective domain?	No of Alumni	13	7	3	1	1
		Percentage	52	28	12	4	4
3	The courses found to be productive in competing professionally at national/international level?	No of Alumni	11	8	4	1	1
		Percentage	44	32	16	4	4
4	The courses found to be appropriate in motivating students towards nation building by inculcating ethical and professional values?	No of Alumni	10	7	5	2	1
		Percentage	40	28	20	8	4
5	The programme helped to understand the impact of domain knowledge in social and global context?	No of Alumni	9	7	6	2	1
		Percentage	36	28	24	8	4
6	The programme provided awareness on recent advancements and innovations?	No of Alumni	10	8	5	1	1
		Percentage	40	32	20	4	4
7	The programme improved critical thinking ability and problem-solving aptitude.	No of Alumni	11	7	5	1	1
		Percentage	44	28	20	4	4
8	The programme helped to take independent decisions and perform managerial & administerial functions diligently?	No of Alumni	13	6	3	2	1
		Percentage	52	24	12	8	4
9	The curriculum was helpful in acquiring advance level knowledge to pursue research and higher studies?	No of Alumni	14	5	3	2	1
		Percentage	56	20	12	8	4

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Analysis of Feedback:

- 88 % alumni think that the courses based on state of art trends and recent developments, appropriate in motivating students towards nation building by inculcating ethical and professional values, their programme helped them to understand the impact of domain knowledge in social and global context and helped to take independent decisions and perform managerial & administerial functions diligently. The curriculum was helpful in acquiring advance level knowledge to pursue research and higher studies while 12 % students don't think so.
- According to 92% alumni the courses are helpful in developing skills and knowledge in their domain, these courses are productive in competing professionally at national/international level by provided awareness on recent advancements and innovations and improved critical thinking ability and problem-solving aptitude on the other hand 08% students have negative opinion regarding this fact.

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Action Taken Report

(School of Engineering and Technology)

Sr. No.	Suggestions	Action taken	Outcome
1.	Most alumni suggested to emphasise more on interdisciplinary learning and research	Following New Education Policy interdisciplinary and multidisciplinary courses were added in the curriculum.	The Students could get a wider exposure.
2.	Besides providing knowledge, students should be made skilful.	The School has placed an emphasis on value-added courses on research, courses that focus on developing skills, and courses that focus on developing personality	Holistic development of the students was found possible.
3.	Skill oriented workshops should be organised for the students.	The School organised skill based workshop and evaluated them.	Students were made future skilled professionals.
4.	Many Alumni offered to help in developing and teaching an industry-focused curriculum	The School organised Student-Alumni interactive sessions.	The students were aware about industry requirement and work culture there.

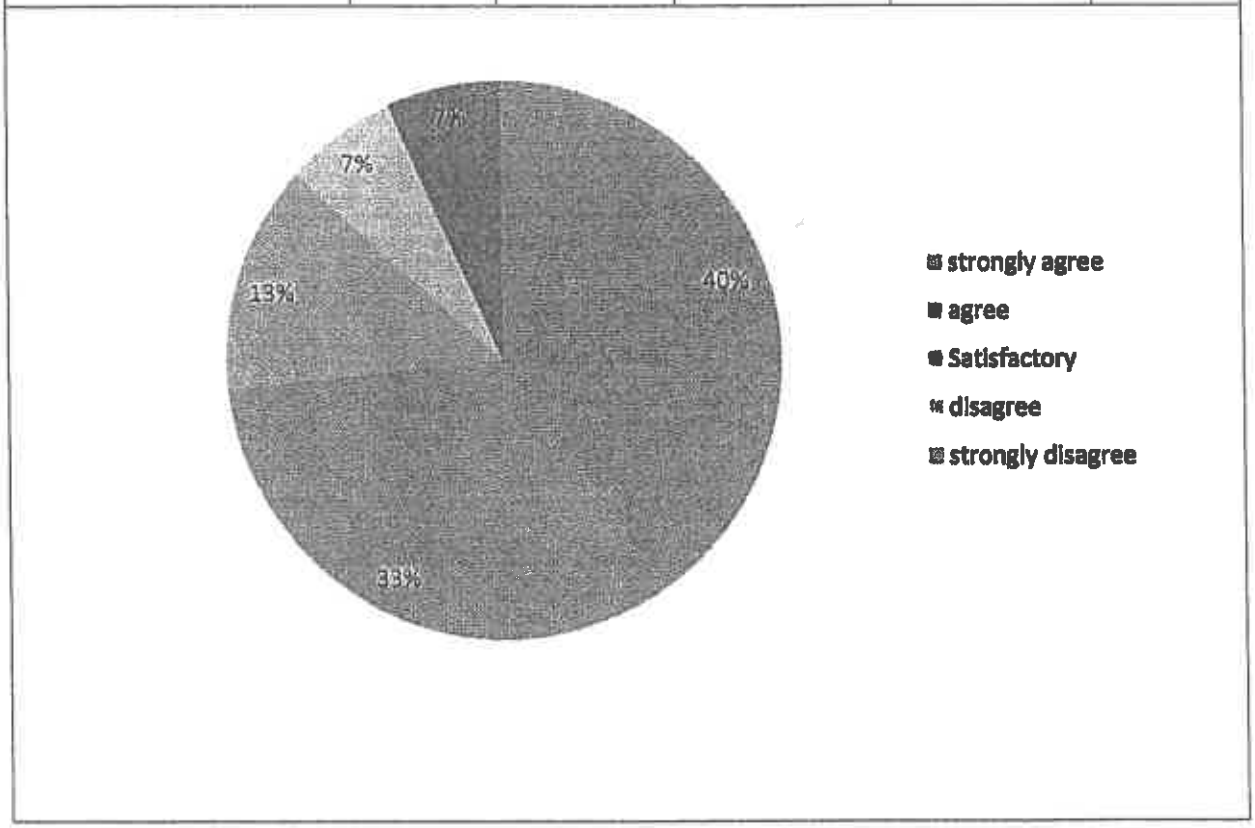
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Analysis of Employer' Feedback of School of Engineering and Technology through Table and Pie Chart

Q.1 The curriculum assists the students to acquire necessary entry level skills in industrial sector.

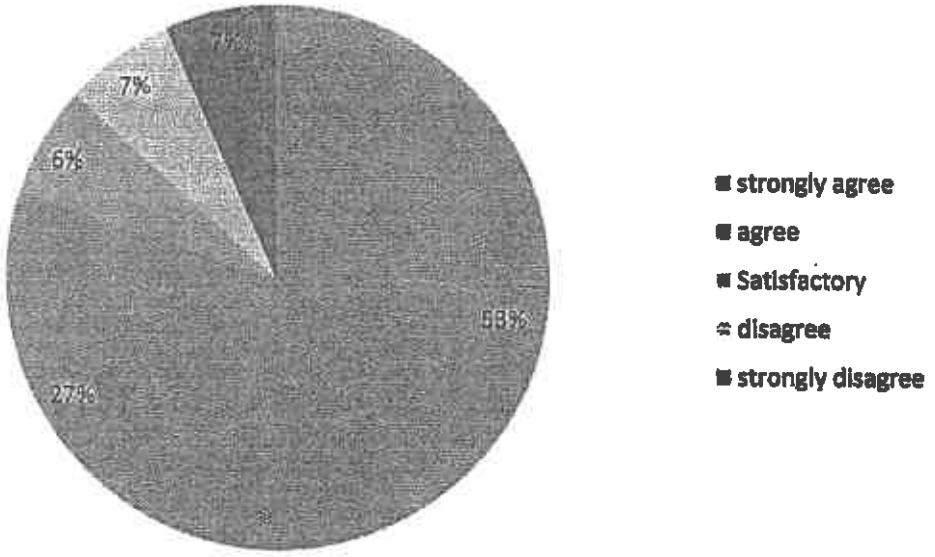
The curriculum assists the students to acquire necessary entry level skills in industrial sector.	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	40.00	33.33	13.33	6.67	6.67



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Q.2 The curriculum offers adequate scope for life-long learning and higher-level aptitude for new technology/tools.

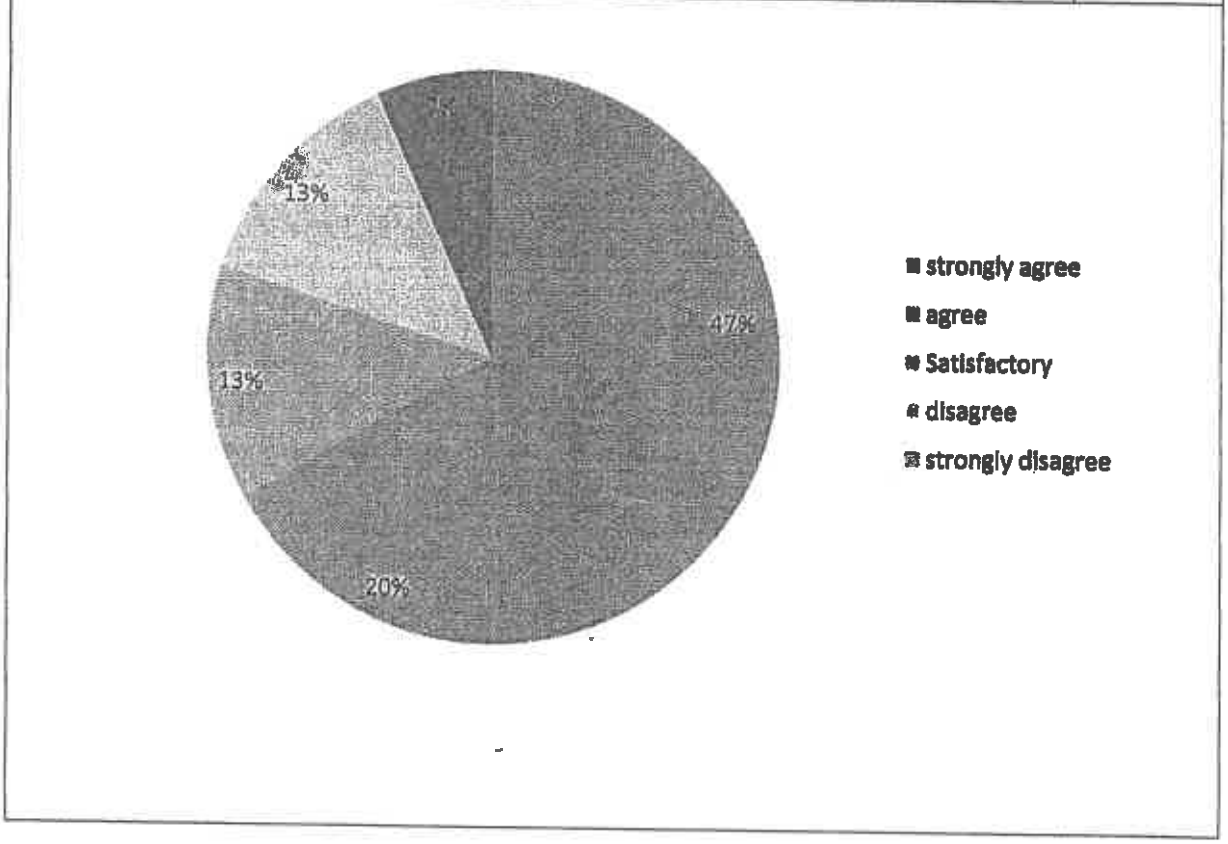
The curriculum offers adequate scope for life-long learning and higher-level aptitude for new technology/tools.	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	53.33	26.67	6.67	6.67	6.67



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Q.3 The curriculum has adequate scope for multidisciplinary knowledge and sufficient number of elective courses.

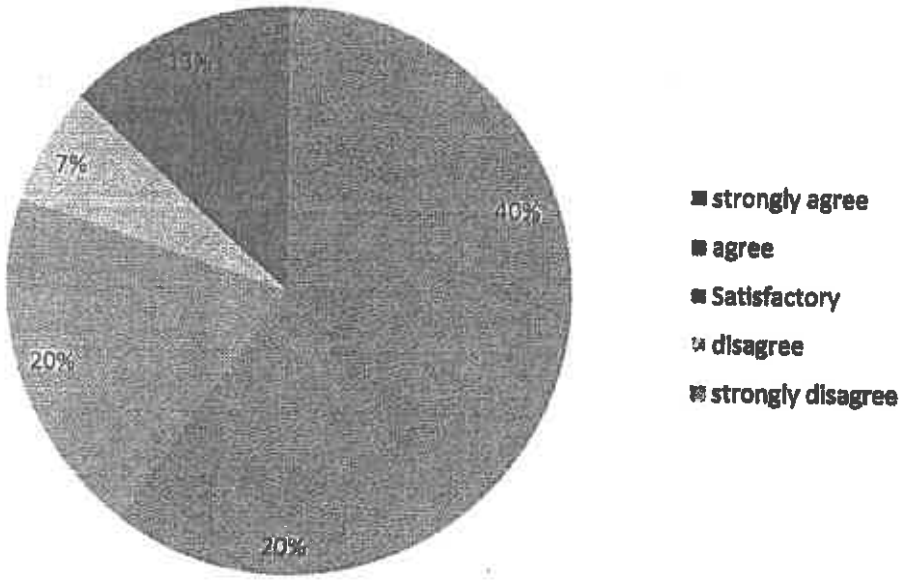
The curriculum has adequate scope for multidisciplinary knowledge and sufficient number of elective courses.	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	46.67	20.00	13.33	13.33	6.67



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Q.4 The curriculum has relevant content to assist students to work independently as well in a team with high level of adaptability.

The curriculum has relevant content to assist students to work independently as well in a team with high level of adaptability.	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	40.00	20.00	20.00	6.67	13.33

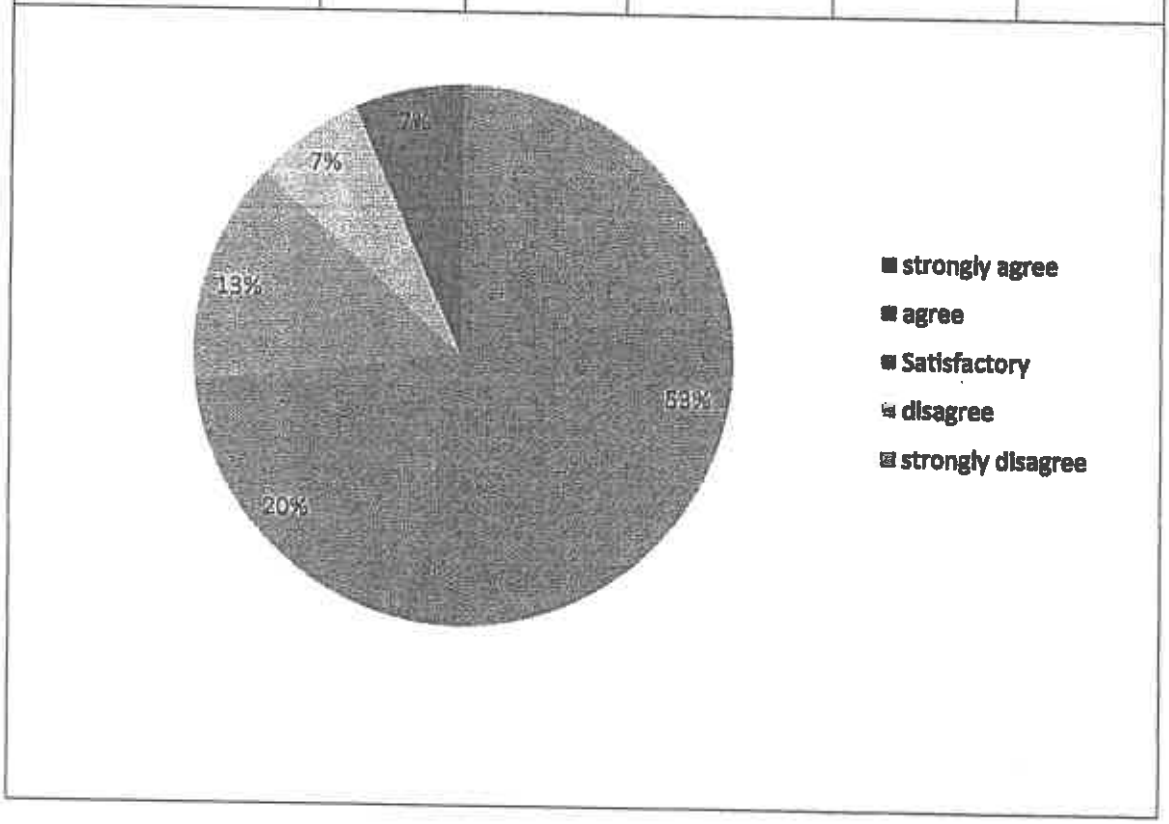


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Q.5 The curriculum provides enough scope for improving entrepreneurial skill as well as industry readiness.

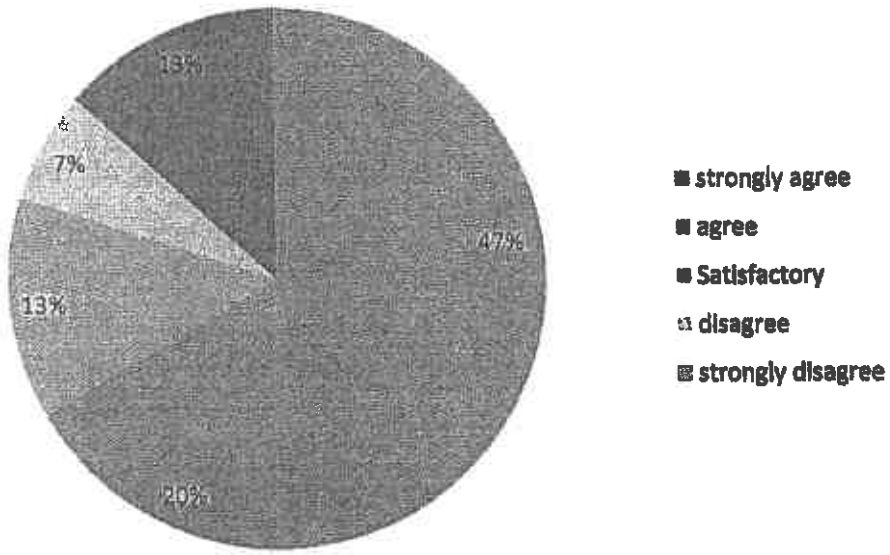
The curriculum provides enough scope for improving entrepreneurial skill as well as industry readiness.	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	53.33	20.00	13.33	6.67	6.67



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Q.6 The curriculum provides ample knowledge for increased employability and to promote students for higher education.

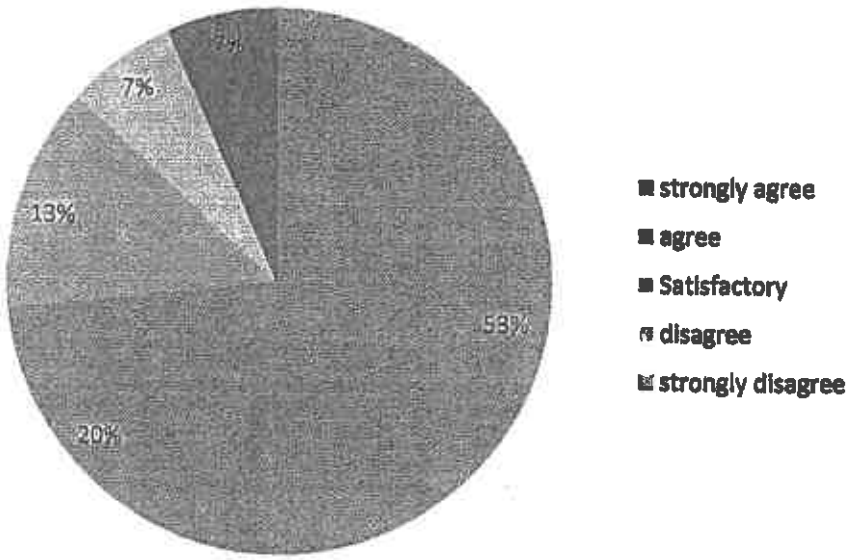
The curriculum provides ample knowledge for increased employability and to promote students for higher education.	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	46.67	20.00	13.33	6.67	13.33



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Q.7 The curriculum has focus on personality development by presence of courses on human values and professional ethics

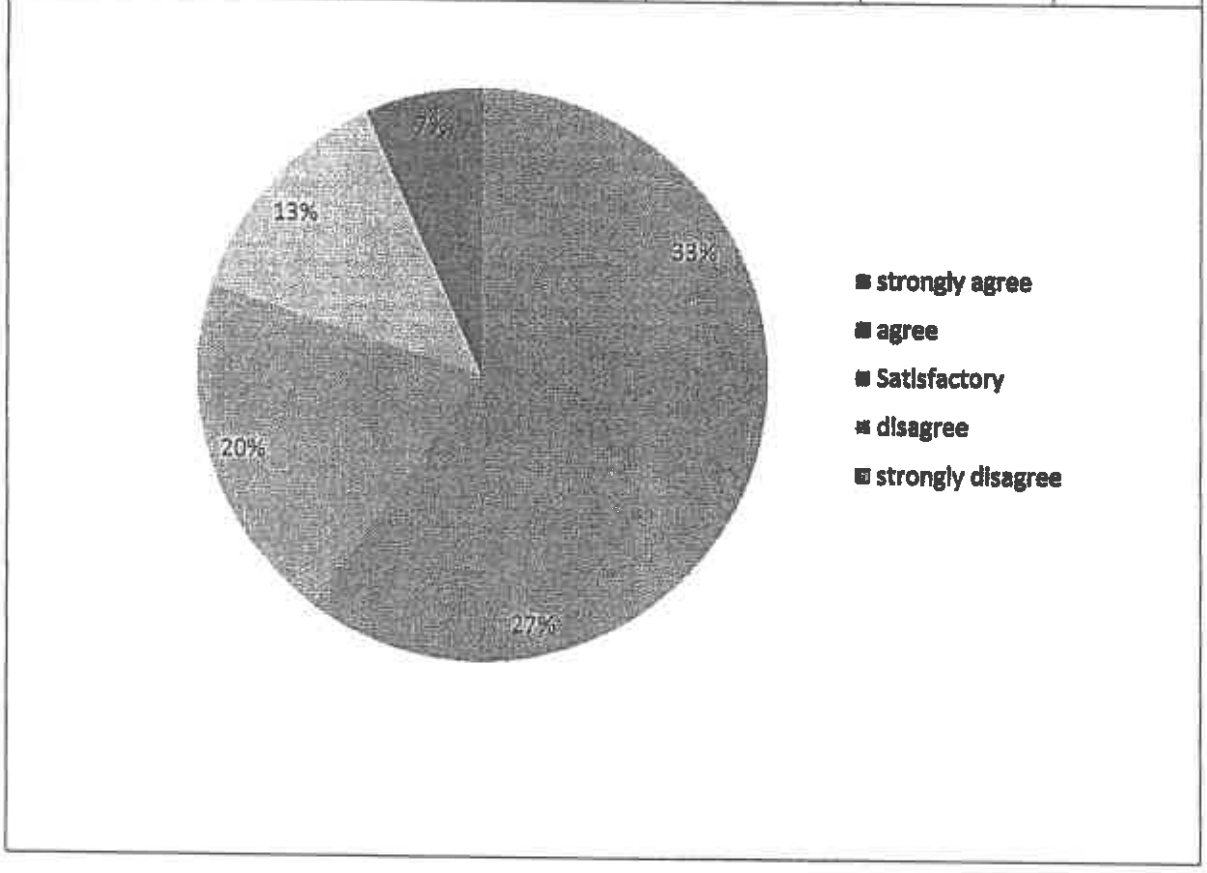
The curriculum has focus on personality development by presence of courses on human values and professional ethics	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	53.33	20.00	13.33	6.67	6.67



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Q.8 The curriculum is well organized and balanced for the programme with proper credit allocation.

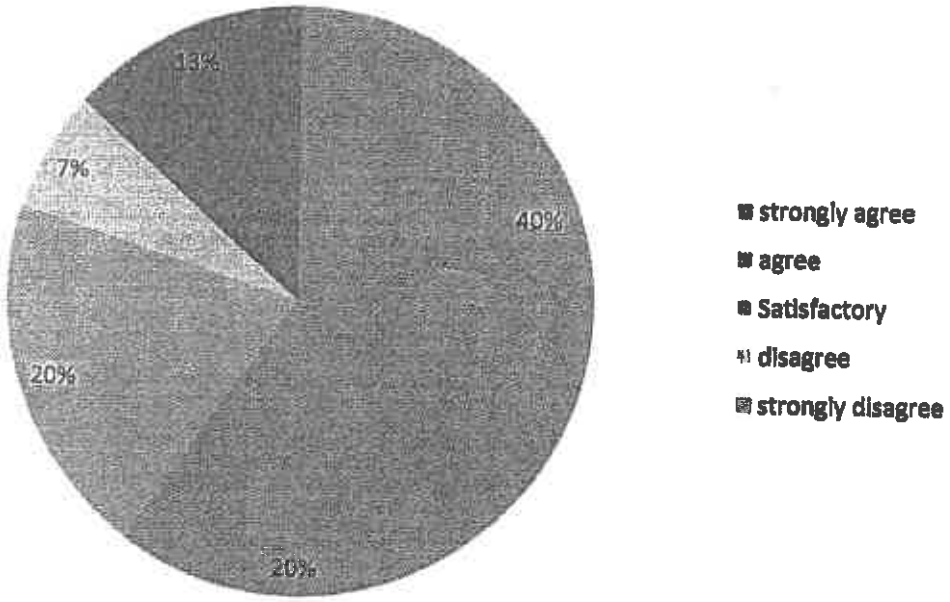
The curriculum is well organized and balanced for the programme with proper credit allocation.	Strongly Agree	Agree	Satisfactory	.Disagree	Strongly Disagree
Response (%)	33.33	26.67	20.00	13.33	6.67



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Q.9 The courses have adequate balance between theory and application for a student's holistic development.

The courses have adequate balance between theory and application for a student's holistic development.	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	40.00	20.00	20.00	6.67	13.33



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School of Engineering & Technology (15)						
Total no. of Employer: 15		**Strongly Agree**	**Agree**	**Satisfied**	**Disagree**	**Strongly Disagree**
The curriculum assists the students to acquire necessary entry level skills in industrial sector.	No. of Employer	6	5	2	1	1
	Percentage	40.00	33.33	13.33	6.67	6.67
The curriculum offers adequate scope for life-long learning and higher-level aptitude for new technology/tools.	No. of Employer	8	4	1	1	1
	Percentage	53.32	26.67	6.67	6.67	6.67
The curriculum has adequate scope for multidisciplinary knowledge and sufficient number of elective courses	No. of Employer	7	3	2	2	1
	Percentage	46.67	20.00	13.33	13.33	6.67
The curriculum has relevant content to assist students to work independently as well in a team with high level of adaptability.	No. of Employer	6	3	3	1	2
	Percentage	40.00	20.00	20.00	6.67	13.33
The curriculum provides enough scope for improving entrepreneurial skill as well as industry readiness.	No. of Employer	8	3	2	1	1
	Percentage	53.33	20.00	13.33	6.67	6.67
The curriculum provides ample knowledge for increased employability and to promote students for higher education.	No. of Employer	7	3	2	1	2
	Percentage	46.67	20.00	13.33	6.67	13.33
The curriculum has focus on personality development by	No. of Employer	8	3	2	1	1

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presence of courses on human values and professional ethics	Percentage	53.33	20.00	13.33	6.67	6.67
The curriculum is well organized and balanced for the programme with proper credit allocation.	No. of Employer	5	4	3	2	1
	Percentage	33.33	26.67	20.00	13.33	6.67
The courses have adequate balance between theory and application for a student's holistic development.	No. of Employer	6	3	3	1	2
	Percentage	40.00	20.00	20.00	6.67	13.33

Analysis of Feedback:

According to 83.33% employers think that the curriculum assists the students to acquire necessary entry level skills in industrial sector offering adequate scope for life-long learning and higher-level aptitude for new technology/tools as it has adequate scope for multidisciplinary knowledge and sufficient number of elective courses and has relevant content to assist students to work independently as well in a team with high level of adaptability. The curriculum provides enough scope for improving entrepreneurial skill as well as industry readiness, ample knowledge for increased employability and to promote students for higher education, focuses on personality development by presence of courses on human values and professional ethics as the curriculum is well organized and balanced for the programme with proper credit allocation and all the courses have adequate balance between theory and application for student's holistic development while 16.33% of the employers don't think so.

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Action Taken Report

(School of Engineering and Technology)

Sr. No.	Suggestions	Action taken	Outcome
1.	Courses that focus on application of domain specific knowledge in new contexts and develop entrepreneurial/employable skills to be offered	Value added courses handled by academic/industry experts are offered outside the curriculum. Industry-academia connects ensured through Webinars, online& offline guest lectures, boot camps, conclave and training programmes.	Enhanced Industry-Relevant Knowledge, Improved Employability and Continuous Learning Culture.
2.	It was suggested to improve the infrastructure	The existing facilities were evaluated and ungraded as per the student's and faculty's needs.	Enhanced and more productive teaching leaning practices.
3.	Gender awareness programs to be encouraged for both boys and girls.	Gender sensitization programs were reinforced through activities of Women cell on general and mental health,	Students were sensitized with Empowerment Through Self-Defense, and

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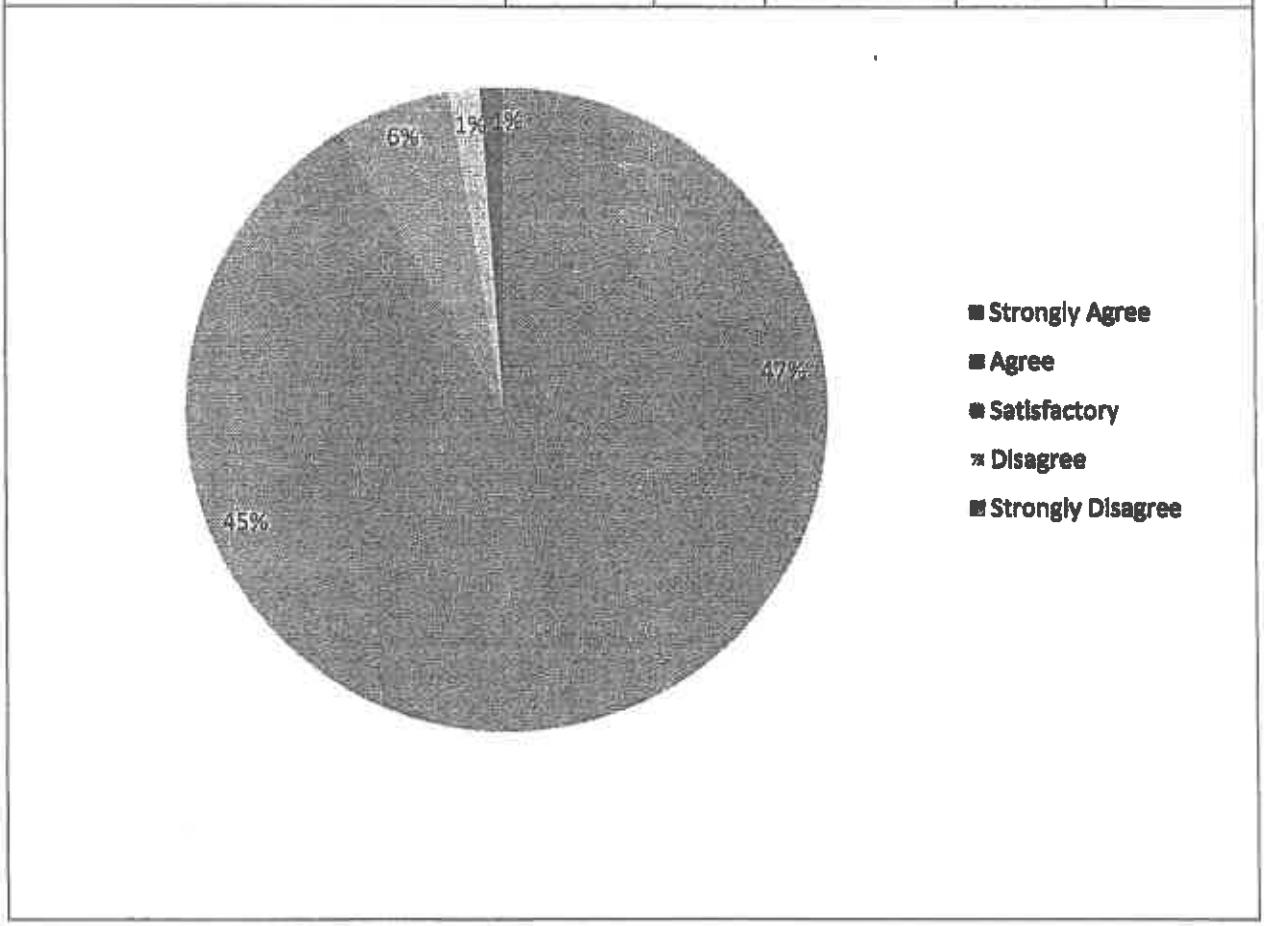
		personal care, personality development, self-defense and entrepreneurship for both Boys and Girls.	coexistence.
4.	Students are to be strong in their aptitude skills, as it is the first level of interview process.	Intensive training on aptitude skills was planned for the next academic year.	Students will enhance their employability skills

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Analysis of Students' Feedback of School of Engineering and Technology through Table and Pie Chart

Q.1. Whether the curriculum has depth of the subjects and clears the concept?

Curriculum has depth of the subjects and clears the concept	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	46.90	44.57	5.81	1.55	1.16

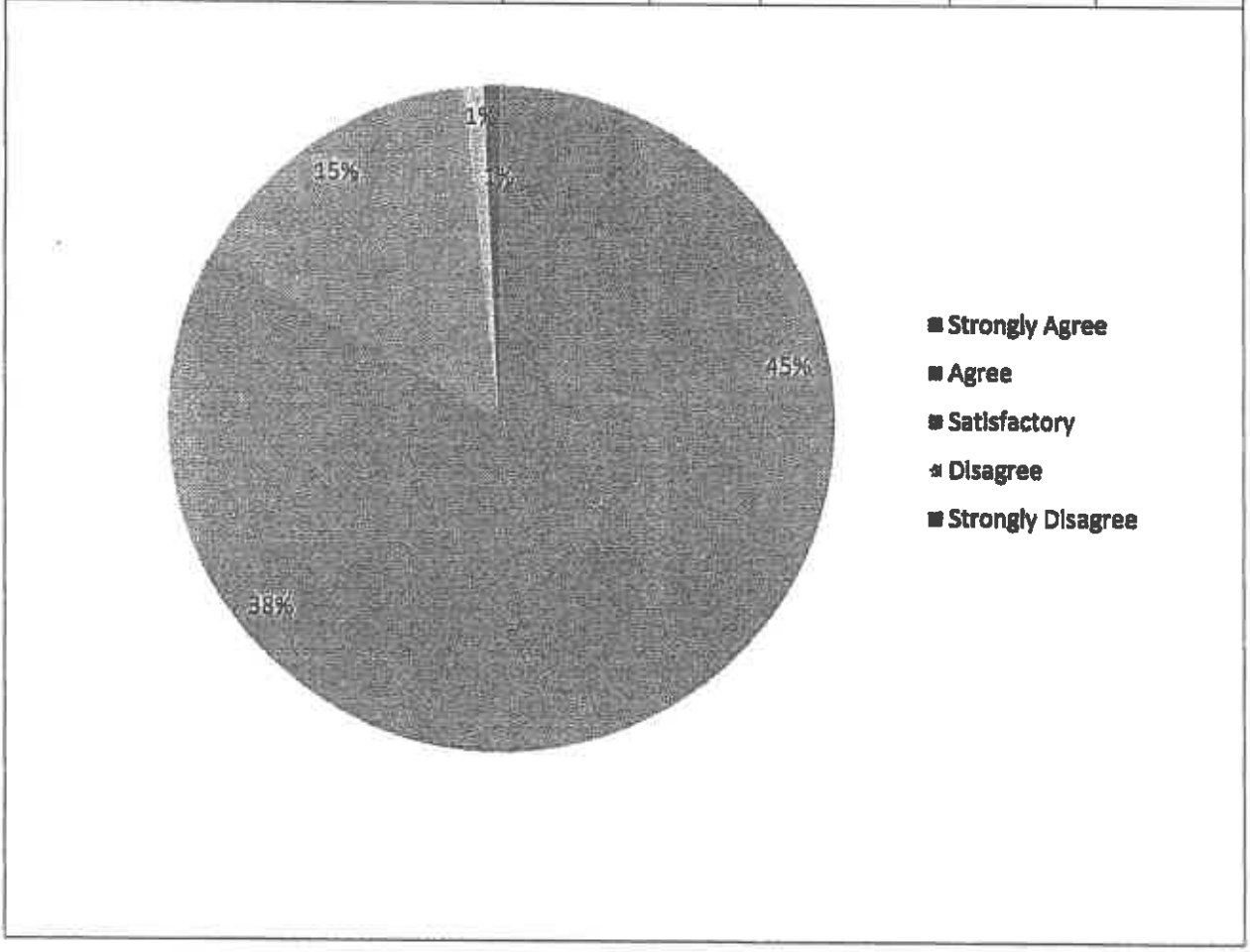


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Q.2. How do you rate the course outcomes and relevance to the course content?

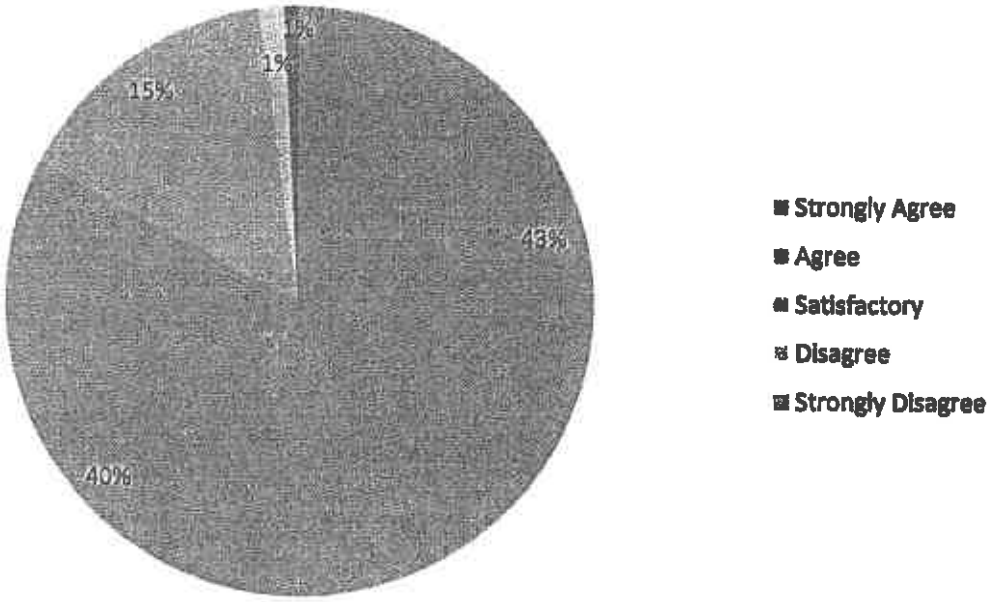
Rate the course outcomes and relevance to the course content	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	44.96	38.18	15.12	0.97	0.78



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Q.3. How do you rate the sequence of units in the courses?

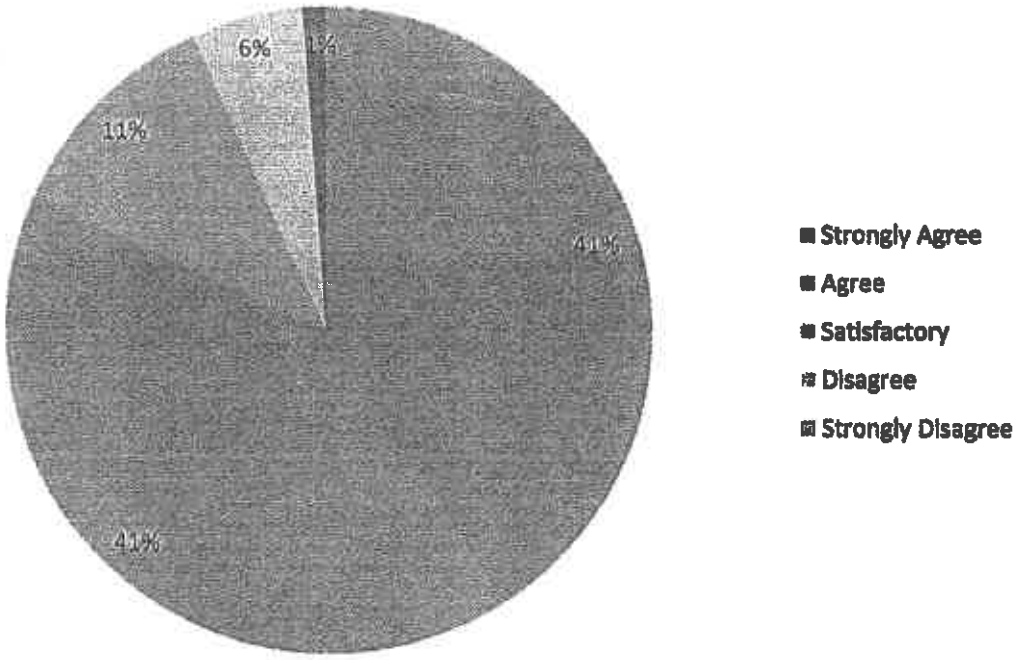
Rate the sequence of units in the courses	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	43.02	39.73	15.12	1.36	0.78



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Q.4. How do you rate the credits allotted to individual courses?

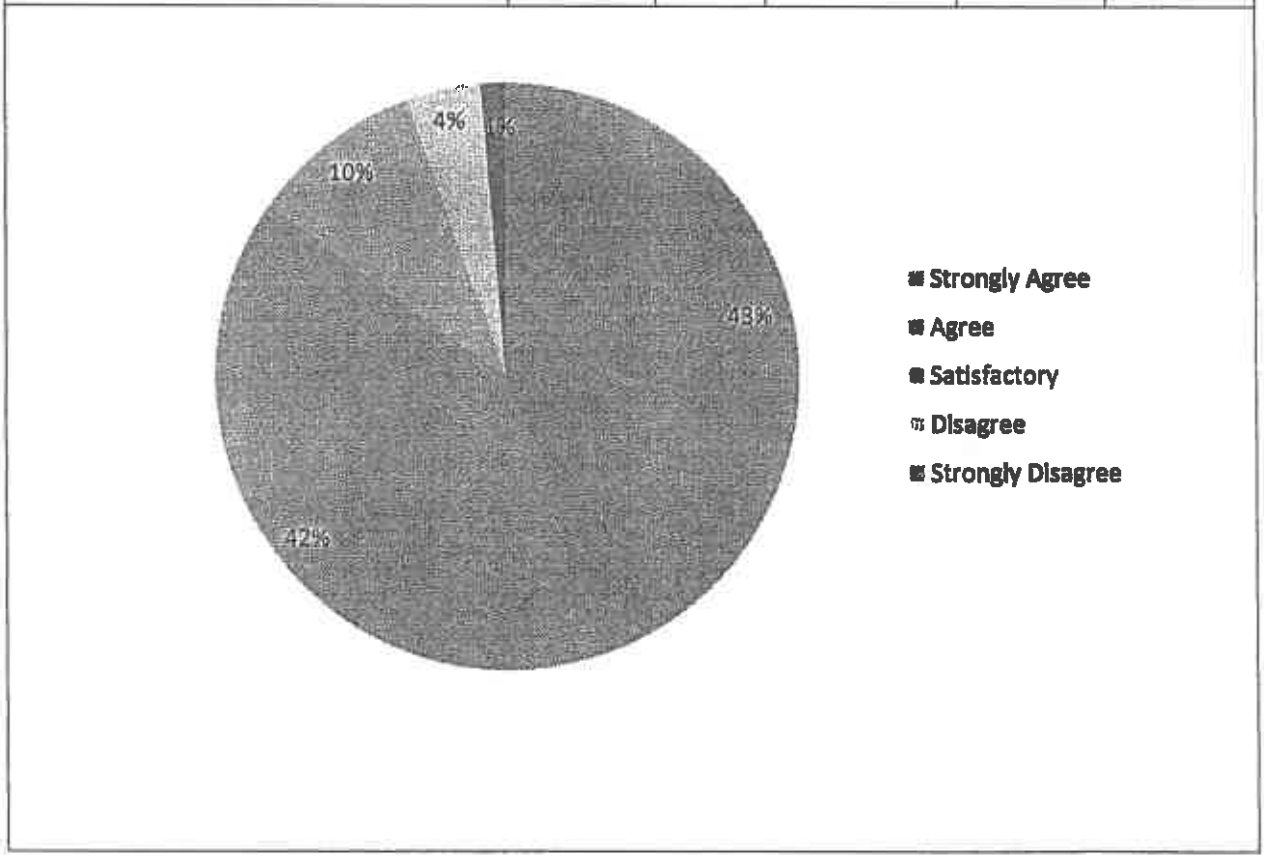
Rate the credits allotted to individual courses	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	40.89	40.89	11.43	5.62	1.16



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Q.5. Does the curriculum focus on employability/career orientation?

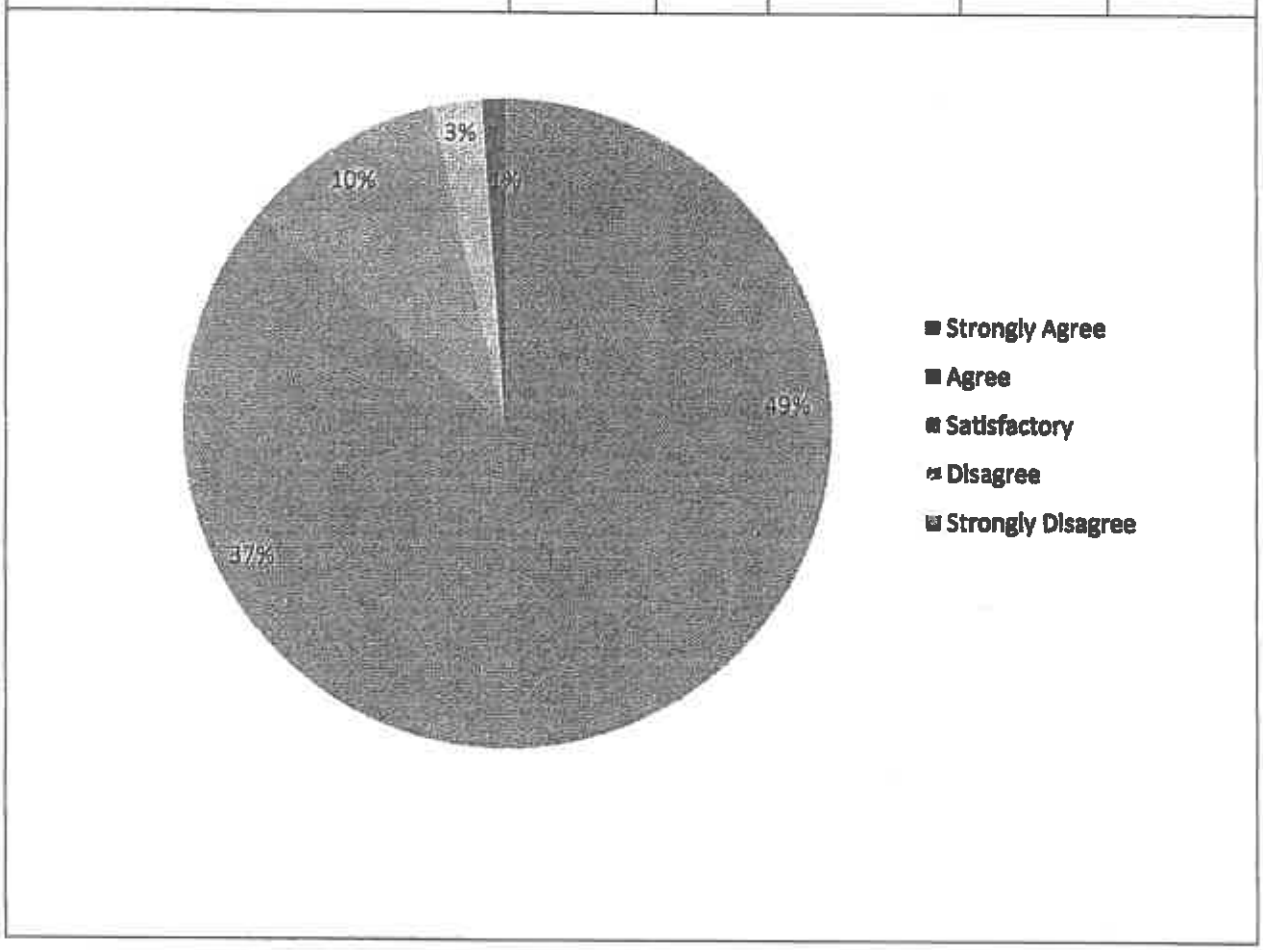
Curriculum focus on employability/career orientation	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	43.41	41.47	9.69	4.07	1.36



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Q.6. Does the curriculum focus on skill development/entrepreneurship?

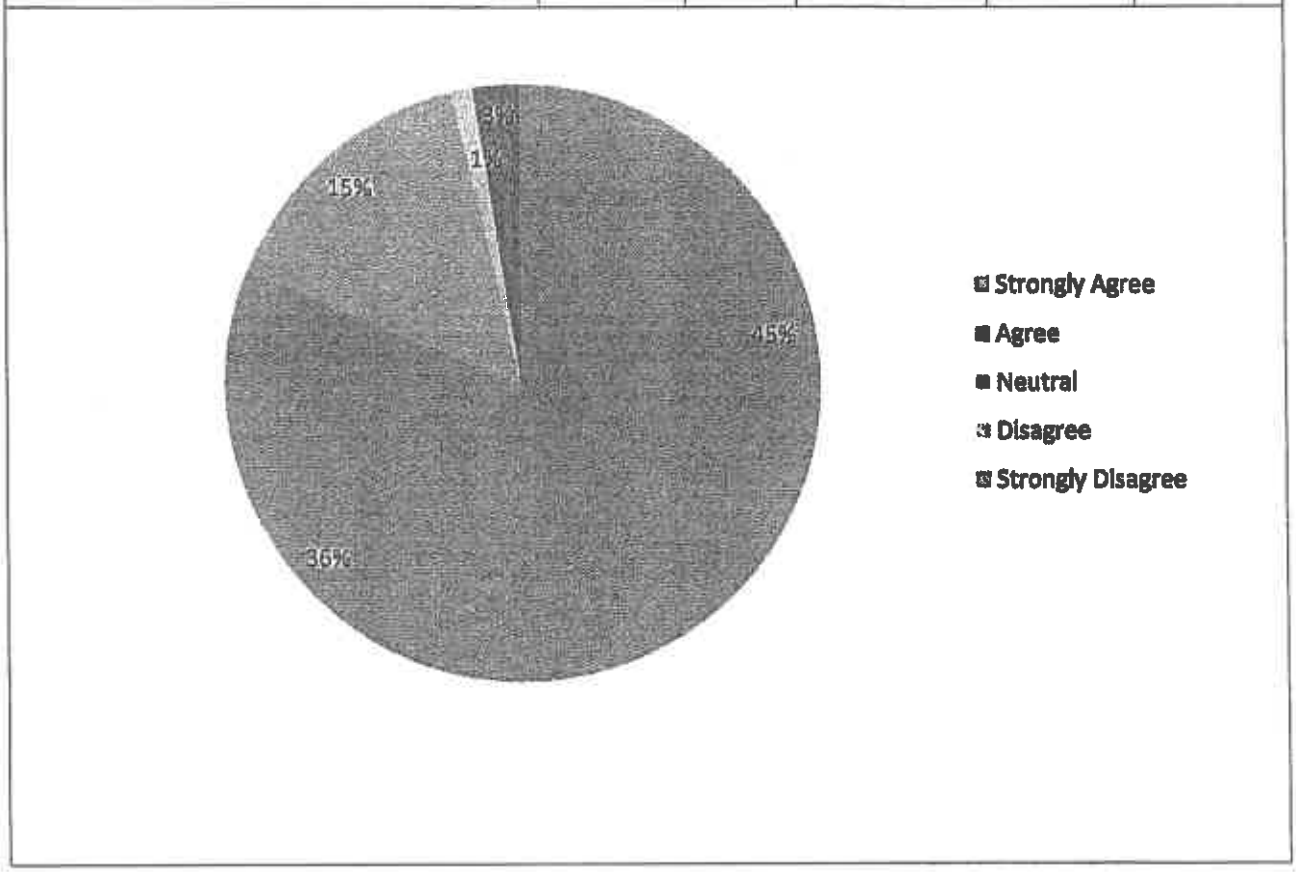
Curriculum focus on skill development/entrepreneurship	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	49.22	36.82	10.27	2.52	1.16



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Q.7. Does the curriculum have satisfactory number of elective courses?

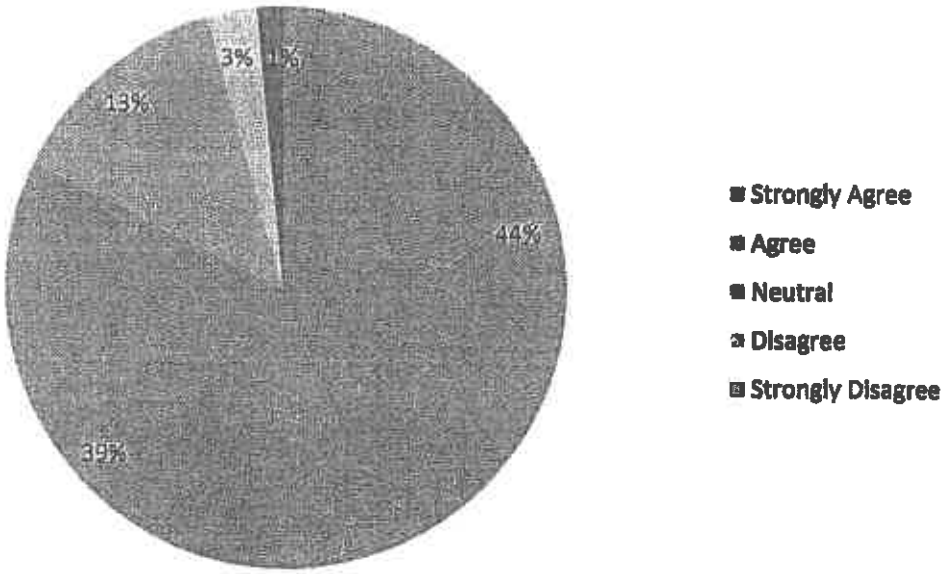
Curriculum have satisfactory number of elective courses	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	45.35	35.85	15.12	1.16	2.52



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Q.8. Does the curriculum focus on life skill or help in value addition?

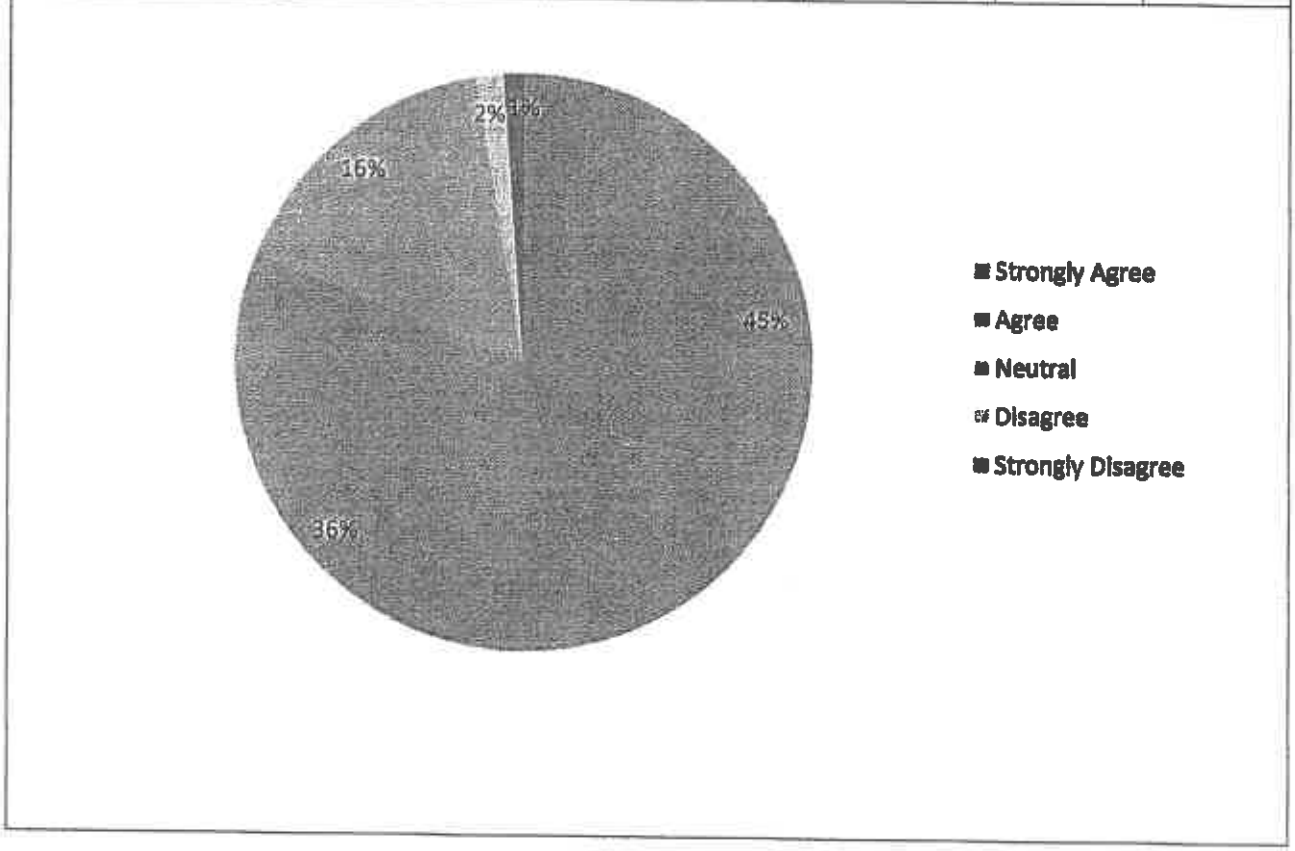
Curriculum focus on life skill or help in value addition	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	43.60	38.57	13.37	2.91	1.55



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Q.9. Do the theory subjects are properly linked to the laboratories/provide real-life exposure?

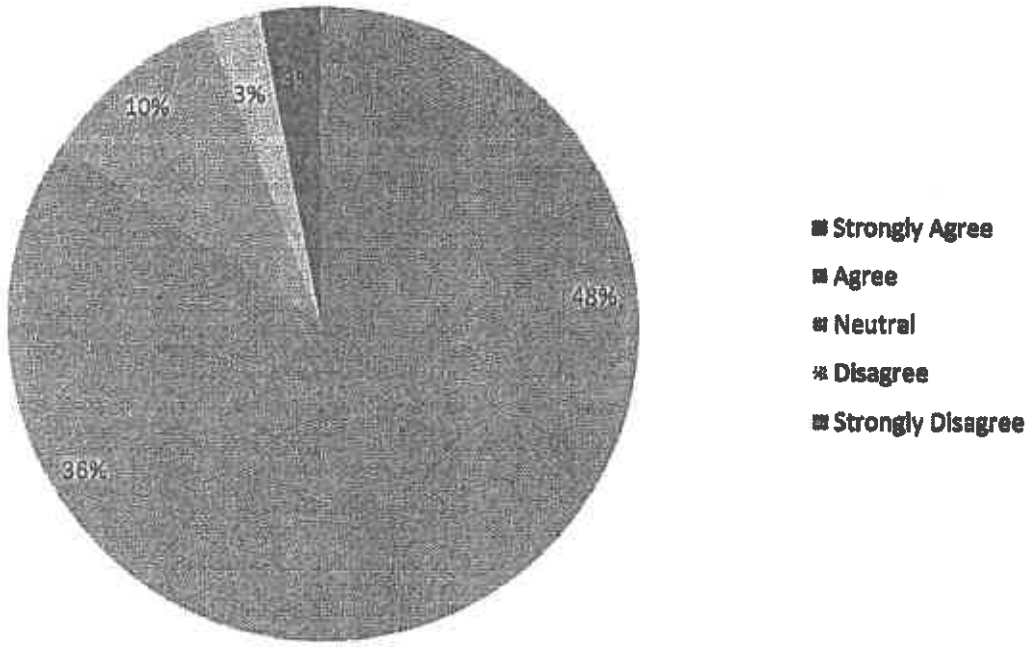
Theory subjects are properly linked to the laboratories/provide real-life exposure	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	45.35	35.66	16.28	1.55	1.16



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Q.10. Does the curriculum provide multidisciplinary knowledge/information to a student?

Curriculum provide multidisciplinary knowledge/information to a student	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	48.26	36.24	9.69	2.71	3.10



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School of Engineering & Technology (516)						
Question	Details	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Whether the curriculum has depth of the subjects and clears the concept?	No of Students	242	230	30	8	6
	Percentage	46.90	44.57	5.81	1.55	1.16
How do you rate the course outcomes and relevance to the course content?	No of Students	232	197	78	5	4
	Percentage	44.96	38.18	15.12	0.97	0.78
How do you rate the sequence of units in the courses?	No of Students	222	205	78	7	4
	Percentage	43.02	39.73	15.12	1.36	0.78
How do you rate the credits allotted to individual courses?	No of Students	211	211	62	29	3
	Percentage	40.89	40.89	12.02	5.62	0.58
Does the curriculum focus on employability/career orientation?	No of Students	224	214	55	21	2
	Percentage	43.41	41.47	10.66	4.07	0.39
Does the curriculum focus on skill development/entrepreneurship?	No of Students	254	190	53	13	6
	Percentage	49.22	36.82	10.27	2.52	1.16
Does the curriculum have satisfactory number of elective courses?	No of Students	234	185	78	6	13
	Percentage	45.35	35.85	15.12	1.16	2.52
Does the curriculum focus on life skill or help in value addition?	No of Students	225	199	69	15	8
	Percentage	43.60	38.57	13.37	2.91	1.55
Do the theory subjects are properly linked to the laboratories/provide real-life exposure?	No of Students	234	184	84	8	6
	Percentage	45.35	35.66	16.28	1.55	1.16
Does the curriculum provide multidisciplinary knowledge/information to a student?	No of Students	249	187	50	14	16
	Percentage	48.26	36.24	9.69	2.71	3.10

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Analysis of Feedback:

- 97.29% students agree with the view that the curriculum has depth of subjects and clears the concept while 2.71% students don't think so.
- 98.26% students thinks that the course outcome is quite relevant to the course content. On the other side very few students 1.74% students don't agree with the fact.
- Sequence of units is correct according to 97.87% students and 2.13% students have negative approach towards the fact.
- Credits allotted to the individual course are apt according to 93.22% students while 6.78% students don't agree
- 94.57% students think that the curriculum focuses on employability/career orientation and 5.43% students do not think so.
- 96.32% students agree that the curriculum focuses on skill development/entrepreneurship while 3.68% students don't think so.
- The curriculum has satisfactory number of elective courses according to 96.32% students while 3.68% students don't agree.
- 95.54% students think that the curriculum focuses on life skills and helps in value addition whereas 4.46% students think in negative.
- 97.29% students agree with the view that the theory subjects are properly linked to the labs and provide real life exposure while 2.71% students do not think so.
- 94.19% students are positive regarding the fact that the curriculum provides multidisciplinary knowledge or information to the students while 5.81% students don't think so.

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Action Taken Report

(School of Engineering and Technology)

Sr. No.	Suggestions	Action taken	Outcome
1.	More number of guest lecture and workshop has to provide to enhance their state of art technology	The school organized a three days Techno fest, in which had an opportunity to showcase their talent and won lucrative prize money.	Students to get an opportunity to prove themselves and learnt many more new things in the fest.
2.	Skill based certification courses should be there in the curriculum.	A value added "Programming with Python" was organized by the school.	Students could learnt latest technology and now they can utilized their knowledge in effective manner.
3.	Learning by doing courses can be include in the curriculum for deep knowledge gaining	The theory part of syllabus had been linked with practical to give them practical knowledge.	Students were need prepared for industry purposes with their practical knowledge.
4.	More focus should be on practices, which would improve the ability of students to identify the problem in computer science engineering.	An industrial visit at Ministry of Earth Sciences Noida was organized by school.	Students got experiential learning through their interaction with company official and understood their work culture along with thing how to resolve technical issues.

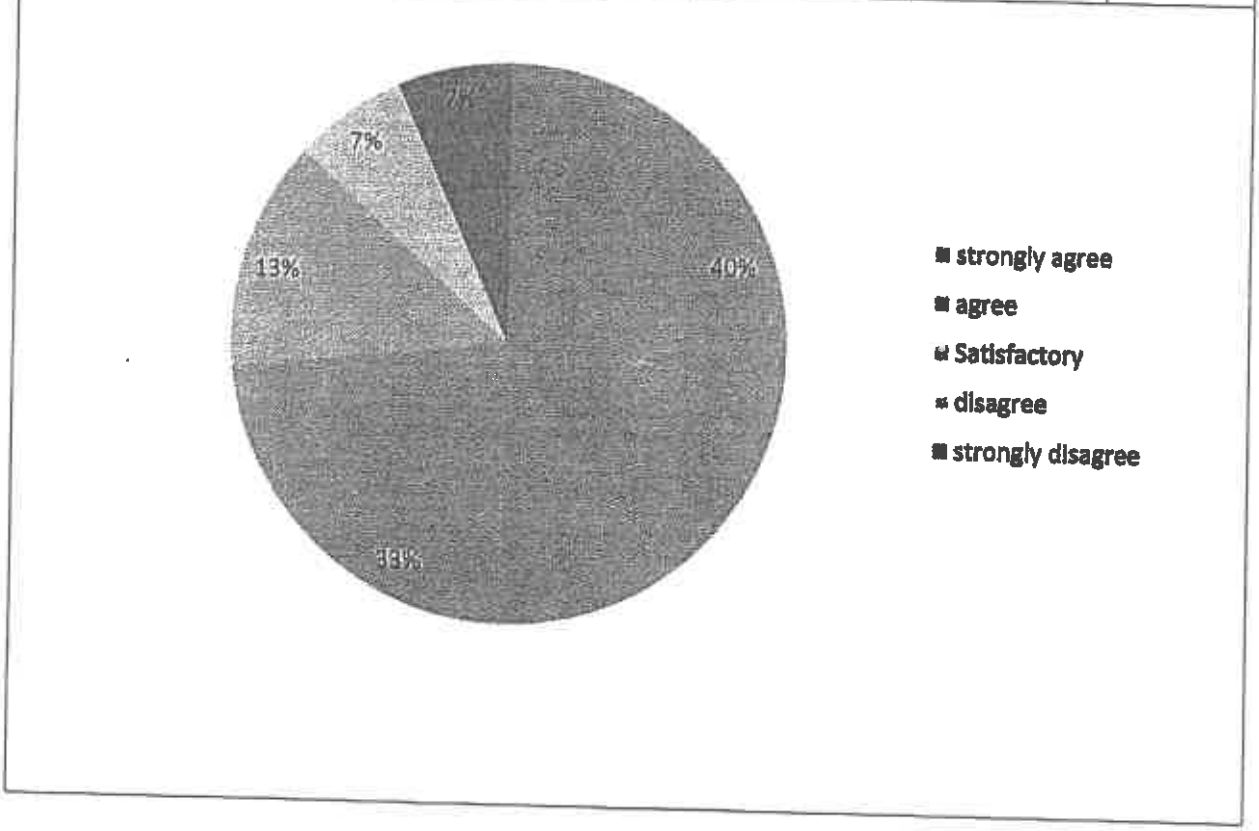
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Analysis of Peer Academicians' Feedback of School of Engineering and Technology through Table and Pie Chart

Q.1 The syllabus of the courses are proper in relation to the competencies expected out of the programme.

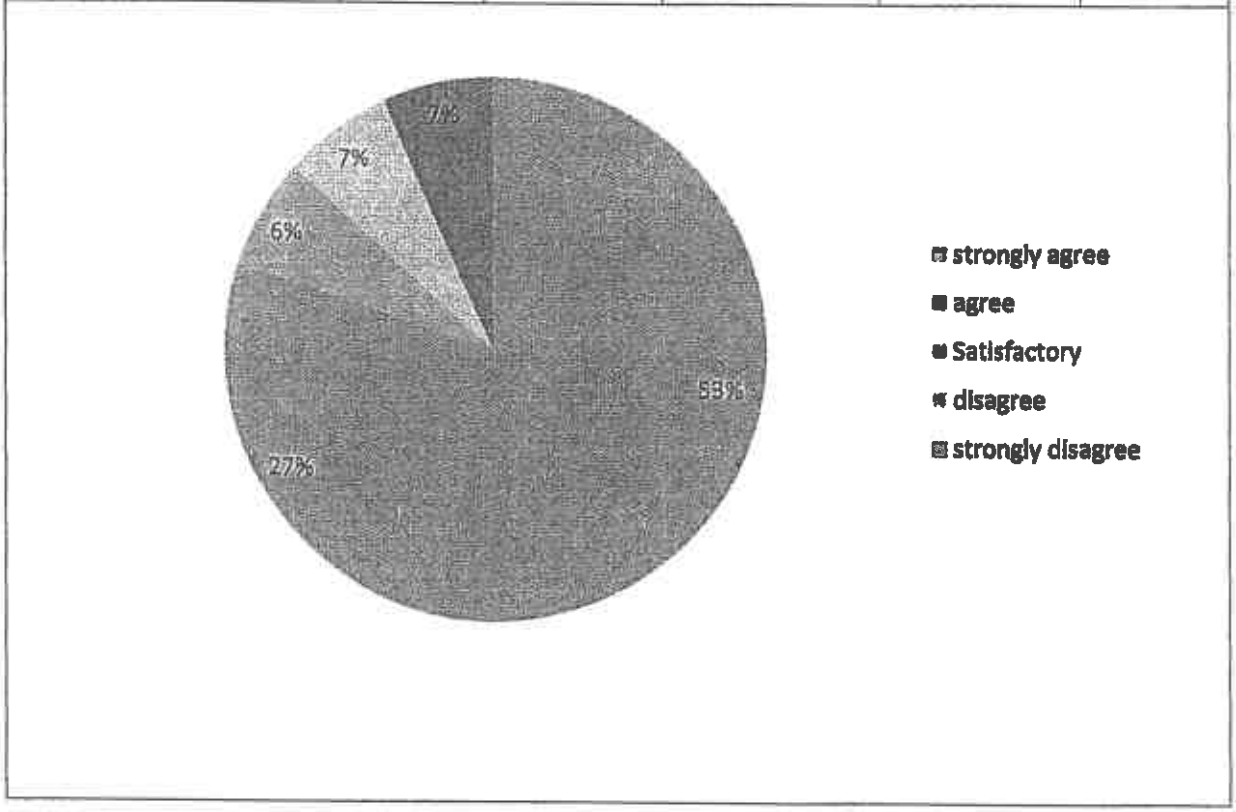
The syllabus of the courses are proper in relation to the competencies expected out of the programme.	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	40.00	33.33	13.33	6.67	6.67



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Q.2 The sequence and overall organization of the courses is proper in the curriculum.

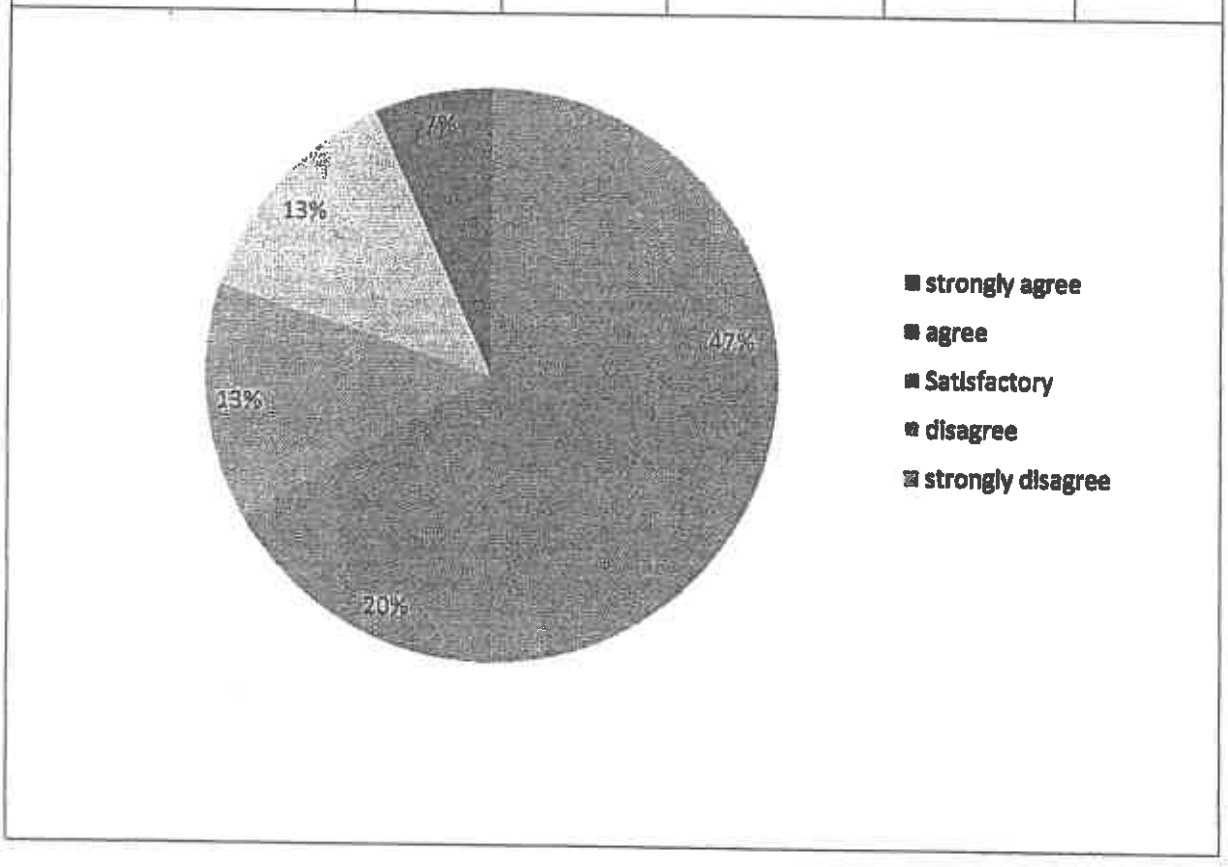
The sequence and overall organization of the courses is proper in the curriculum.	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	53.33	26.67	6.67	6.67	6.67



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Q.3 The curriculum has adequate scope for multidisciplinary knowledge and sufficient number of elective courses.

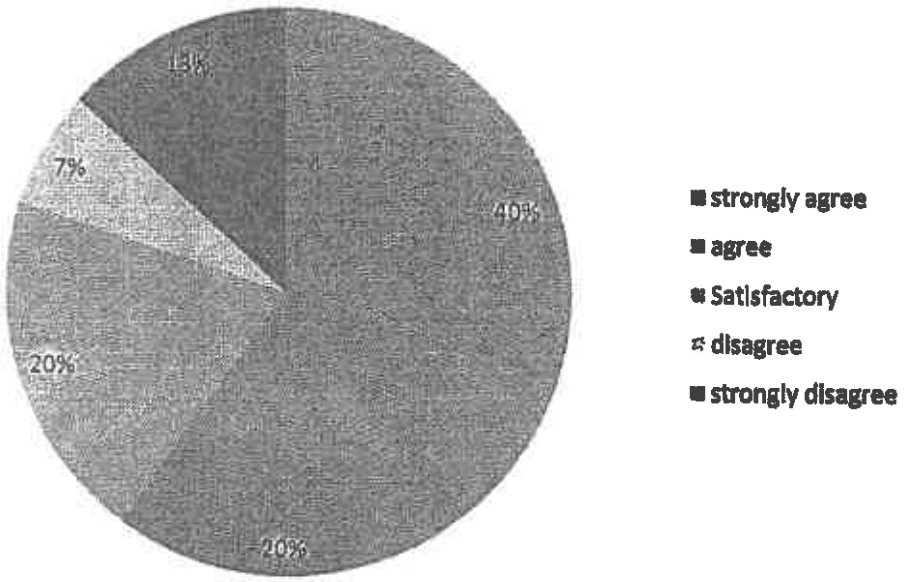
The curriculum has adequate scope for multidisciplinary knowledge and sufficient number of elective courses.	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	46.67	20.00	13.33	13.33	6.67



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Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
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Q.4 Extra care has been taken for extra learning or self-learning while designing the courses.

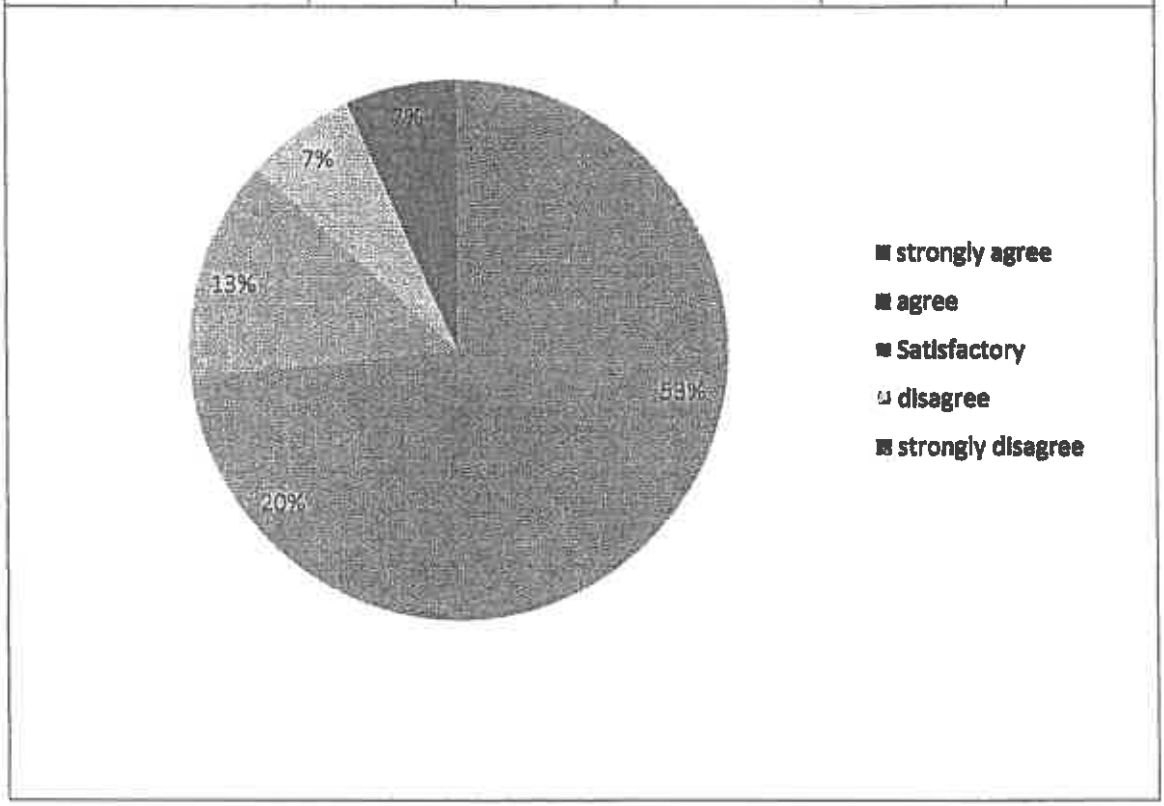
Extra care has been taken for extra learning or self-learning while designing the courses.	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	40.00	20.00	20.00	6.67	13.33



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Area Gangoh, Distt. Saharanpur (U.P.)
247341, India
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Q.5 The curriculum provides enough scope for improving entrepreneurial skill as well as industry readiness.

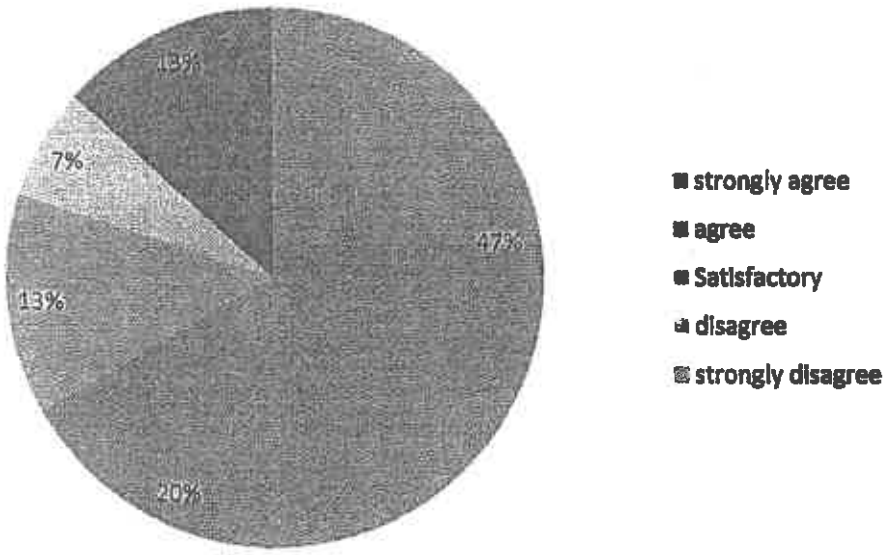
The curriculum provides enough scope for improving entrepreneurial skill as well as industry readiness.	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	53.33	20.00	13.33	6.67	6.67



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Q.6 The curriculum provides ample knowledge for increased employability and to promote students for higher education.

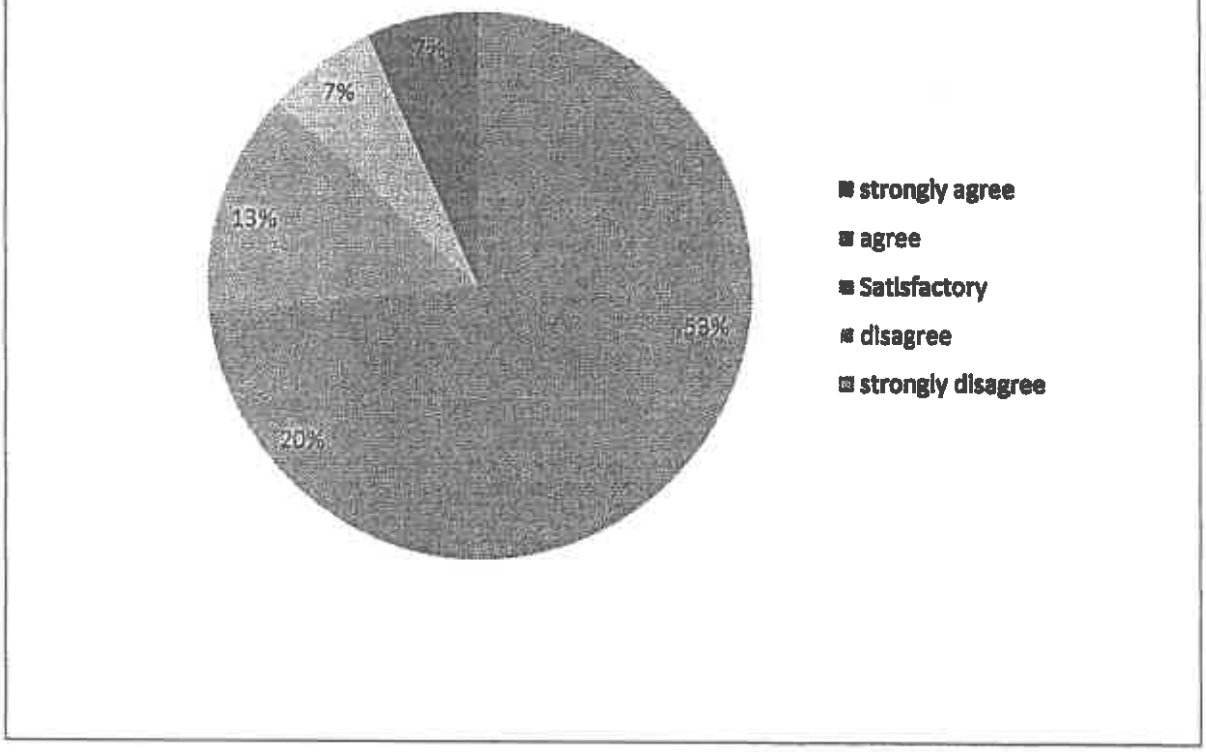
The curriculum provides ample knowledge for increased employability and to promote students for higher education.	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	46.67	20.00	13.33	6.67	13.33



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Q.7 The curriculum has focus on personality development by presence of courses on human values and professional ethics

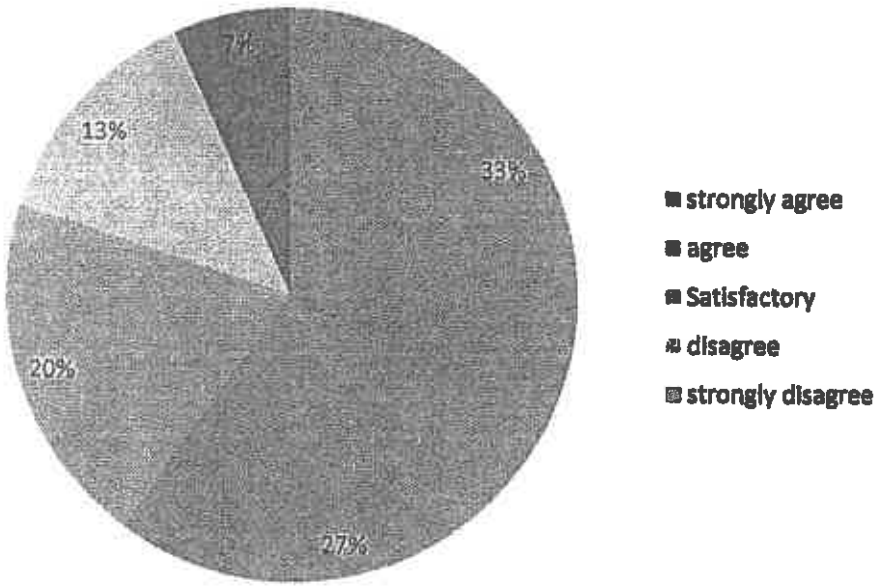
The curriculum has focus on personality development by presence of courses on human values and professional ethics	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	53.33	20.00	13.33	6.67	6.67



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U.: www.sng.ac.in

Q.8 The curriculum is well organized and balanced for the programme with proper credit allocation.

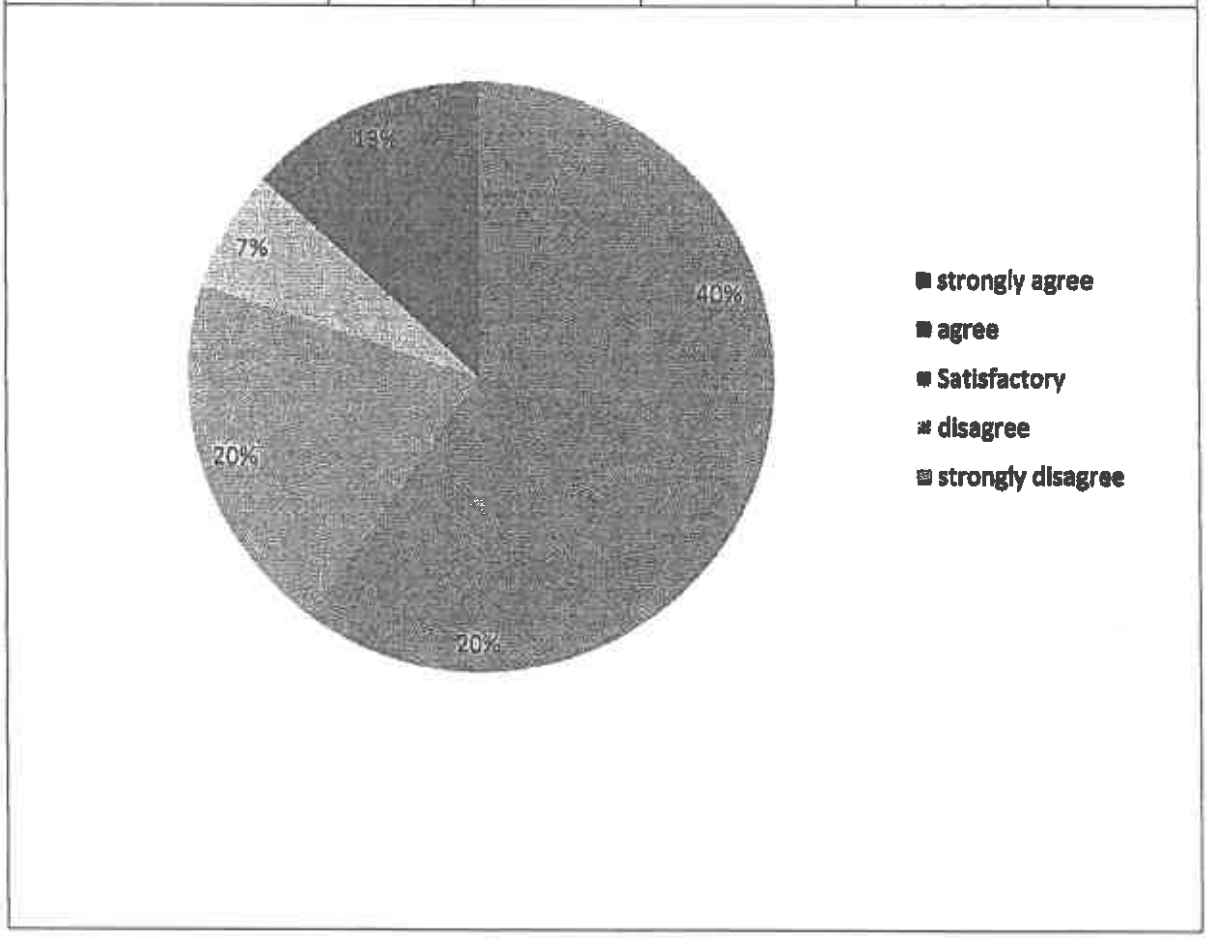
The curriculum is well organized and balanced for the programme with proper credit allocation.	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	33.33	26.67	20.00	13.33	6.67



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Babu Vijendra Marg, Adarsh Institutional
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Q.9 The courses have adequate balance between theory and application for a student's holistic development.

The courses have adequate balance between theory and application for a student's holistic development.	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	40.00	20.00	20.00	6.67	13.33



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School of Engineering & Technology (15)						
Total no. of Peer Academicians: 15		Strongly Agree	Agree	Satisfied	Disagree	Strongly Disagree
The syllabus of the courses are proper in relation to the competencies expected out of the programme.	No. of Academicians	6	5	2	1	1
	Percentage	40.00	33.33	13.33	6.67	6.67
The sequence and overall organization of the courses is proper in the curriculum	No. of Academicians	8	4	1	1	1
	Percentage	53.33	26.67	6.67	6.67	6.67
The curriculum has adequate scope for multidisciplinary knowledge and sufficient number of elective courses	No. of Academicians	7	3	2	2	1
	Percentage	46.67	20.00	13.33	13.33	6.67
Extra care has been taken for extra learning or self-learning while designing the courses.	No. of Academicians	6	3	3	1	2
	Percentage	40.00	20.00	20.00	6.67	13.33
The curriculum provides enough scope for improving entrepreneurial skill as well as industry readiness.	No. of Academicians	8	3	2	1	1
	Percentage	53.33	20.00	13.33	6.67	6.67
The curriculum provides ample knowledge for increased employability and to promote students for higher education.	No. of Academicians	7	3	2	1	2
	Percentage	46.67	20.00	13.33	6.67	13.33
The curriculum has focus	No. of	8	3	2	1	1

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on personality development by presence of courses on human values and professional ethics	Academicians					
	Percentage	53.33	20.00	13.33	6.67	6.67
The curriculum is well organized and balanced for the programme with proper credit allocation.	No. of Academicians	5	4	3	2	1
	Percentage	33.33	26.67	20.00	13.33	6.67
The courses have adequate balance between theory and application for a student's holistic development.	No. of Academicians	6	3	3	1	2
	Percentage	40.00	20.00	20.00	6.67	13.33

Analysis of Feedback:

- 86.66 % Peer Academicians think that the syllabus of the courses are proper in relation to the competencies expected out of the programme and the sequence and overall organization of the courses is proper in the curriculum. They also think that the curriculum provides enough scope for improving entrepreneurial skill as well as industry readiness and has focus on personality development by presence of courses on human values and professional ethics while 13.34 % students don't think so.
- 80 % Peer Academicians supports the view that the curriculum has adequate scope for multidisciplinary knowledge and sufficient number of elective courses, extra care has been taken for extra learning or self-learning while designing the courses that's why provides ample knowledge for increased employability and to promote students for higher education. The curriculum is well organized and balanced for the programme with proper credit allocation and the courses have adequate balance between theory and application for a student's holistic development whereas 20% peer academicians have negative approach in their feedback.

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Action Taken Report

(School of Engineering and Technology)

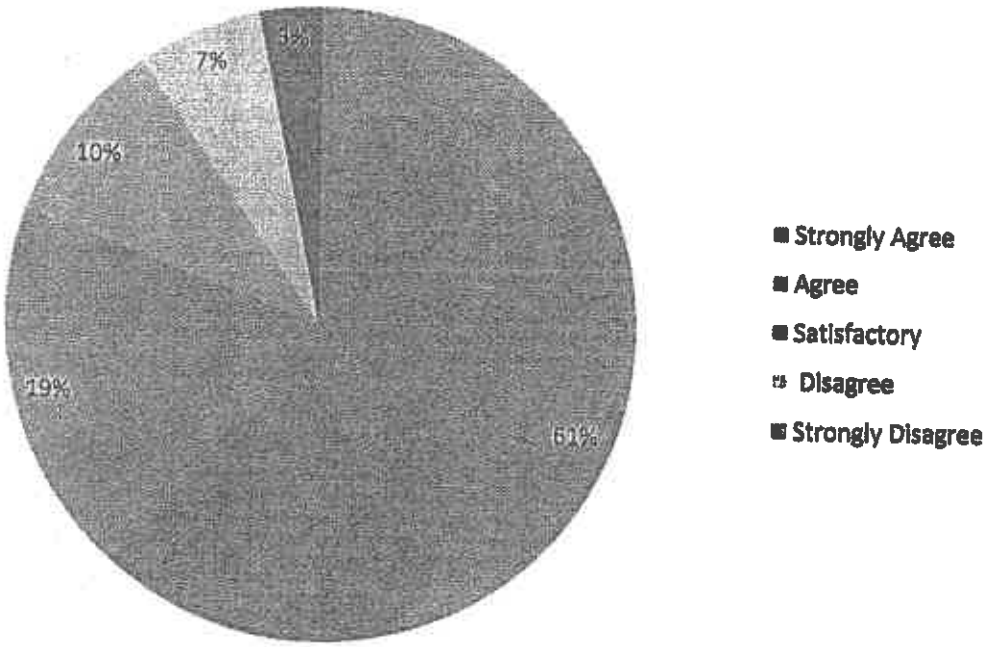
Sr. No.	Suggestions	Action taken	Outcome
1.	Interaction with experts may be increased during teaching learning activities	Expert lectures, small Group Discussions are emphasized.	Students reflected more confidence in their presentations and interaction.
2.	Curriculum may be made more flexible, value oriented and employable	More Value added, Certificate and Skill oriented courses have been included as a part of curriculum enrichment. Elective courses and new courses have been included for more academic flexibility.	-Improved students learning and academic progress. - More emphasis on soft skills and transferable skills.
3.	Need for regular industrial visits, study tours and extension activities suiting the current trends.	Regular industrial visits, study tours and extension activities were conducted during the session	Industry exposure, networking opportunities and skill development
4.	Incorporation of internship and apprenticeship in all disciplines	Departments are motivated to initiate internship activities.	Exposure to industrial practices, and the real world situations

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Babu Vijendra Marg, Adarsh Institutional
Area Gangoh, Distt. Saharanpur (U.P.)
247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
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Analysis of Teacher's Feedback of School of Engineering and Technology through Table and Pie Chart

Q.1 The curriculum is well organized and balanced for the programme with proper credit allocation.

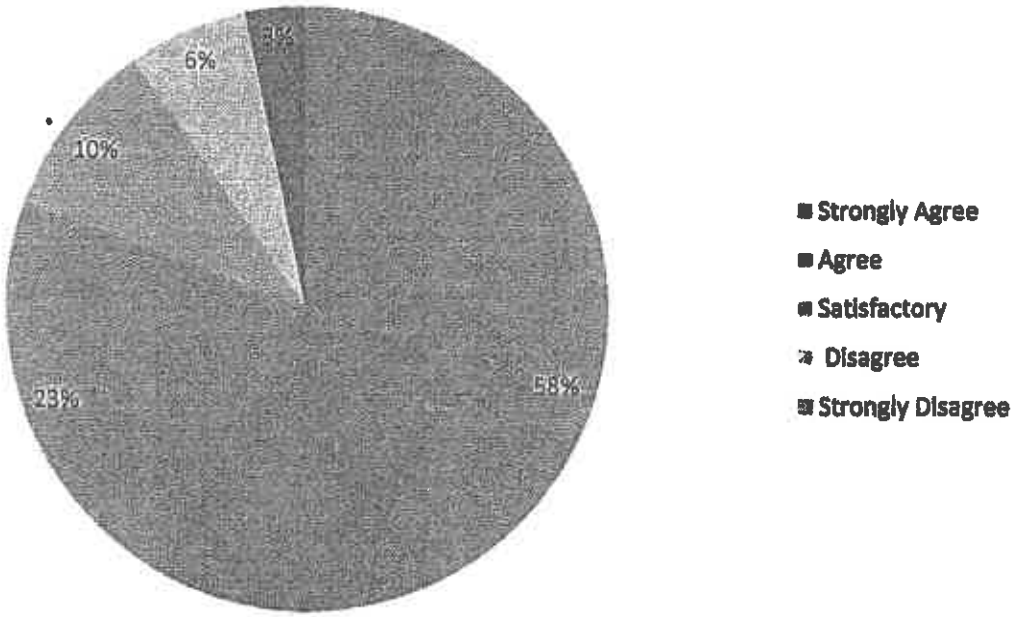
The curriculum is well organized and balanced for the programme with proper credit allocation	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	61.29	19.35	9.68	6.45	3.23



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Q.2 The courses have adequate balance between theory and application for student's holistic development.

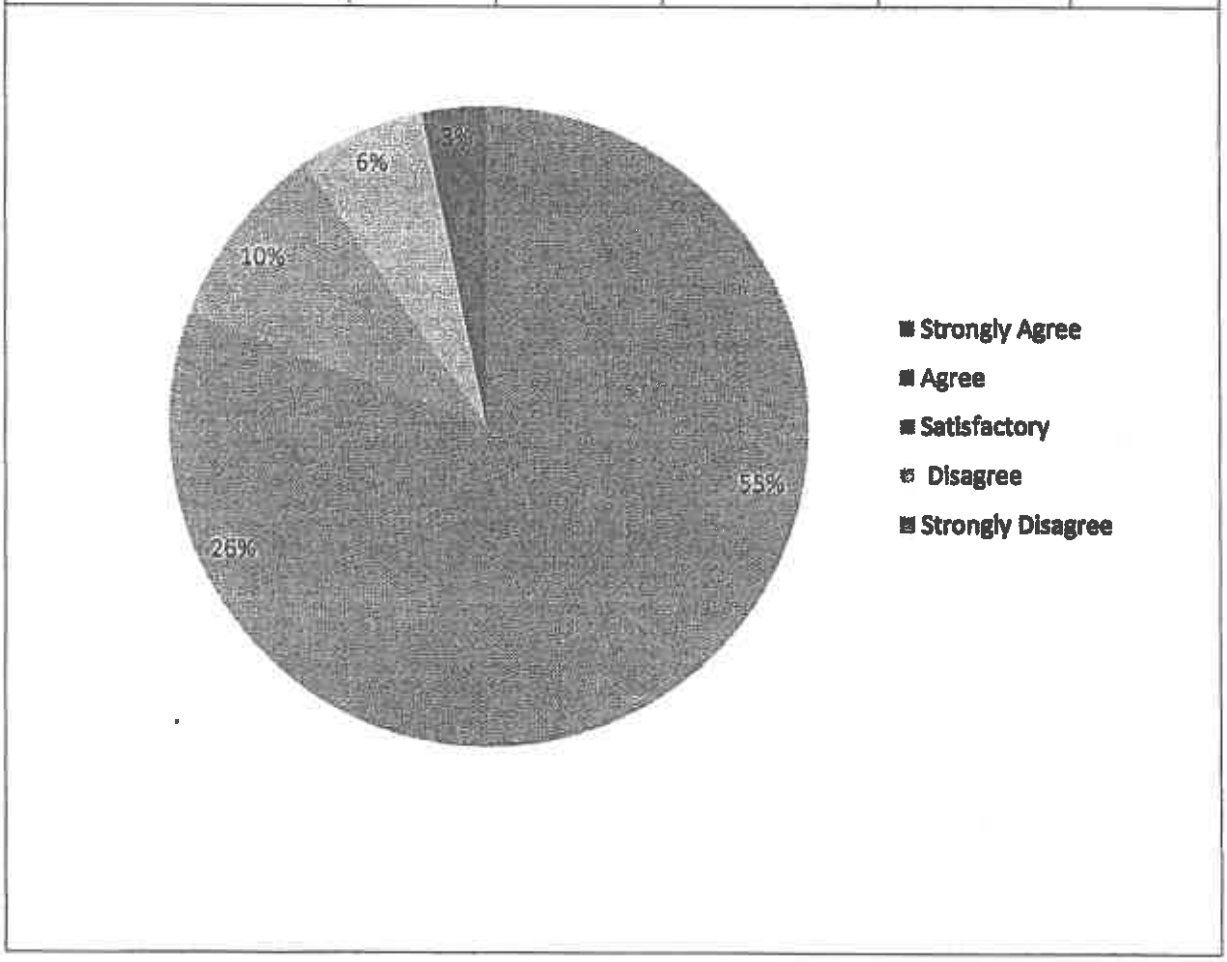
The courses have adequate balance between theory and application for student's holistic development.	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	58.06	22.58	9.68	6.45	3.23



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Q.3 The curriculum has adequate scope for multidisciplinary knowledge and sufficient number of elective courses.

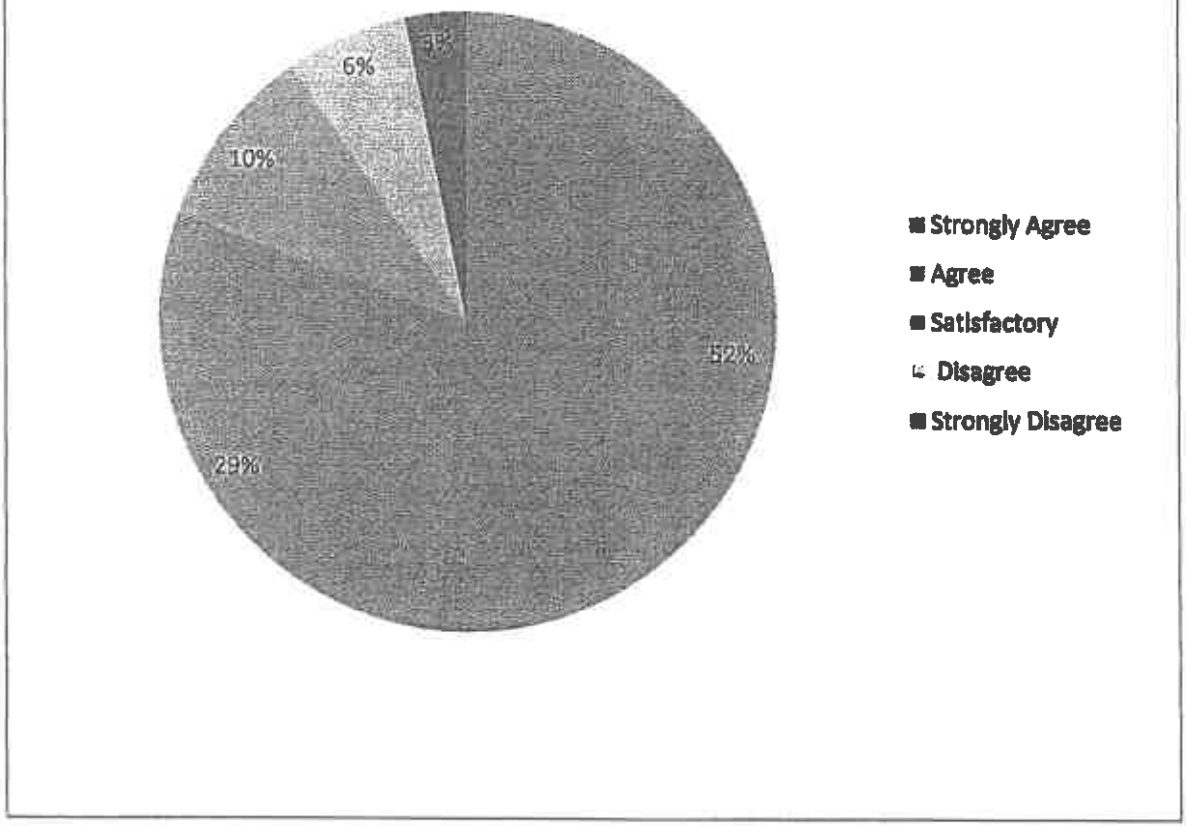
The curriculum has adequate scope for multidisciplinary knowledge and sufficient number of elective courses.	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	54.84	25.81	9.68	6.45	3.23



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Q.4 The curriculum has focus on personality development by presence of courses on human values and professional ethics

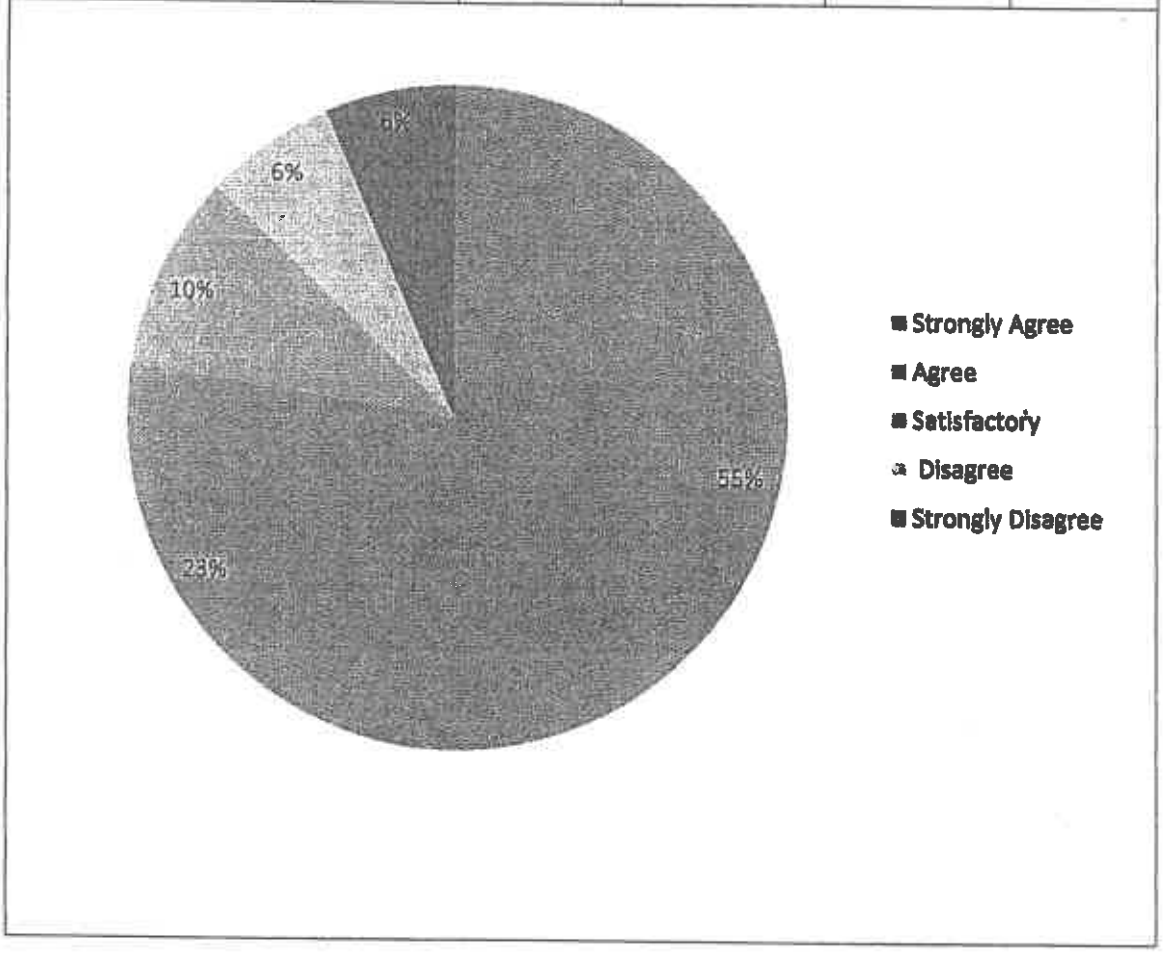
The curriculum has focus on personality development by presence of courses on human values and professional ethics.	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	51.61	29.03	9.68	6.45	3.23



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Q.5 The curriculum provides enough scope for improving entrepreneurial skill as well as industry readiness.

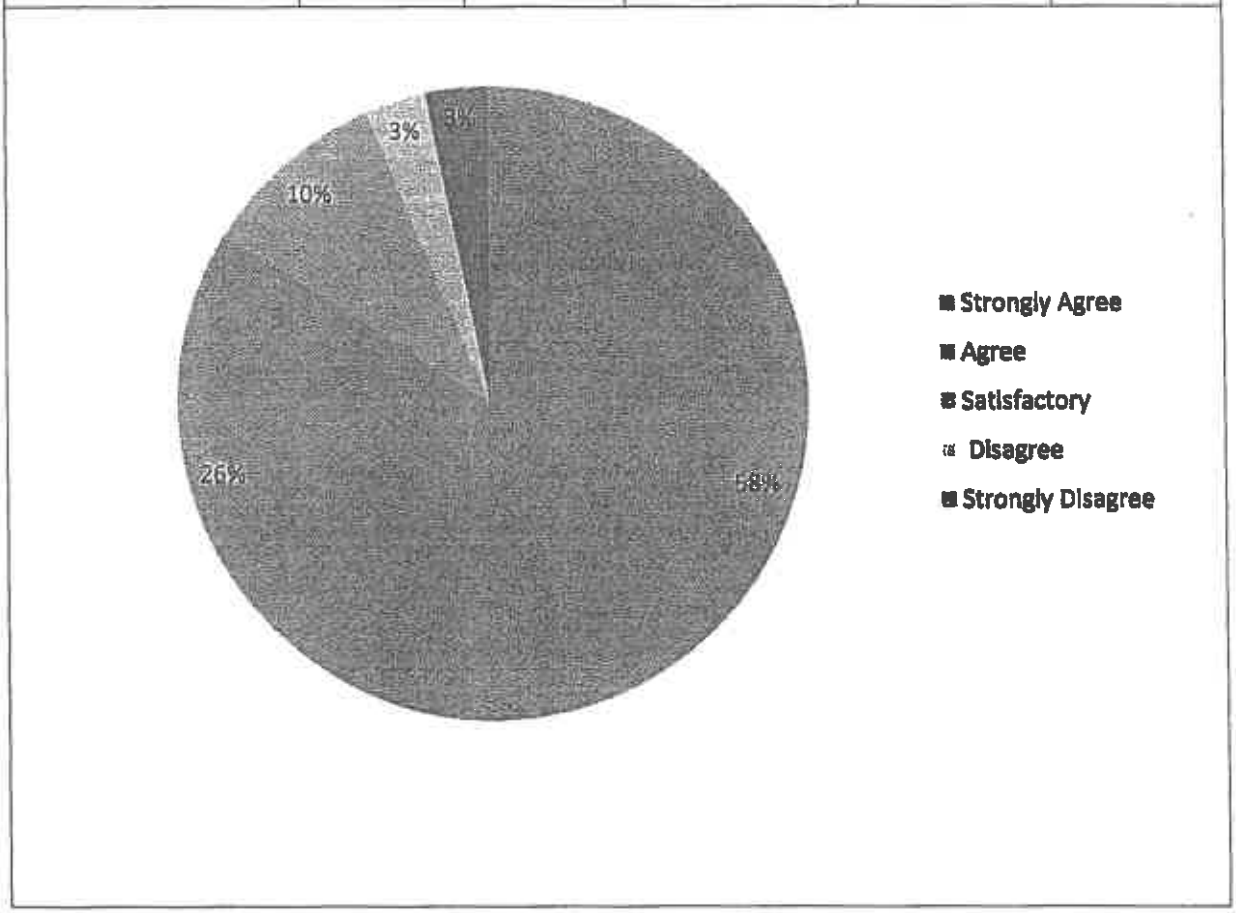
The curriculum provides enough scope for improving entrepreneurial skill as well as industry readiness.	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	54.84	22.58	9.68	6.45	6.45



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Q.6 The curriculum provides ample knowledge for increased employability and to promote students for higher education.

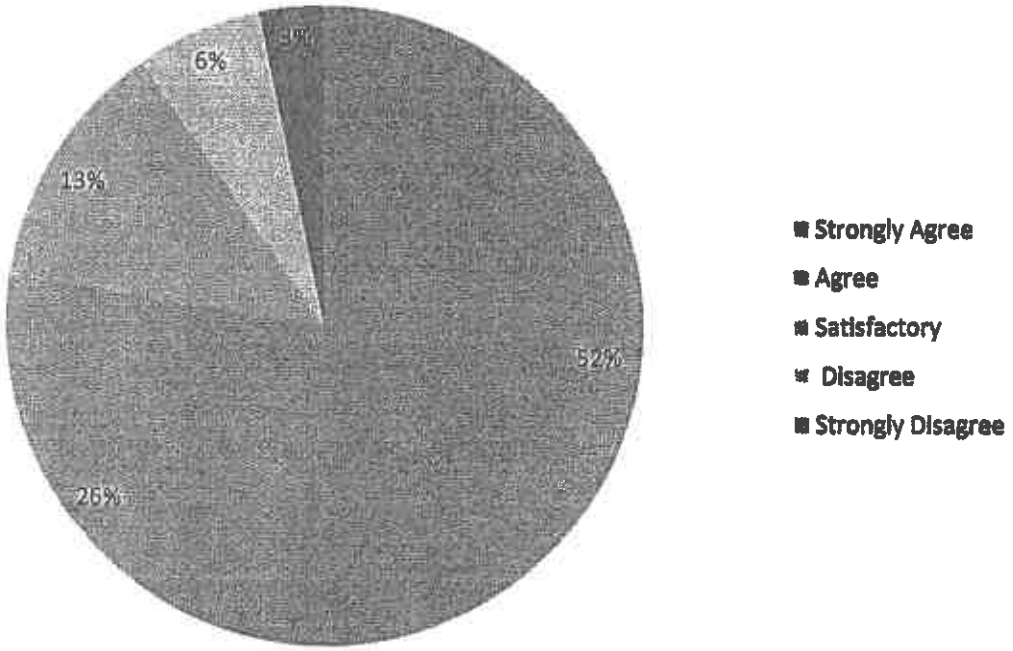
The curriculum provides ample knowledge for increased employability and to promote students for higher education.	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	58.06	25.81	9.68	3.23	3.23



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Q.7 The curriculum helps in enhancing problem solving capability related to local/global societal issues.

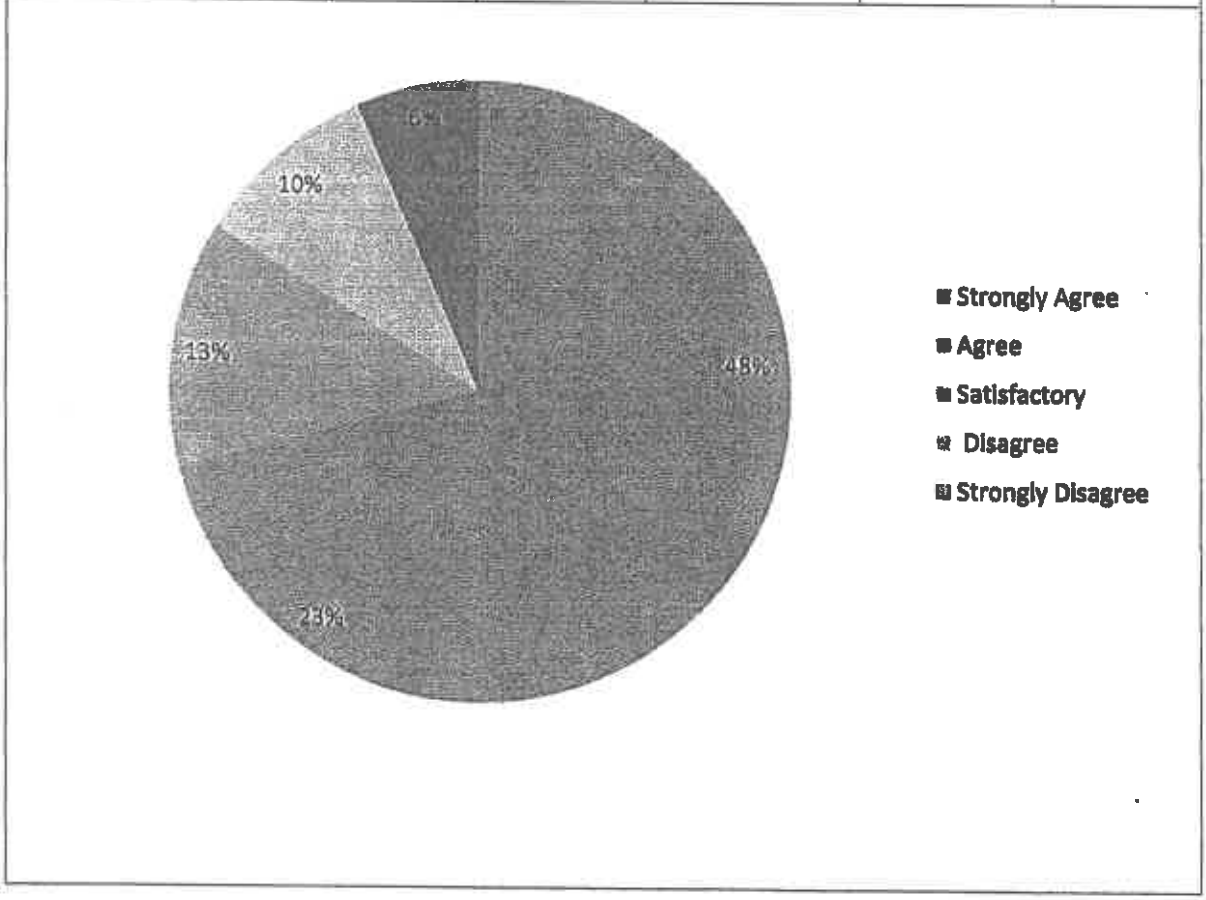
The curriculum helps in enhancing problem solving capability related to local/global societal issues.	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	51.61	25.81	12.90	6.45	3.23



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Q.8 Adequate freedom is given to offer opinion on design & development of curriculum.

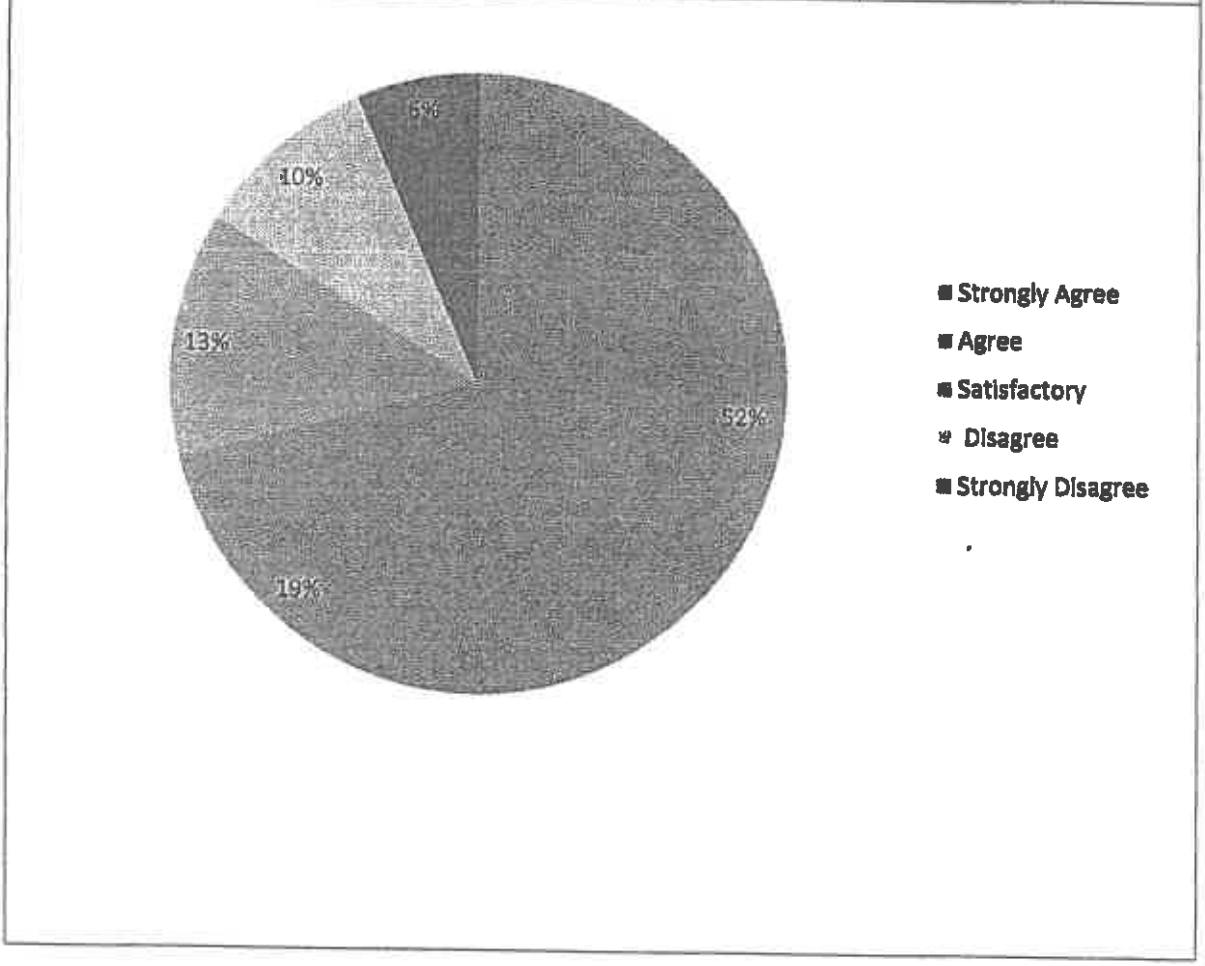
Adequate freedom is given to offer opinion on design & development of curriculum.	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	48.39	22.58	12.90	9.68	6.45



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Q.9 The existing system for curriculum revision is found to be effective.

The existing system for curriculum revision is found to be effective.	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	51.61	19.35	12.90	9.68	6.45



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School of Engineering and Technology(31)

Total no. of Teachers : 31		Strongly Agree	Agree	Satisfied	Disagree	Strongly Disagree
The curriculum is well organized and balanced for the programme with proper credit allocation.	No. of Teachers	19	6	3	2	1
	Percentage	61.29	19.35	9.68	6.45	3.23
The courses have adequate balance between theory and application for student's holistic development.	No. of Teachers	18	7	3	2	1
	Percentage	58.06	22.58	9.68	6.45	3.22
The curriculum has adequate scope for multidisciplinary knowledge and sufficient number of elective courses.	No. of Teachers	17	8	3	2	1
	Percentage	54.84	25.81	9.68	6.45	3.23
The curriculum has focus on personality development by presence of courses on human values and professional ethics	No. of Teachers	16	9	3	2	1
	Percentage	51.61	29.03	9.68	6.45	3.23
The curriculum provides enough scope for improving entrepreneurial skill as well as industry readiness.	No. of Teachers	17	7	3	2	2
	Percentage	54.84	22.58	9.68	6.45	6.45

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The curriculum provides ample knowledge for increased employability and to promote students for higher education.	No. of Teachers	18	8	3	1	1
	Percentage	58.06	25.81	9.68	3.23	3.23
The curriculum helps in enhancing problem solving capability related to local/global societal issues	No. of Teachers	16	8	4	2	1
	Percentage	51.61	25.81	12.90	6.45	3.23
Adequate freedom is given to offer opinion on design & development of curriculum.	No. of Teachers	15	7	4	3	2
	Percentage	48.39	22.58	12.90	9.68	6.45
The existing system for curriculum revision is found to be effective.	No. of Teachers	16	6	4	3	2
	Percentage	51.61	19.35	12.90	9.68	6.45

Analysis of Feedback:

- 90.32% teachers are of the opinion that the curriculum is well organized and balanced for the programme with proper credit allocation, has adequate scope for multidisciplinary knowledge and sufficient number of elective courses, and focuses on personality development by presence of courses on human values and professional ethics. The curriculum helps in enhancing problem solving capability related to local/global societal issues and the courses have adequate balance between theory and application for student's holistic development while 9.68% teachers don't think so.
- 87% teachers give positive feedback regarding the curriculum as it provides enough scope for improving entrepreneurial skill as well as industry readiness while 13% teachers are on the other side.
- 93.54% teachers think that the curriculum provides ample knowledge for increased employability and to promote students for higher education while 6.46% teachers don't give positive feedback.

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- 83.87% teachers think that an adequate freedom is given to offer opinion on design & development of curriculum and the existing system for curriculum revision is found to be effective.

Action Taken Report

(School of Engineering and Technology)

Sr. No.	Suggestions	Action taken	Outcome
1.	Focus should be on increasing the basket of value added courses.	More value added courses were added in the curriculum.	Improved students' learning and academic progress.
2.	The faculty requested for a better platform for digital attendance for the students.	More number of biometric machines were installed.	Accurate Attendance Tracking and Time efficiency.
3.	Holistic development of students	Festivals and days of national importance were celebrated on campus.	Students developed a sense of fraternity and harmony in life.
4.	Language competence should be taken care of.	Labs on Communication Skills were scheduled in the time table.	Students' speaking abilities were improved.

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EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

22st Meeting of BOS (Item No. 4 Annexure -3)

SHOBHIT UNIVERSITY GANGOH
SCHOOL OF ENGINEERING AND TECHNOLOGY

List of Examiners (2023-2024)

Sr. No.	Course code with Title	Name, Designation, Institution and Correspondence address of the Paper Setter/Examiner
1	OOPS Using C++ (BCA-201)	External Examiner 1. Dr. Abhay Bhatia, Associate Professor, Computer Science and Engineering, Roorkee Institute of Technology, Roorkee. 2. Dr. Sreesh Gaur, Associate Professor, Computer Science and Engineering, KITE Group of Institutions, Meerut. 3. Dr. Vishant Kumar, Professor, Computer Science and Engineering, JBIT, Dehradun. Internal Examiner 1. Dr. Tarun Kumar Sharma, Professor, Computer Science and Engineering, Shobhit University, Gangoh. 2. Mr. Vinod Kumar, Assistant Professor, Computer Science and Engineering, Shobhit University, Gangoh.
2	Database Management Systems(BCA-202)	External Examiner 1. Dr. Abhay Bhatia, Associate Professor, Computer Science and Engineering, Roorkee Institute of Technology, Roorkee. 2. Dr. Sreesh Gaur, Associate Professor, Computer Science and Engineering, KITE Group of Institutions, Meerut. 3. Dr. Vishant Kumar, Professor, Computer Science and Engineering, JBIT, Dehradun. Internal Examiner 1. Mr. Kuldeep Chauhan, Assistant Professor, Computer Science and Engineering, Shobhit University, Gangoh. 2. Mr. Nitin Kumar, Assistant Professor, Computer Science and Engineering, Shobhit University, Gangoh.
3	Web & E-Commerce Technologies(BCA-	External Examiner 1. Dr. Abhay Bhatia, Associate Professor, Computer Science and Engineering, Roorkee Institute of Technology, Roorkee.

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Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

	203)	2. Dr. Sreesh Gaur, Associate Professor, Computer Science and Engineering, KITE Group of Institutions, Meerut. 3. Dr. Vishant Kumar, Professor, Computer Science and Engineering, JBIT, Dehradun. Internal Examiner 1. Mr. Nitin Kumar, Assistant Professor, Computer Science and Engineering, Shobhit University, Gangoh. 2. Mrs. Sumika Jain, Assistant Professor, Computer Science and Engineering, Shobhit University, Gangoh.
4	Discrete Structures(BCA-204)	External Examiner 1. Dr. Abhay Bhatia, Associate Professor, Computer Science and Engineering, Roorkee Institute of Technology, Roorkee. 2. Dr. Vishant Kumar, Professor, Computer Science and Engineering, JBIT, Dehradun. 3. Dr. Sreesh Gaur, Associate Professor, Computer Science and Engineering, KITE Group of Institutions, Meerut. Internal Examiner 1. Mr. Vinod Kumar, Assistant Professor, Computer Science and Engineering, Shobhit University, Gangoh. 2. Mr. Kuldeep Chauhan, Assistant Professor, Computer Science and Engineering, Shobhit University, Gangoh.
5	Environmental Studies(BCA-205)	External Examiner 1. Dr. Abhay Bhatia, Associate Professor, Computer Science and Engineering, Roorkee Institute of Technology, Roorkee. 2. Dr. Vishant Kumar, Professor, Computer Science and Engineering, JBIT, Dehradun. 3. Dr. Sreesh Gaur, Associate Professor, Computer Science and Engineering, KITE Group of Institutions, Meerut. Internal Examiner 1. Mr. Vinod Kumar, Assistant Professor, Computer Science and Engineering, Shobhit University, Gangoh. 2. Mrs. Sumika Jain, Assistant Professor, Computer Science and Engineering, Shobhit University, Gangoh.

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Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.mg.ac.in

6	OOPS Using C++ Lab(BCA-251)	External Examiner 1. Dr. Abhay Bhatia, Associate Professor, Computer Science and Engineering, Roorkee Institute of Technology, Roorkee. 2. Dr. Sreesh Gaur, Associate Professor, Computer Science and Engineering, KITE Group of Institutions, Meerut. 3. Dr. Vishant Kumar, Professor, Computer Science and Engineering, JBIT, Dehradun. Internal Examiner 1. Mr. Vinod Kumar, Assistant Professor, Computer Science and Engineering, Shobhit University, Gangoh. 2. Mrs. Sumika Jain, Assistant Professor, Computer Science and Engineering, Shobhit University, Gangoh.
7	Database Management Systems Lab(BCA-252)	External Examiner 1. Dr. Sreesh Gaur, Associate Professor, Computer Science and Engineering, KITE Group of Institutions, Meerut. 2. Dr. Abhay Bhatia, Associate Professor, Computer Science and Engineering, Roorkee Institute of Technology, Roorkee. 3. Dr. Vishant Kumar, Professor, Computer Science and Engineering, JBIT, Dehradun. Internal Examiner 1. Mr. Vinod Kumar, Assistant Professor, Computer Science and Engineering, Shobhit University, Gangoh. 2. Mrs. Sumika Jain, Assistant Professor, Computer Science and Engineering, Shobhit University, Gangoh.
8	Seminar Based on Learning(BCA-253)	External Examiner 1. Dr. Abhay Bhatia, Associate Professor, Computer Science and Engineering, Roorkee Institute of Technology, Roorkee. 2. Dr. Sreesh Gaur, Associate Professor, Computer Science and Engineering, KITE Group of Institutions, Meerut. 3. Dr. Vishant Kumar, Professor, Computer Science and Engineering, JBIT, Dehradun. Internal Examiner

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Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

		1. Dr. Tarun Kumar Sharma, Professor, Computer Science and Engineering, Shobhit University, Gangoh. 2. Mr. Vinod Kumar, Assistant Professor, Computer Science and Engineering, Shobhit University, Gangoh.
9	Data Structures(BCA-401)	External Examiner 1. Dr. Sreesh Gaur, Associate Professor, Computer Science and Engineering, KITE Group of Institutions, Meerut. 2. Dr. Vishant Kumar, Professor, Computer Science and Engineering, JBIT, Dehradun. 3. Dr. Abhay Bhatia, Associate Professor, Computer Science and Engineering, Roorkee Institute of Technology, Roorkee. Internal Examiner 1. Dr. Tarun Kumar Sharma, Professor, Computer Science and Engineering, Shobhit University, Gangoh. 2. Mr. Vinod Kumar, Assistant Professor, Computer Science and Engineering, Shobhit University, Gangoh.
10	Java Programming(BCA-402)	External Examiner 1. Dr. Sreesh Gaur, Associate Professor, Computer Science and Engineering, KITE Group of Institutions, Meerut. 2. Dr. Abhay Bhatia, Associate Professor, Computer Science and Engineering, Roorkee Institute of Technology, Roorkee. 3. Dr. Vishant Kumar, Professor, Computer Science and Engineering, JBIT, Dehradun. Internal Examiner 1. Mr. Kuldeep Chauhan, Assistant Professor, Computer Science and Engineering, Shobhit University, Gangoh. 2. Mr. Nitin Kumar, Assistant Professor, Computer Science and Engineering, Shobhit University, Gangoh.
11	Computer System Architecture(BCA-403)	External Examiner 1. Dr. Abahay Bhatia 2. Dr. Mamta

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Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

		3. Dr. Sreesh Gaur, Associate Professor, Computer Science and Engineering, KITE Group of Institutions, Meerut. Internal Examiner 1. Dr. Tarun Kumar Sharma, Professor, Computer Science and Engineering, Shobhit University, Gangoh. 2. Mr. Vinod Kumar, Assistant Professor, Computer Science and Engineering, Shobhit University, Gangoh.
12	Knowledge Management(BCA-404)	External Examiner 1. Dr. Abhay Bhatia, Associate Professor, Computer Science and Engineering, Roorkee Institute of Technology, Roorkee. 2. Dr. Sreesh Gaur, Associate Professor, Computer Science and Engineering, KITE Group of Institutions, Meerut. 3. Dr. Vishant Kumar, Professor, Computer Science and Engineering, JBIT, Dehradun. Internal Examiner 1. 1.Mr. Kuldeep Chauhan, Assistant Professor, Computer Science and Engineering, Shobhit University, Gangoh. 2. 2.Mr. Nitin Kumar, Assistant Professor, Computer Science and Engineering, Shobhit University, Gangoh.
13	Data Structures Lab(BCA-451)	External Examiner 1. Dr. Vishant Kumar, Professor, Computer Science and Engineering, JBIT, Dehradun. 2. Ankit Sharma 3. Dr. Abhay Bhatia, Associate Professor, Computer Science and Engineering, Roorkee Institute of Technology, Roorkee. Internal Examiner 1. Dr. Varun Bansal, Professor, Computer Science and Engineering, Shobhit University, Gangoh. 2. Mr. Vinod Kumar, Assistant Professor, Computer Science and Engineering, Shobhit University, Gangoh.
14	Java Programming Lab(BCA-452)	External Examiner 1. Dr. Vishant Kumar, Professor, Computer Science and Engineering, JBIT, Dehradun.

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Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

		2. Dr. Abhay Bhatia, Associate Professor, Computer Science and Engineering, Roorkee Institute of Technology, Roorkee. 3. Dr. Sreesh Gaur, Associate Professor, Computer Science and Engineering, KITE Group of Institutions, Meerut. Internal Examiner 1. Dr. Varun Bansal, Professor, Computer Science and Engineering, Shobhit University, Gangoh. 2. Mr. Vinod Kumar, Assistant Professor, Computer Science and Engineering, Shobhit University, Gangoh.
15	Computer System Architecture Lab(BCA-453)	External Examiner 1. Dr. Vishant Kumar, Professor, Computer Science and Engineering, JBIT, Dehradun. 2. Dr. Sreesh Gaur, Associate Professor, Computer Science and Engineering, KITE Group of Institutions, Meerut. 3. Dr. Abhay Bhatia, Associate Professor, Computer Science and Engineering, Roorkee Institute of Technology, Roorkee. Internal Examiner 1. Mr. Kuldeep Chauhan, Assistant Professor, Computer Science and Engineering, Shobhit University, Gangoh. 2. Mr. Nitin Kumar, Assistant Professor, Computer Science and Engineering, Shobhit University, Gangoh.
16	Seminar Based on Learning(BCA-454)	External Examiner 1. Dr. Vishant Kumar, Professor, Computer Science and Engineering, JBIT, Dehradun. 2. Dr. Sreesh Gaur, Associate Professor, Computer Science and Engineering, KITE Group of Institutions, Meerut. 3. Dr. Abhay Bhatia, Associate Professor, Computer Science and Engineering, Roorkee Institute of Technology, Roorkee. Internal Examiner 3. Mr. Kuldeep Chauhan, Assistant Professor, Computer Science and Engineering, Shobhit University, Gangoh.

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Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

		4. Mr. Nitin Kumar, Assistant Professor, Computer Science and Engineering, Shobhit University, Gangoh.
17	Data Communication and Computer Networks(BCA-601)	External Examiner 1. Dr. Abhay Bhatia, Associate Professor, Computer Science and Engineering, Roorkee Institute of Technology, Roorkee. 2. Dr. Vishant Kumar, Professor, Computer Science and Engineering, JBIT, Dehradun. 3. Dr. Sreesh Gaur, Associate Professor, Computer Science and Engineering, KITE Group of Institutions, Meerut. Internal Examiner 3. Mr. Kuldeep Chauhan, Assistant Professor, Computer Science and Engineering, Shobhit University, Gangoh. 4. Mr. Nitin Kumar, Assistant Professor, Computer Science and Engineering, Shobhit University, Gangoh.
18	Artificial Intelligence(BCA-602)	External Examiner 1. Dr. Sreesh Gaur, Associate Professor, Computer Science and Engineering, KITE Group of Institutions, Meerut. 2. Dr. Ankit Sharma, Assistant Professor, Computer Science and Engineering, Motherhood University, Roorkee. 3. Dr. Abhay Bhatia, Associate Professor, Computer Science and Engineering, Roorkee Institute of Technology, Roorkee. Internal Examiner 5. Mr. Kuldeep Chauhan, Assistant Professor, Computer Science and Engineering, Shobhit University, Gangoh. 6. Mr. Nitin Kumar, Assistant Professor, Computer Science and Engineering, Shobhit University, Gangoh.
19	Cyber Security & Cyber Laws(BCA-603)	External Examiner 1. Dr. Abhay Bhatia, Associate Professor, Computer Science and Engineering, Roorkee Institute of Technology, Roorkee. 2. Dr. Sreesh Gaur, Associate Professor, Computer Science and Engineering, KITE Group of Institutions, Meerut.

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Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

		3. Dr. Ankit Sharma, Assistant Professor, Computer Science and Engineering, Motherhood University, Roorkee. Internal Examiner 1. Mr. Kuldeep Chauhan, Assistant Professor, Computer Science and Engineering, Shobhit University, Gangoh. 2. Mr. Nitin Kumar, Assistant Professor, Computer Science and Engineering, Shobhit University, Gangoh.
20	Software Project management(BCA-604)	External Examiner 1. Dr. Ankit Sharma, Assistant Professor, Computer Science and Engineering, Motherhood University, Roorkee. 2. Dr. Sreesh Gaur, Associate Professor, Computer Science and Engineering, KITE Group of Institutions, Meerut. 3. Dr. Abhay Bhatia, Associate Professor, Computer Science and Engineering, Roorkee Institute of Technology, Roorkee. Internal Examiner Mrs. Sumika Jain, Assistant Professor, Computer Science and Engineering, Shobhit University, Gangoh. Mr. Vinod Kumar, Assistant Professor, Computer Science and Engineering, Shobhit University, Gangoh.
21	Computer Networks Lab(BCA-651)	External Examiner 1. Dr. Ankit Sharma, Assistant Professor, Computer Science and Engineering, Motherhood University, Roorkee. 2. Dr. Sreesh Gaur, Associate Professor, Computer Science and Engineering, KITE Group of Institutions, Meerut. 3. Dr. Abhay Bhatia, Associate Professor, Computer Science and Engineering, Roorkee Institute of Technology, Roorkee. Internal Examiner 1. Mr. Kuldeep Chauhan, Assistant Professor, Computer Science and Engineering, Shobhit University, Gangoh. 2. Mr. Nitin Kumar, Assistant Professor, Computer Science and

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Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Dist. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

		Engineering, Shobhit University, Gangoh.
22	Seminar and Group Discussion(BCA-656)	External Examiner 1. Dr. Sreesh Gaur, Associate Professor, Computer Science and Engineering, KITE Group of Institutions, Meerut. 2. Dr. Ankit Sharma, Assistant Professor, Computer Science and Engineering, Motherhood University, Roorkee. 3. Dr. Abhay Bhatia, Associate Professor, Computer Science and Engineering, Roorkee Institute of Technology, Roorkee. Internal Examiner 1. Mrs. Sumika Jain, Assistant Professor, Computer Science and Engineering, Shobhit University, Gangoh. 2. Mr. Vinod Kumar, Assistant Professor, Computer Science and Engineering, Shobhit University, Gangoh.
23	Research Project-II (BCA-658)	External Examiner 1. Dr. Abhay Bhatia, Associate Professor, Computer Science and Engineering, Roorkee Institute of Technology, Roorkee. 2. Dr. Sreesh Gaur, Associate Professor, Computer Science and Engineering, KITE Group of Institutions, Meerut. 3. Dr. Vishant Kumar, Professor, Computer Science and Engineering, JBIT, Dehradun. Internal Examiner 1. Mrs. Sumika Jain, Assistant Professor, Computer Science and Engineering, Shobhit University, Gangoh. 2. Mr. Vinod Kumar, Assistant Professor, Computer Science and Engineering, Shobhit University, Gangoh.

MCA List of Examiners (2023-2024)

Sr. No.	Course code with Title	Name, Designation, Institution and Correspondence address of the Paper Setter/Examiner
1	Software Engineering & Project Management	External Examiner 1. Dr. Abhay Bhatia, Associate Professor, Computer Science and Engineering, Roorkee Institute of Technology, Roorkee.

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

	(MCA-201)	2. Dr. Ankit Sharma, Assistant Professor, Computer Science and Engineering, Motherhood University, Roorkee. 3. Dr. Vishant Kumar, Professor, Computer Science and Engineering, JBIT, Dehradun. Bansal Internal Examiner 1. Mr. Jitendra K. Saini, Assistant Professor, Computer Science and Engineering, Shobhit University, Gangoh. 2. Mr. Shahnawaaj, Assistant Professor, Computer Science and Engineering, Shobhit University, Gangoh.
2.	ASP .Net(MCA-202)	External Examiner 1. Dr. Sreesh Gaur, Associate Professor, Computer Science and Engineering, KITE Group of Institutions, Meerut. 2. Dr. Maheep Singh, Professor, Computer Science and Engineering, National Institute of Technology, Srinagar, Professor, Computer Science and Engineering, National Institute of Technology, Srinagar 3. Dr. Mukesh Rawat, Professor, Computer Science and Engineering, Meerut Institute of Engineering & Technology, Meerut Internal Examiner 1. Dr. Varun Bansal, Professor, Computer Science and Engineering, Shobhit University, Gangoh. 2. Mr. Shubham Kumar, Assistant Professor, Computer Science and Engineering, Shobhit University, Gangoh.
3.	Python(MCA-203)	External Examiner 1. Dr. Sreesh Gaur, Associate Professor, Computer Science and Engineering, KITE Group of Institutions, Meerut. 2. Dr. Maheep Singh, Professor, Computer Science and Engineering, National Institute of Technology, Srinagar, Professor, Computer Science and Engineering, National Institute of Technology, Srinagar 3. Dr. Mukesh Rawat, Professor, Computer Science and Engineering, Meerut Institute of Engineering & Technology, Meerut Internal Examiner 1. Dr. Tarun Kumar Sharma, Professor, Computer Science and Engineering, Shobhit University, Gangoh. 2. Mr. Vinod Kumar, Assistant Professor, Computer Science and Engineering, Shobhit University, Gangoh.

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Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

4.	Artificial Intelligence(MCA-204)	External Examiner 1. Dr. Mukesh Rawat, Professor, Computer Science and Engineering, Meerut Institute of Engineering & Technology, Meerut 2. Dr. Vishant Kumar, Professor, Computer Science and Engineering, JBIT, Dehradun. Bansal 3. Dr. Abhay Bhatia, Associate Professor, Computer Science and Engineering, Roorkee Institute of Technology, Roorkee. Internal Examiner 1. Mr. Jitendra K. Saini, Assistant Professor, Computer Science and Engineering, Shobhit University, Gangoh. 2. Dr. Tarun Kumar Sharma, Professor, Computer Science and Engineering, Shobhit University, Gangoh.
5.	Distributed Operating System (MCA-231)	External Examiner 1. Dr. Maheep Singh, Professor, Computer Science and Engineering, National Institute of Technology, Srinagar 2. Dr. Sreesh Gaur, Associate Professor, Computer Science and Engineering, KITE Group of Institutions, Meerut. 3. Dr. Maheep Singh, Professor, Computer Science and Engineering, National Institute of Technology, Srinagar, Internal Examiner 1. Dr. Varun Bansal, Professor, Computer Science and Engineering, Shobhit University, Gangoh. 2. Mr. Jitendra K. Saini, Assistant Professor, Computer Science and Engineering, Shobhit University, Gangoh.
6.	Lab Software Engineering and Project Management (MCA-251)	External Examiner 1. Dr. Sreesh Gaur, Associate Professor, Computer Science and Engineering, KITE Group of Institutions, Meerut. 2. Dr. Maheep Singh, Professor, Computer Science and Engineering, National Institute of Technology, Srinagar, 3. Dr. Mukesh Rawat, Professor, Computer Science and Engineering, Meerut Institute of Engineering & Technology, Meerut Internal Examiner 1. Dr. Varun Bansal, Professor, Computer Science and Engineering, Shobhit University, Gangoh. 2. Mrs. Sumika Jain, Assistant Professor, Computer Science and Engineering, Shobhit University, Gangoh.

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E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

7.	Lab ASP. Net (MCA-252)	External Examiner 1. Dr. Mukesh Rawat, Professor, Computer Science and Engineering, Meerut Institute of Engineering & Technology, Meerut 2. Dr. Vishant Kumar, Professor, Computer Science and Engineering, JBIT, Dehradun. Bansal 3. Dr. Abhay Bhatia, Associate Professor, Computer Science and Engineering, Roorkee Institute of Technology, Roorkee. Internal Examiner 1. Mr. Jitendra K. Saini, Assistant Professor, Computer Science and Engineering, Shobhit University, Gangoh. 2. Mr. Shahnawaj, Assistant Professor, Computer Science and Engineering, Shobhit University, Gangoh.
8.	Lab Python (MCA-253)	External Examiner 1. Dr. Vishant Kumar, Professor, Computer Science and Engineering, JBIT, Dehradun. Bansal 2. Dr. Maheep Singh, Professor, Computer Science and Engineering, National Institute of Technology, Srinagar 3. Dr. Abhay Bhatia, Associate Professor, Computer Science and Engineering, Roorkee Institute of Technology, Roorkee. Internal Examiner 1. Dr. Varun Bansal, Professor, Computer Science and Engineering, Shobhit University, Gangoh. 2. Mrs. Sumika Jain, Assistant Professor, Computer Science and Engineering, Shobhit University, Gangoh.
9.	MAJOR PROJECT PRESENTATION & VIVA(MCA-462)	External Examiner 1. Dr. Maheep Singh, Professor, Computer Science and Engineering, National Institute of Technology, Srinagar, 2. Dr. Mukesh Rawat, Professor, Computer Science and Engineering, Meerut Institute of Engineering & Technology, Meerut 3. Dr. Maheep Singh, Professor, Computer Science and Engineering, National Institute of Technology, Srinagar Internal Examiner 1. Mr. Vinod Kumar, Assistant Professor, Computer Science and Engineering, Shobhit University, Gangoh. 2. Mr. Anuj Kumar, Assistant Professor, Computer Science and Engineering, Shobhit University, Gangoh.

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Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

M.Tech List of Examiners (2023-2024)

Sr. No.	Course code with Title	Name, Designation, Institution and Correspondence address of the Paper Setter/Examiner
1.	Resource Management of Computer Systems CE- 502	External Examiner 1. Dr. Maheep Singh, Professor, Computer Science and Engineering, National Institute of Technology, Srinagar, 2. Dr. Mukesh Rawat, Professor, Computer Science and Engineering, Meerut Institute of Engineering & Technology, Meerut 3. Dr. Maheep Singh, Professor, Computer Science and Engineering, National Institute of Technology, Srinagar Internal Examiner 1. Mrs. Sumika Jain, Assistant Professor, Computer Science and Engineering, Shobhit University, Gangoh. 2. Mr. Raveendra Kr. Bharati, Assistant Professor, Computer Science and Engineering, Shobhit University, Gangoh.
2.	Soft Computing CE-504	External Examiner 1. Dr. Abhay Bhatia, Associate Professor, Computer Science and Engineering, Roorkee institute of Technology, Roorkee. 2. Dr. Sreesh Gaur, Associate Professor, Computer Science and Engineering, KITE Group of Institutions, Meerut. 3. Dr. Vishant Kumar, Professor, Computer Science and Engineering, JBIT, Dehradun, Bansal Internal Examiner 1. Mr. Raveendra Kr. Bharati, Assistant Professor, Computer Science and Engineering, Shobhit University, Gangoh. 2. Mr. Kuldeep Chauhan, Assistant Professor, Computer Science and Engineering, Shobhit University, Gangoh.
3.	High Performance Computer Architecture CE- 506	External Examiner 1. Dr. Mukesh Rawat, Professor, Computer Science and Engineering, Meerut Institute of Engineering & Technology, Meerut 2. Dr. Maheep Singh, Professor, Computer Science and Engineering, National Institute of Technology, Srinagar 3. Dr. Abhay Bhatia, Associate Professor, Computer Science and Engineering, Roorkee institute of Technology, Roorkee.

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Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.snu.ac.in

		Internal Examiner 1. Dr. Varun Bansal, Professor, Computer Science and Engineering, Shobhit University, Gangoh. 2. Mr. Nitin Kumar, Assistant Professor, Computer Science and Engineering, Shobhit University, Gangoh.
4.	Mobile & Wireless Communication CE-522	External Examiner 1. Dr. Sreesh Gaur, Associate Professor, Computer Science and Engineering, KITE Group of Institutions, Meerut. 2. Dr. Vishant Kumar, Professor, Computer Science and Engineering, JBIT, Dehradun. Bansal 3. Dr. Maheep Singh, Professor, Computer Science and Engineering, National Institute of Technology, Srinagar Internal Examiner 1. Mr. Raveendra Kr. Bharati, Assistant Professor, Computer Science and Engineering, Shobhit University, Gangoh. 2. Mr. Kuldeep Chauhan, Assistant Professor, Computer Science and Engineering, Shobhit University, Gangoh.
5.	Operating systems Lab CE-552	External Examiner 1. Dr. Abhay Bhatia, Associate Professor, Computer Science and Engineering, Roorkee institute of Technology, Roorkee. 2. Dr. Sreesh Gaur, Associate Professor, Computer Science and Engineering, KITE Group of Institutions, Meerut. 3. Dr. Mukesh Rawat, Professor, Computer Science and Engineering, Meerut Institute of Engineering & Technology, Meerut Internal Examiner 1. Mr. Vinod Kumar, Assistant Professor, Computer Science and Engineering, Shobhit University, Gangoh. 2. Mrs. Sumika Jain, Assistant Professor, Computer Science and Engineering, Shobhit University, Gangoh.
6.	Seminar-II CE-582	External Examiner 1. Dr. Abhay Bhatia, Associate Professor, Computer Science and Engineering, Roorkee institute of Technology, Roorkee. 2. Dr. Sreesh Gaur, Associate Professor, Computer Science and

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E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

		Engineering, KITE Group of Institutions, Meerut. 3. Dr. Vishant Kumar, Professor, Computer Science and Engineering, JBIT, Dehradun. Bansal Internal Examiner 1. Mr. Madhav P. Namdev, Assistant Professor, Computer Science and Engineering, Shobhit University, Gangoh. 2. Mr. Raveendra Kr. Bharati, Assistant Professor, Computer Science and Engineering, Shobhit University, Gangoh.
7.	Dissertation CE- 692	External Examiner 1. Dr. Maheep Singh, Professor, Computer Science and Engineering, National Institute of Technology, Srinagar, 2. Dr. Mukesh Rawat, Professor, Computer Science and Engineering, Meerut Institute of Engineering & Technology, Meerut 3. Dr. Maheep Singh, Professor, Computer Science and Engineering, National Institute of Technology, Srinagar Internal Examiner 1. Dr. Varun Bansal, Professor, Computer Science and Engineering, Shobhit University, Gangoh. 2. Mr. Nitin Kumar, Assistant Professor, Computer Science and Engineering, Shobhit University, Gangoh.
		B.tech CSE (Examiner)
Sr. No.	Course code with Title	Name, Designation, Institution and Correspondence address of the Paper Setter/Examiner
1.	MATHEMATICS-II (CMAN 102)	External Examiner 1. Dr. Sreesh Gaur, Associate Professor, Computer Science and Engineering, KITE Group of Institutions, Meerut. 2. Dr. Mukesh Rawat, Professor, Computer Science and Engineering, Meerut Institute of Engineering & Technology, Meerut 3. Dr. Maheep Singh, Professor, Computer Science and Engineering, National Institute of Technology, Srinagar

Shobhit University
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Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

		Internal Examiner 1. Dr. Vishvas Chand, Professor, Computer Science and Engineering, Shobhit University, Gangoh. 2. Mr. Abdulla Khan, Assistant Professor, Computer Science and Engineering, Shobhit University, Gangoh.
2.	ENGINEERING PHYSICS (CPHN 102)	External Examiner 1. Dr. Mukesh Rawat, Professor, Computer Science and Engineering, Meerut Institute of Engineering & Technology, Meerut 2 Dr. Maheep Singh, Professor, Computer Science and Engineering, National Institute of Technology, Srinagar 3 Dr. Abhay Bhatia, Associate Professor, Computer Science and Engineering, Roorkee institute of Technology, Roorkee. Internal Examiner 1. Mohd Ahamad, Assistant Professor, Computer Science and Engineering, Shobhit University, Gangoh. 2. Mr. Hamid Ali, Assistant Professor, Computer Science and Engineering, Shobhit University, Gangoh.
3.	COMPUTER FUNDAMENTALS AND PROGRAMMING USING-C (CCSN 102)	External Examiner 1. Dr. Abhay Bhatia, Associate Professor, Computer Science and Engineering, Roorkee institute of Technology, Roorkee. 2. Dr. Sreesh Gaur, Associate Professor, Computer Science and Engineering, KITE Group of Institutions, Meerut. 3. Dr. Vishant Kumar, Professor, Computer Science and Engineering, JBIT, Dehradun. Bansal Internal Examiner 1. Dr. Varun Bansal, Professor, Computer Science and Engineering, Shobhit University, Gangoh. 2. Mr. Kuldeep Chauhan, Assistant Professor, Computer Science and Engineering, Shobhit University, Gangoh.
4.	BASICS OF	External Examiner

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

	ELECTRICAL ENGINEERING (CEEN 102)	1. Dr. Maheep Singh, Professor, Computer Science and Engineering, National Institute of Technology, Srinagar,
		2. Dr. Mukesh Rawat, Professor, Computer Science and Engineering, Meerut Institute of Engineering & Technology, Meerut
		3. Dr. Ankit Sharma, Assistant Professor, Computer Science and Engineering, Motherhood University, Roorkee.
		Internal Examiner 1. Dr. Jasvir Singh Rana, Professor, Computer Science and Engineering, Shobhit University, Gangoh.
		2. Mr. Shoyab Hussain, Assistant Professor, Computer Science and Engineering, Shobhit University, Gangoh.
5.	TECHNICAL COMMUNICATION (CPCN 102)	External Examiner 1. Dr. Mukesh Rawat, Professor, Computer Science and Engineering, Meerut Institute of Engineering & Technology, Meerut
		2. Dr. Maheep Singh, Professor, Computer Science and Engineering, National Institute of Technology, Srinagar
		3. Dr. Abhay Bhatia, Associate Professor, Computer Science and Engineering, Roorkee institute of Technology, Roorkee.
		Internal Examiner 1. Mr. Dhruv Joshi, Assistant Professor, Computer Science and Engineering, Shobhit University, Gangoh.
		2. Ms. Abhilasha R. Goel, Assistant Professor, Computer Science and Engineering, Shobhit University, Gangoh.
6.	ENGINEERING PHYSICS LAB (CPHN 152)	External Examiner 1. Dr. Abhay Bhatia, Associate Professor, Computer Science and Engineering, Roorkee institute of Technology, Roorkee.

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E-mail: registrargangoh@shobhituniversity.ac.in
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		2. Dr. Sreesh Gaur, Associate Professor, Computer Science and Engineering, KITE Group of Institutions, Meerut.
		3. Dr. Vishant Kumar, Professor, Computer Science and Engineering, JBIT, Dehradun. Bansal
		Internal Examiner 1. Mohd Ahamad, Assistant Professor, Computer Science and Engineering, Shobhit University, Gangoh.
		2. Mr. Hamid Ali, Assistant Professor, Computer Science and Engineering, Shobhit University, Gangoh.
7.	COMPUTER PROGRAMMING USING C LAB (CCSN 152)	External Examiner 1. Dr. Mukesh Rawat, Professor, Computer Science and Engineering, Meerut Institute of Engineering & Technology, Meerut
		2. Dr. Maheep Singh, Professor, Computer Science and Engineering, National Institute of Technology, Srinagar
		3. Dr. Abhay Bhatia, Associate Professor, Computer Science and Engineering, Roorkee institute of Technology, Roorkee.
		Internal Examiner 1. Dr. Varun Bansal, Professor, Computer Science and Engineering, Shobhit University, Gangoh.
		2. Mr. Kuldeep Chauhan, Assistant Professor, Computer Science and Engineering, Shobhit University, Gangoh.
8.	BASIC ELECTRICAL ENGINEERING LAB (CEEN 152)	External Examiner 1. Dr. Ankit Sharma, Assistant Professor, Computer Science and Engineering, Motherhood University, Roorkee.
		2. Dr. Mukesh Rawat, Professor, Computer Science and Engineering, Meerut Institute of Engineering & Technology, Meerut

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E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

		3. Dr. Maheep Singh, Professor, Computer Science and Engineering, National Institute of Technology, Srinagar
		Internal Examiner 1. Dr. Jasvir Singh Rana, Professor, Computer Science and Engineering, Shobhit University, Gangoh.
		2. Mr. Shoyab Hussain, Assistant Professor, Computer Science and Engineering, Shobhit University, Gangoh.
9.	OBJECT ORIENTED PROGRAMMING USING C++ (CCSN 202)	External Examiner 1. Dr. Abhay Bhatia, Associate Professor, Computer Science and Engineering, Roorkee institute of Technology, Roorkee.
		2. Dr. Sreesh Gaur, Associate Professor, Computer Science and Engineering, KITE Group of Institutions, Meerut.
		3. Dr. Vishant Kumar, Professor, Computer Science and Engineering, JBIT, Dehradun. Bansal
		Internal Examiner 1. Dr. Tarun Kumar Sharma, Professor, Computer Science and Engineering, Shobhit University, Gangoh.
		2. Mr. Vinod Kumar, Assistant Professor, Computer Science and Engineering, Shobhit University, Gangoh.
10.	DESIGN AND ANALYSIS OF ALGORITHMS (CCSN 204)	External Examiner 1. Dr. Mukesh Rawat, Professor, Computer Science and Engineering, Meerut Institute of Engineering & Technology, Meerut
		2. Dr. Maheep Singh, Professor, Computer Science and Engineering, National Institute of Technology, Srinagar
		3. Dr. Abhay Bhatia, Associate Professor, Computer Science and Engineering, Roorkee institute of Technology, Roorkee.

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U.: www.siig.ac.in

		Internal Examiner 1. Dr. Varun Bansal, Professor, Computer Science and Engineering, Shobhit University, Gangoh.
		2. Mr. Nitin Kumar, Assistant Professor, Computer Science and Engineering, Shobhit University, Gangoh.
11.	INTERNET AND WEB TECHNOLOGY (CCSN 206)	External Examiner 1. Dr. Abhay Bhatia, Associate Professor, Computer Science and Engineering, Roorkee institute of Technology, Roorkee.
		2. Dr. Sreesh Gaur, Associate Professor, Computer Science and Engineering, KITE Group of Institutions, Meerut.
		3. Dr. Vishant Kumar, Professor, Computer Science and Engineering, JBIT, Dehradun. Bansal
		Internal Examiner 1. Dr. Varun Bansal, Professor, Computer Science and Engineering, Shobhit University, Gangoh.
		2. Mr. Kuldeep Chauhan, Assistant Professor, Computer Science and Engineering, Shobhit University, Gangoh.
12.	COMPUTER NETWORKS (CCSN 208)	External Examiner 1. Dr. Ankit Sharma, Assistant Professor, Computer Science and Engineering, Motherhood University, Roorkee.
		2. Dr. Mukesh Rawat, Professor, Computer Science and Engineering, Meerut Institute of Engineering & Technology, Meerut
		3. Dr. Maheep Singh, Professor, Computer Science and Engineering, National Institute of Technology, Srinagar
		Internal Examiner 1. Dr. Varun Bansal, Professor, Computer Science and

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U.: www.sug.ac.in

		Engineering, Shobhit University, Gangoh.
		2. Mr. Kuldeep Chauhan, Assistant Professor, Computer Science and Engineering, Shobhit University, Gangoh.
13.	FORMAL LANGUAGES & AUTOMATION THEORY (CCSN 210)	External Examiner 1. Dr. Mukesh Rawat, Professor, Computer Science and Engineering, Meerut Institute of Engineering & Technology, Meerut
		2. Dr. Maheep Singh, Professor, Computer Science and Engineering, National Institute of Technology, Srinagar
		3. Dr. Abhay Bhatia, Associate Professor, Computer Science and Engineering, Roorkee institute of Technology, Roorkee.
		Internal Examiner 1. Mr. Nitin Kumar, Assistant Professor, Computer Science and Engineering, Shobhit University, Gangoh.
		2. Mrs. Sumika Jain, Assistant Professor, Computer Science and Engineering, Shobhit University, Gangoh.
14.	TECHNICAL ENGLISH (CBSN 202)	External Examiner 1. Dr. Ankit Sharma, Assistant Professor, Computer Science and Engineering, Motherhood University, Roorkee.
		2. Dr. Mukesh Rawat, Professor, Computer Science and Engineering, Meerut Institute of Engineering & Technology, Meerut
		3. Dr. Maheep Singh, Professor, Computer Science and Engineering, National Institute of Technology, Srinagar
		Internal Examiner 1. Dr. Jasvir Singh Rana, Professor, Computer Science and Engineering, Shobhit University, Gangoh.
		2. Mr. Shoyab Hussain, Assistant Professor, Computer Science

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U.: www.sug.ac.in

		and Engineering, Shobhit University, Gangoh.
15.	OBJECT ORIENTED PROGRAMMING USING C++ LAB (CCSN 252)	External Examiner 1. Dr. Abhay Bhatia, Associate Professor, Computer Science and Engineering, Roorkee institute of Technology, Roorkee.
		2. Dr. Sreesh Gaur, Associate Professor, Computer Science and Engineering, KITE Group of Institutions, Meerut.
		3. Dr. Vishant Kumar, Professor, Computer Science and Engineering, JBIT, Dehradun. Bansal
		Internal Examiner 1. Dr. Tarun Kumar Sharma, Professor, Computer Science and Engineering, Shobhit University, Gangoh.
		2. Mr. Vinod Kumar, Assistant Professor, Computer Science and Engineering, Shobhit University, Gangoh.
16.	DESIGN AND ANALYSIS OF ALGORITHMS LAB (CCSN 254)	External Examiner 1. Dr. Mukesh Rawat, Professor, Computer Science and Engineering, Meerut Institute of Engineering & Technology, Meerut
		2. Dr. Maheep Singh, Professor, Computer Science and Engineering, National Institute of Technology, Srinagar
		3. Dr. Abhay Bhatia, Associate Professor, Computer Science and Engineering, Roorkee institute of Technology, Roorkee.
		Internal Examiner 1. Dr. Varun Bansal, Professor, Computer Science and Engineering, Shobhit University, Gangoh.
		2. Mr. Nitin Kumar, Assistant Professor, Computer Science and Engineering, Shobhit University, Gangoh.
17.	INTERNET AND	External Examiner

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
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U.: www.sug.ac.in

	WEB TECHNOLOGY LAB (CCSN 256)	1. Dr. Abhay Bhatia, Associate Professor, Computer Science and Engineering, Roorkee institute of Technology, Roorkee.
		2. Dr. Sreesh Gaur, Associate Professor, Computer Science and Engineering, KITE Group of Institutions, Meerut.
		3. Dr. Vishant Kumar, Professor, Computer Science and Engineering, JBIT, Dehradun. Bansal
		Internal Examiner 1. Dr. Varun Bansal, Professor, Computer Science and Engineering, Shobhit University, Gangoh.
		2. Mr. Kuldeep Chauhan, Assistant Professor, Computer Science and Engineering, Shobhit University, Gangoh.
18.	COMPUTER GRAPHICS (CCSN 302)	External Examiner 1. Dr. Ankit Sharma, Assistant Professor, Computer Science and Engineering, Motherhood University, Roorkee.
		2. Dr. Mukesh Rawat, Professor, Computer Science and Engineering, Meerut Institute of Engineering & Technology, Meerut
		3. Dr. Maheep Singh, Professor, Computer Science and Engineering, National Institute of Technology, Srinagar
		Internal Examiner 1. Dr. Tarun Kumar Sharma, Professor, Computer Science and Engineering, Shobhit University, Gangoh.
		2. Mrs. Sumika Jain, Assistant Professor, Computer Science and Engineering, Shobhit University, Gangoh.
19.	DATA WAREHOUSING & DATA MINING (CCSN 304)	External Examiner 1. Dr. Abhay Bhatia, Associate Professor, Computer Science and Engineering, Roorkee institute of Technology, Roorkee.
		2. Dr. Sreesh Gaur, Associate Professor, Computer Science

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U.: www.sug.ac.in

		and Engineering, KITE Group of Institutions, Meerut.
		3. Dr. Vishant Kumar, Professor, Computer Science and Engineering, JBIT, Dehradun. Bansal
		Internal Examiner 1. Dr. Varun Bansal, Professor, Computer Science and Engineering, Shobhit University, Gangoh.
		2. Mrs. Sumika Jain, Assistant Professor, Computer Science and Engineering, Shobhit University, Gangoh.
20.	MOBILE COMPUTING (CCSN 306)	External Examiner 1. Dr. Mukesh Rawat, Professor, Computer Science and Engineering, Meerut Institute of Engineering & Technology, Meerut
		2. Dr. Maheep Singh, Professor, Computer Science and Engineering, National Institute of Technology, Srinagar
		3. Dr. Abhay Bhatia, Associate Professor, Computer Science and Engineering, Roorkee institute of Technology, Roorkee.
		Internal Examiner 1. Mrs. Sumika Jain, Assistant Professor, Computer Science and Engineering, Shobhit University, Gangoh.
		2. Mr. Nitin Kumar, Assistant Professor, Computer Science and Engineering, Shobhit University, Gangoh.
21.	KNOWLEDGE MANAGEMENT & EXPERT SYSTEM (CCSN 308)	External Examiner 1. Dr. Abhay Bhatia, Associate Professor, Computer Science and Engineering, Roorkee institute of Technology, Roorkee.
		2. Dr. Sreesh Gaur, Associate Professor, Computer Science and Engineering, KITE Group of Institutions, Meerut.
		3. Dr. Vishant Kumar, Professor, Computer Science and

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		Engineering, JBIT, Dehradun. Bansal
		Internal Examiner 1. Dr. Mahipal Singh, Professor, Computer Science and Engineering, Shobhit University, Gangoh.
		2. Dr. Shri Kant Gupta, Professor, Computer Science and Engineering, Shobhit University, Gangoh.
22.	SOFTWARE PROJECT MANAGEMENT (CUCS 342)	External Examiner 1. Dr. Ankit Sharma, Assistant Professor, Computer Science and Engineering, Motherhood University, Roorkee.
		2. Dr. Mukesh Rawat, Professor, Computer Science and Engineering, Meerut Institute of Engineering & Technology, Meerut
		3. Dr. Maheep Singh, Professor, Computer Science and Engineering, National Institute of Technology, Srinagar
		Internal Examiner 1. Mr. Kuldeep Chauhan, Assistant Professor, Computer Science and Engineering, Shobhit University, Gangoh.
		2. Mrs. Sumika Jain, Assistant Professor, Computer Science and Engineering, Shobhit University, Gangoh.
23.	ENVIRONMENTAL STUDIES (CBSN 302)	External Examiner 1. Dr. Abhay Bhatia, Associate Professor, Computer Science and Engineering, Roorkee institute of Technology, Roorkee.
		2. Dr. Sreesh Gaur, Associate Professor, Computer Science and Engineering, KITE Group of Institutions, Meerut.
		3. Dr. Vishant Kumar, Professor, Computer Science and Engineering, JBIT, Dehradun. Bansal
		Internal Examiner

Shobhit University
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E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

		1. Dr. Jasvir Singh Rana, Professor, Computer Science and Engineering, Shobhit University, Gangoh.
		2. Mr. Shoyab Hussain, Assistant Professor, Computer Science and Engineering, Shobhit University, Gangoh.
24.	COMPUTER GRAPHICS LAB (CCSN 352)	External Examiner 1. Dr. Abhay Bhatia, Associate Professor, Computer Science and Engineering, Roorkee institute of Technology, Roorkee.
		2. Dr. Sreesh Gaur, Associate Professor, Computer Science and Engineering, KITE Group of Institutions, Meerut.
		3. Dr. Vishant Kumar, Professor, Computer Science and Engineering, JBIT, Dehradun. Bansal
		Internal Examiner 1. Dr. Tarun Kumar Sharma, Professor, Computer Science and Engineering, Shobhit University, Gangoh.
		2. Mrs. Sumika Jain, Assistant Professor, Computer Science and Engineering, Shobhit University, Gangoh.
25.	DATA WAREHOUSING & DATA MINING LAB (CCSN 354)	External Examiner 1. Dr. Mukesh Rawat, Professor, Computer Science and Engineering, Meerut Institute of Engineering & Technology, Meerut
		2. Dr. Maheep Singh, Professor, Computer Science and Engineering, National Institute of Technology, Srinagar
		3. Dr. Abhay Bhatia, Associate Professor, Computer Science and Engineering, Roorkee institute of Technology, Roorkee.
		Internal Examiner 1. Dr. Varun Bansal, Professor, Computer Science and Engineering, Shobhit University, Gangoh.
		2. Mrs. Sumika Jain, Assistant Professor, Computer Science

Shobhit University
EDUCATION EMPOWERS
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E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

		and Engineering, Shobhit University, Gangoh.
26.	MINI PROJECT (CCSN 356)	External Examiner 1. Dr. Ankit Sharma, Assistant Professor, Computer Science and Engineering, Motherhood University, Roorkee.
		2. Dr. Mukesh Rawat, Professor, Computer Science and Engineering, Meerut Institute of Engineering & Technology, Meerut
		3. Dr. Maheep Singh, Professor, Computer Science and Engineering, National Institute of Technology, Srinagar
		Internal Examiner 1. Dr. Tarun Kumar Sharma, Professor, Computer Science and Engineering, Shobhit University, Gangoh.
		2. Dr. Varun Bansal, Professor, Computer Science and Engineering, Shobhit University, Gangoh.
27.	INTERNSHIP AND Report Presentation (CCSN 462)	External Examiner 1. Dr. Mukesh Rawat, Professor, Computer Science and Engineering, Meerut Institute of Engineering & Technology, Meerut
		2. Dr. Maheep Singh, Professor, Computer Science and Engineering, National Institute of Technology, Srinagar
		3. Dr. Abhay Bhatia, Associate Professor, Computer Science and Engineering, Roorkee institute of Technology, Roorkee.
		Internal Examiner 1. Dr. Mahipal Singh, Professor, Computer Science and Engineering, Shobhit University, Gangoh.
		2. Dr. Tarun Kumar Sharma, Professor, Computer Science and Engineering, Shobhit University, Gangoh.

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail:
U:

SHOBHIT UNIVERSITY GANGOH
School of Engineering and Technology

Date: 03/06/2024

NOTICE

Subject: Meeting of the Board of Studies

All members of the Board of Studies are hereby informed that a meeting will be held as per the following details:

Date: 14/06/2024
Time: 02.00 PM
Venue: SOET, Shobhit University, Gangoh

Agenda:

1. Confirmation of minutes of the previous meeting
2. **New Interdisciplinary Courses to be added in M. Tech. 1st semester and B. Tech 1st semester w.e.f. the academic session 2024-25**
3. Approval of Revision in Syllabus of BCA 2nd Semester and B. Tech 2nd, 4th and 6th Semester w. e. f. the academic session 2024-25
4. Analysis of Students' feedback & Action taken report & Analysis of the feedback on curriculum from stakeholders
5. Approval of Examiners (Theory & Practical) and Paper Setters for the even semester courses in BCA, MCA , B. Tech & M. Tech for session **Jan. to June 2024**
6. Discussion on the value Added courses offered for students and ratification of the same.
7. Any other matter with the permission of the Chair

All members are requested to make it convenient to attend the meeting and come prepared with relevant documents and suggestions.

Prof. (Dr.) Manish Bansal
Chairperson, Board of Studies
Head of the Department
03/06/2024

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Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U P.) 247341, India
Tel: +91 7830810052
E-mail: cg[illegible]
U.: www.su[illegible]

SHOBHIT UNIVERSITY GANGOH
School of Engineering and Technology

Date: 03/06/2024

To
Dr. Rajesh Kumar Saini
Head of the Department
Dept. of Mathematics Science and Computer Application
Bundelkhand University, Jhansi

Subject: Invitation to Attend the Board of Studies Meeting

Dear Sir

Greetings from School of Engineering and Technology

We are pleased to invite you to participate as an external subject expert in the upcoming meeting of the Board of Studies for the School of Engineering and Technology, scheduled as follows:

Date: 14/06/2024
Time: 02.00 PM
Mode: SOET, Shobhit University, Gangoh

The meeting will deliberate on important academic matters including syllabus revision, new course proposals, and academic planning for the upcoming session. Your expert insights and contributions would be invaluable to the academic enrichment of our programs.

We request you to kindly confirm your availability and mode of attendance at your earliest convenience. For online participation, a meeting link will be shared upon confirmation. If attending in person, necessary hospitality arrangements will be made.

We look forward to your positive response and support.

Thank you.

Warm regards,

Prof. (Dr.) Varun Bansal
Chairperson, Board of Studies

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Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: reg.sitrargangoh@[illegible]
U.: www.[illegible]

SHOBHIT UNIVERSITY GANGOH
School of Engineering and Technology

Date: 03/06/2024

To
Dr. Neeraj Singhal
Professor
School of Computer Science and Engineering
Sir Chhotu Ram Institute of Engineering & Technology

Subject: Invitation to Attend the Board of Studies Meeting

Dear Sir

Greetings from School of Engineering and Technology

We are pleased to invite you to participate as an external subject expert in the upcoming meeting of the Board of Studies for the School of Engineering and Technology, scheduled as follows:

Date: 14/06/2024
Time: 02.00 PM
Mode: SOET, Shobhit University, Gangoh

The meeting will deliberate on important academic matters including syllabus revision, new course proposals, and academic planning for the upcoming session. Your expert insights and contributions would be invaluable to the academic enrichment of our programs.

We request you to kindly confirm your availability and mode of attendance at your earliest convenience. For online participation, a meeting link will be shared upon confirmation. If attending in person, necessary hospitality arrangements will be made.

We look forward to your positive response and support.

Thank you.

Warm regards,

Prof.(Dr.) Varun Bansal
Chairperson, Board of Studies

School of Engineering & Technology ★ Shobhit University Gangoh ★

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SHOBHIT UNIVERSITY GANGOH

School of Engineering and Technology

Date: 14/06/2024

Attendance Sheet (School of Engineering and Technology, BOS Meeting on 14/06/2024)

Sr. No	Name	External/Internal Member	Signature
1	Prof.(Dr.) Rajesh Kumar Saini	External Expert	
2	Dr. Neeraj Singhal	External Expert	
3	Dr. Mahipal Singh	Internal Member	
4	Dr. Jasvir Singh Rana	Internal Member	

Chairman

School of Engineering and Technology ★ Shobhit University Gangoh ★

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Area Gangoh, Distt. Saharanpur (U.P.)
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U.: www.sug.ac.in

School of Engineering & Technology

Date: 14.06.2024

Minutes of the Meeting of Board of Studies

23rd Meeting of the Board of Studies of the School of Engineering and Technology, Shobhit University Gangoh was organized on 14th June 2024 at 02:00 PM onwards. The following members were present in the meeting:

1. Prof. (Dr.) Varun Bansal
   Head of the Department
   Computer Science and Engineering
   Shobhit University Gangoh — Chairperson

2. Prof. (Dr.) Rajesh Kumar Saini
   Head of the Department
   Dept. of Mathematics Science and Computer Application
   Bundelkhand University, Jhansi — External expert

3. Dr. Neeraj Singhal
   Professor
   School of Computer Science and Engineering
   Sir Chhotu Ram Institute of Engineering & Technology — External Expert

4. Dr. Mahipal Singh,
   Professor
   School of Engineering and Technology
   Shobhit University Gangoh — Member

5. Dr. Jasvir Singh Rana
   Professor
   School of Engineering and Technology
   Shobhit University Gangoh — Member

Welcome address by Chairman
The Chairman extended a warm welcome to all the members of Board of Studies and the following information was tabled before the members of the Board of Studies:

Input given by the Subject Experts on the Scheme and syllabi of the ongoing Batches.

The following discussed and approved on Choice Based Credit System:

Item BOS 23.1: Approval of the Minutes of the 22nd BOS Meeting held on 21st Dec. 2023 was circulated among the members and the same were notified after the approval of the Board of Studies. {Annexure- 1}

Item BOS 23.2: New Interdisciplinary Courses to be added in M. Tech. 1st semester and B. Tech 1st semester w.e.f. the academic session 2024-25. {Annexure-2}

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U: www.sug.ac.in

- **BOS members approved the syllabus of CE-511E in M. Tech 1st semester**
- **BOS members approved the syllabus of CPCN-101E B. Tech 1st Semester.**

Item BOS 23.3: Approval of Revision in Syllabus of BCA 2nd Semester and B. Tech 2nd, 4th and 6th Semester w. e. f. the academic session 2024-25.

- BOS approved Revision in Syllabus of BCA-252 in BCA 2nd semester.
- BOS approved Revision in Syllabus of CCSN-152, CCSN-256 and CCSN-352 in B. Tech 2nd, 4th semester and 6th Semester. {Annexure-3}

Item BOS 23.4: Analysis of Students' feedback & Action taken report:

- BOS Chairman has expressed that the student feedback and action taken report process is done at the end of semester. The BOS members noted the same.

Item BOS 23.5: Analysis of the feedback on curriculum from stakeholders:

- The BOS chairman presented the analysis report of stakeholders' feedback on curriculum. The BOS members noted the same and advised to incorporate the suggestions as per the feasibility. The Action Taken Report is enclosed herewith. {Annexure-4}

Item BOS 23.6: Approval of Examiners (Theory & Practical) and Paper Setters for the even semester courses in BCA, MCA , B. Tech & M. Tech for session **Jan. to June 2024** The same is being sent to the Controller of Examinations, Shobhit University Gangoh, in a sealed cover. {Annexure-5}

Item BOS 23.7: Discussion on the Value Added courses offered for students and ratification of the same.

- BOS members approved the list of Value added courses offered to students.

The meeting ended with a vote of thanks to the Chairman, Board of Studies.

The suggestions given by the panel of BOS have been discussed with the Vice Chancellor and Dean Academics. The action taken on the suggestions has been approved by competent authorities.

Signed by:

(Chairman, BOS)

(Dean Academics)

(Vice Chancellor)

23rd Meeting of BOS (Item No. 23.1 Annexure -1)

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

School of Engineering & Technology

Date: 21.12.2023

Minutes of the Meeting of Board of Studies

22nd meeting of the Board of Studies of the School of Engineering and Technology, Shobhit University Gangoh was organized on 21st Dec. 2023 at 10:00 am onwards. The following members were present in the meeting:

1.	Prof. (Dr.) Varun Bansal Head of the Department Computer Science and Engineering Shobhit University Gangoh	Chairperson
2.	Prof. (Dr.) Rajesh Kumar Saini Head of the Department Dept. of Mathematics Science and Computer Application Bundelkhand University, Jhansi	External expert
3.	Dr. Neeraj Singhal Professor School of Computer Science and Engineering Sir Chhotu Ram Institute of Engineering & Technology	External Expert
4.	Dr. Mahipal Singh, Professor School of Engineering and Technology Shobhit University Gangoh	Member
5.	Dr. Jasvir Singh Rana Professor School of Engineering and Technology Shobhit University Gangoh	Member

Welcome address by Chairman

The Chairman extended a warm welcome to all the members of Board of Studies and the following information was tabled before the members of the Board of Studies:

Input given by the Subject Experts on the Scheme and syllabi of the ongoing Batches.

The following discussed and approved on Choice Based Credit System:

Item BOS 22.1: Approval of the Minutes of the 21st BOS Meeting held on 27 June 2023

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Was circulated among the members and the same were notified after the approval of the Board of Studies. {Annexure- 1}

Item BOS 22.2:Analysis of Students' feedback & Action taken report:

- BOS Chairman has expressed that the student feedback and action taken report process is done at the end of semester. The BOS members noted the same.

Item BOS 23.3: Analysis of the feedback on curriculum from stakeholders:

- The BOS chairman presented the analysis report of stakeholders' feedback on curriculum. The BOS members noted the same and advised to incorporate the suggestions as per the feasibility. The Action Taken Report is enclosed herewith. {Annexure-2}

Item BOS 22.4: Approval of Examiners (Theory & Practical) and Paper Setters for the even semester courses in BCA, MCA , B. Tech & M. Tech for session **Jan. to June 2024** The same is being sent to the Controller of Examinations, Shobhit University Gangoh, in a sealed cover. {Annexure-3}

Item BOS 22.5: Discussion on the Value Added courses offered for students and ratification of the same.

- BOS members approved the list of Value added courses offered to students.

The meeting ended with a vote of thanks to the Chairman, Board of Studies.

The suggestions given by the panel of BOS have been discussed with the Vice Chancellor and Dean Academics. The action taken on the suggestions has been approved by competent authorities.

Signed by:

(Chairman, BOS)

(Vice Chancellor)

(Dean Academics)

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23rd Meeting of BOS (Item No. 23.2 Annexure -2)

Shobhit University
EDUCATION EMPOWERS

Shobhit University, Gangoh

(Established by UP Shobhit University Act No. 3, 2012)

School of School of Engineering and Technology

Ordinances, Regulations & Syllabus

For

Master of Technology, Two Year Programme

Semester System

(w.e.f. session 2013-14)

Approved and adopted in the year 2019 (13th Meeting, Board of Studies)

Shobhit University, Gangoh, Saharanpur

Department of Computer Engg.

M.Tech. (Computer Engineering)

(Teaching Scheme)

First Semester

Course No	Subject	L T P	Cr
CE- 501	Software Engineering Methodologies	3 – 1 – 0	4
CE- 503	Analysis and Design of Algorithms	3 – 1 – 0	4
CE- 505	Advanced Database Management Systems	3 – 1 – 0	4
CE- 507	Computer Communication and Networks	3 – 1 – 0	4
CE- 509	Fundamental of Computer Programming (Audit)	2 – 1 – 0	0
CE- 511	Fundamental of Mathematics (Audit)	2 – 1 – 0	0
CE- 511 A	Mathematics /		
CE- 511 B	Basic Mathematics /		
CE- 511 C	Mathematics-I		
CE- 511 D	Advanced Applied Mathematics		
CE- 511 E	Advanced Mathematics		
CE- 551	Algorithms Lab	0 – 0 – 4	2
CE- 581	Seminar-I	0 – 0 – 4	2
		Total: 20	

Second Semester

CE- 502	Resource Management of Computer Systems	3 – 1 – 0	4
CE- 504	Soft Computing	3 – 1 – 0	4
CE- 506	High Performance Computer Architecture	3 – 1 – 0	4
	Elective –I (Choose any one)	3 – 1 – 0	4
CE-522	Mobile & Wireless Communication		
CE-524	Real Time System		
CE-526	Cloud Computing		
CE-552	Operating systems Lab	0 – 0 – 4	2
CE-582	Seminar-II	0 – 0 – 4	2
		Total: 20	

Third Semester

CE- 601	Data Mining and Warehousing	3 – 1 – 0	4
CE- 603	Internet and Web Technology	3 – 1 – 0	4
CE- 605	Medical Image Processing	3 – 1 – 0	4
CE- 607	Software Verification, Validation and Testing	3 – 1 – 0	4
	Elective –II (Choose any one)	3 – 1 – 0	4
CE-623	Security of Information System		
CE-625	Network Security		
CE-671	Minor Project	0 – 0 – 4	2
CE-681	Seminar-III	0 – 0 – 4	2
		Total: 28	

Fourth Semester

CE- 692	Dissertation	0 – 0 – 28	14
		Total: 14	

Advanced Mathematics

CE- 511 E

L T P Cr.

2 1 0 0

COURSE OBJECTIVES:

The objectives of this course are to

1. Understand advanced mathematical concepts and theories.
2. Develop problem-solving and analytical skills.
3. Apply mathematical methods to real-world scenarios.
4. Explore advanced topics like calculus, linear algebra, and differential equations.
5. Enhance mathematical reasoning and logical thinking.

Course Outcomes:

At the end of this course, students will demonstrate the ability to:

1. Gain a deeper understanding of advanced mathematical concepts.
2. Develop strong analytical and problem-solving abilities.
3. Apply mathematical methods in various fields.
4. Solve complex problems using advanced techniques.
5. Strengthen logical reasoning and mathematical proof skills.

Unit 1

Covers limits and continuity, differentiation including rules, applications, and higher-order derivatives, the mean value theorem, Taylor series, definite and indefinite integration, as well as improper integrals and their applications.

Unit 2

Delves into vector spaces and subspaces, basis, dimension, rank, matrices with their operations, types, and properties, determinants and inverses, and concludes with eigenvalues, eigenvectors, and diagonalization.

Unit 3

Focuses on first-order differential equations, higher-order linear differential equations, systems of differential equations, the Laplace transform with applications, and partial differential equations.

Unit 4

Explores sequences and series, convergence tests for series, uniform continuity and differentiability, Riemann integration, metric spaces, and compactness.

Unit 5

Introduces complex numbers and functions, analytic functions with Cauchy-Riemann equations, contour integration, series representations of functions, and the residue theorem with its applications.

TEXT BOOKS:-

1. Advanced Engineering Mathematics" by Erwin Kreyszig
2. Advanced Mathematics for Engineers and Scientists" by C.R. Wylie and Louis C. Barrett
3. Mathematical Methods for Physics and Engineering" by Riley, Hobson, and Bence
4. Linear Algebra Done Right" by Sheldon Axler
5. Advanced Calculus" by David V. Widder

Scheme of Teaching

TEACHING SCHEME OF B.TECH. 1ST YEAR (1ST SEMESTER)

W.E.F. Academic Session 2021-22

(COMMON FOR ALL BRANCHES)

CODE	SUBJECT	CREDIT	L	T	P
CMAN-101	Mathematics-I	4	3	1	0
CMAN-101 A	Mathematics				
CMAN-101 B	Basic Mathematics				
CMAN-101 C	Applied Mathematics				
CMAN-101 D	Advanced Applied Mathematics				
CMEN-101	Engineering Mechanics	4	3	1	0
CMEN-101 A	Structural Analysis				
CMEN-101 B	Rigid Body Mechanics				
CMEN-101 C	Fluid Mechanics				
CMEN-101 D	Free-Body Diagrams Mechanics				
CECN-101	Fundamentals Of Electronics	4	3	1	0
CECN-101 A	Analog Electronics				
CECN-101 B	Digital Electronics				
CECN-101 C	Electronics Measurement and Testing				
CECN-101 D	Electromagnetics				
CESN-101	Engineering Chemistry and Environmental Science	4	3	1	0
CESN-101 A	Chemical Thermodynamics				
CESN-101 B	Chemical Kinetics				
CESN-101 C	Environmental Chemistry				
CESN-101 D	Natural Resource Management				
CPCN-101	Presentation and Communication Skills	3	3	0	0
CPCN-101 A	English Communication				
CPCN-101 B	English /				
CPCN-101 C	Technical Communication				
CPCN-101 D	Human Values, Deaddiction and Traffic Rules				
CPCN-101 E	Road Safety and Traffic Management				
CMEN-151	Engineering Workshop Practice	1	0	0	2
CMEN-153	Engineering Graphics Lab	1	0	0	2
CPCN-151	Communication Lab	1	0	0	2
CPCN-151 A	English Communication Lab				
CPCN-151 B	English Lab				
CPCN-151 C	Technical Communication Lab				
CPCN-151 D	Human Values, Deaddiction And Traffic Rules (Lab)				
TOTAL		22	15	4	6

Road Safety and Traffic Management

CPCN-101 E

L	T	P	Cr
3	0	0	3

Course Objectives:

The objectives of this course are to

1. Understand key concepts of road safety and traffic management.
2. Learn traffic flow and congestion control strategies.
3. Study road safety laws and regulations.
4. Explore the role of public education in road safety.
5. Analyze accident causes and prevention techniques.

Course Outcomes:

At the end of this course, students will demonstrate the ability to:

1. Understand the principles of road safety and its importance in preventing accidents.
2. Learn traffic rules and regulations to ensure safe driving and pedestrian practices.
3. Analyze traffic flow and apply management techniques for smoother transportation.
4. Develop strategies for reducing congestion and improving road infrastructure.
5. Promote public awareness and education on safe road behavior and accident prevention.

Unit 1: The unit introduces the basics of road safety, emphasizing the importance of accident prevention, traffic rules, and the impact of road safety on public health. It also discusses the roles of government and authorities in ensuring a safe transportation system.

Unit 2: This unit covers traffic management principles, including traffic flow, congestion control, and the use of technology to manage road networks. It looks into different traffic management strategies in both urban and rural contexts.

Unit 3: The focus of this unit is on road safety laws and regulations, highlighting national and international traffic laws, enforcement practices, and the responsibilities of law enforcement agencies in ensuring compliance with safety standards.

Unit 4: This unit explores the role of education and awareness in promoting road safety, with a focus on strategies to educate the public, particularly young drivers, about safe driving practices and the consequences of traffic violations.

Unit 5: The final unit deals with accident investigation and analysis, examining the causes of road accidents, methods of data collection, and how authorities use this information to improve safety measures and reduce accident rates.

TEXT BOOKS:-

1. Traffic Engineering and Transport Planning" by L.R. Kadiyali
2. Road Safety: A Global Perspective" by David S. R. W.
3. Introduction to Traffic Engineering: A Manual for Data Collection and Analysis" by William R. McShane and James F. Roess
4. Traffic Safety and Mobility: Challenges, Countermeasures, and Technologies" edited by V. N. M. Rao

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23rd Meeting of BOS (Item No. 23.3 Annexure -3)

Shobhit University
EDUCATION EMPOWERS

Shobhit University, Gangoh

(Established by UP Shobhit University Act No. 3, 2012)

School of School of Engineering and Technology

Ordinances, Regulations & Syllabus

For

Bachelor of Computer Application (BCA) Three Year Programme

Semester System

(w.e.f. session 2013-14)

Approved and adopted in the year 2021 (17th Meeting, Board of Studies)

Shobhit University, Gangoh (Saharanpur)
Teaching Scheme
Effective from 2021

II Semester

Subject Code	Subject	L	L	P	Cr.
BCA-201	OOPS Using C++	4			4
BCA-202	Database Management Systems	4			4
BCA-203	Web & E-Commerce Technologies	4			4
BCA-204 BCA-204 A BCA-204 B BCA-204 C	Discrete Structures Set Theory Graph Theory Discrete Probability	4			4
BCA-205 BCA-205 A BCA-205 B BCA-205 C BCA-205 D	Environmental Studies Environmental Science Natural Resource Management Pollution Control Environmental Policy and Governance	4			4
BCA-251	OOPS Using C++ Lab			4	2
BCA-252	Database Management Systems Lab			4	2
BCA-253	Seminar Based on Learning			4	2
	Total Credits	**20**		**12**	**26**

DBMS Lab

BCA-252

L	T	P	Cr
0	0	4	2

Course Objectives

1. Understand fundamental concepts and theories of the subject.
2. Apply practical skills through hands-on activities and projects.
3. Develop critical thinking and problem-solving abilities.
4. Collaborate effectively in team-based environments.
5. Cultivate a mindset for continuous learning and improvement.

Course Outcomes:

At the end of this course, Students will demonstrate the ability to:

1. Understand the fundamentals of relational databases and SQL for data management.
2. Develop skills in designing and implementing database schemas and normalization.
3. Execute SQL queries for data manipulation, retrieval, and transaction management.
4. Implement database security features like user authentication and access control.
5. Use database management systems (DBMS) tools to optimize database performance and troubleshoot issues.

List of Experiments:

1. Introduction SQL-SQL*Plus
2. Road way travels E-R Diagrams
3. Various Data Types
4. Tables
5. My SQL Installation
6. DDL and DML Commands with Examples
7. Key Constrains-Normalization
8. Aggregate functions
9. Joins
10. Views
11. Index
12. PL/ SQL
13. Exception handling
14. Triggers
15. Cursors
16. Subprograms-procedure PL/ SQL
17. Functions of PL/ SQL

TEACHING SCHEME OF B.TECH. 1ST YEAR (2ND SEMESTER)
W.E.F. Academic Session 2021-22

CODE	SUBJECT	CREDIT	L	T	P
CMAN-102	Mathematics-II	4	3	1	0
CMAN-102 A	Differential Equations				
CMAN-102 B	Probability and Statistics				
CMAN-102 C	Mathematical Logic				
CMAN-102 D	Differential Geometry				
CPHN -102	Engineering Physics	4	3	1	0
CPHN -102 A	Classical Mechanics				
CPHN -102 B	Electromagnetic Theory				
CPHN -102 C	Quantum Mechanics				
CPHN -102 D	Solid State Physics				
CCSN-102	Computer Fundamentals And Programming Using-C	4	3	1	0
CEEN-102	Basics of Electrical Engineering	4	3	1	0
CEEN-102 A	Circuit Theory				
CEEN-102 B	Electromagnetism				
CEEN-102 C	Digital Electronics				
CEEN-102 D	Electrical Measurements And Instrumentation				
CPCN-102	Technical Communication	3	3	0	0
CPCN-102 A	Business Communication				
CPCN-102 B	Presentation Skills				
CPCN-102 C	Digital Communication				
CPCN-102 D	Audience Analysis				
CPHN-152	Engineering Physics Lab	1	0	0	2
CPHN-152 A	Classical Mechanics Lab				
CPHN-152 B	Electromagnetic Theory Lab				
CPHN-152 C	Quantum Mechanics Lab				
CPHN-152 D	Solid State Physics Lab				
CCSN-152	Computer Programming Using C Lab	1	0	0	2
CEEN-152	Basic Electrical Engineering Lab	1	0	0	2
CEEN-152 A	Circuit Theory Lab				
CEEN-152 B	Electromagnetism Lab				
CEEN-152 C	Digital Electronics Lab				
CEEN-152 D	Electrical Measurements And Instrumentation Lab				
TOTAL		22	15	4	6

SHOBHIT UNIVERSITY, GANGOH (SAHARANPUR)

TEACHING SCHEME

W.E.F. Academic Session 2021-22

B. TECH. (COMPUTER SCIENCE & ENGINEERING)

IV semester

Code	Course Title	Cr.	L	T	P
CCSN-202	Object Oriented Programming Using C++	4	3	1	0
CCSN-204	Design and Analysis Of Algorithms	4	3	1	0
CCSN-206	Internet and Web Technology	4	3	1	0
CCSN-208	Computer Networks	4	3	1	0
CCSN-XXX	Professional Elective-Ii	4	3	1	0
CBSN-202 CBSN-202 A CBSN-202 B CBSN-202 C	Technical English Business Communication Technical Writing Intercultural Communication	2	2	0	0
CCSN-252	Object Oriented Programming Using C++ Lab	1	0	0	2
CCSN-254	Design and Analysis of Algorithms Lab	1	0	0	2
CCSN-256	Internet and Web Technology Lab	1	0	0	2
	Total	25	17	5	6

PROFESSIONAL ELECTIVE-II

1. CCSN 210 Formal Languages & Automation Theory
2. CCSN 212 Nano Sciences

INDUSTRIAL ENHANCEMENT ELECTIVE-I

1. CBSN-202 Technical English
2. CBSN-202 A Business Communication
3. CBSN-202 B Technical Writing
4. CBSN-202 C Intercultural Communication
5. CBSN-204 Operations Research

SHOBHIT UNIVERSITY, GANGOH (SAHARANPUR)

TEACHING SCHEME

W.E.F. Academic Session 2021-22

B. TECH. (COMPUTER SCIENCE & ENGINEERING)

VI Semester

Code	Course Title	Cr.	L	T	P
CCSN-302	Computer Graphics	4	3	1	0
CCSN-304	Data Warehousing & Data Mining	4	3	1	0
CCSN-306	Mobile Computing	4	3	1	0
CCSN-XXX	Professional Elective-IV	4	3	1	0
CUCS-XXX	Open Elective-II	4	3	1	0
CBSN-302 CBSN-302A CBSN-302B CBSN-302C	Environmental Studies Environmental Science Natural Resource Management Pollution Control	2	2	0	0
CCSN-352	Computer Graphics Lab	1	0	0	2
CCSN-354	Data Warehousing & Data Mining Lab	1	0	0	2
CCSN-356	Mini Project	1	0	0	2
	Total	25	17	5	6

PROFESSIONAL ELECTIVE-IV

1. CCSN 308 Knowledge Management & Expert System
2. CCSN 310 Embedded Computing Systems
3. CCSN 312 Simulation and Modeling
4. CCSN 314 Approximation of Algorithms

OPEN ELECTIVE-II

1. CUCS 342 Software Project Management
2. CUCS 344 Microwave Engineering
3. CUCS 346 Supply Chain Management-Planning
4. CUCS 348 Software Testing

Computer Programming Using C Lab

CCSN-152

L	T	P	Cr
0	0	2	1

Course Outcomes:

At the end of this course, students will demonstrate the ability to:

1. Develop programming skills using C for solving computational problems.
2. Write, compile, and debug C programs to implement algorithms and data structures.
3. Understand memory management concepts such as pointers, arrays, and dynamic memory allocation.
4. Apply control structures like loops, conditionals, and functions in C programming.
5. Implement file handling and develop practical applications using C programming concepts.

1. Write a program to display "hello world" in C.
2. Write a program to insert a new line using \n , make a line Single-line comment and make a line multi-line comment.
3. Write a program to create a variable and assign values to variables using scanf() function.
4. Write a program to print other types, use %c for char and %f for float.
5. Write a program to declare more than one variable of the same type.
6. Write a program to calculate the area of a rectangle and area of a triangle.
7. Write a program to perform operations on variables and values (+ , - , *, / ,%).
8. Write a program to perform addition assignment operator (+=) adds a value to a variable.
9. Write a program to find out if a person is old enough to vote using Scanf() function.
10. Write a program to Find out if a number is even or odd using Scanf() function.
11. Write a program for a condition using While Loop.
12. Write a program to print table for the given number using while Loop.
13. Write a program to make the multi-dimensional (2D) array using for Loop.
14. Write a program to print the Right-Angled Triangle Pattern using for loop.
15. Write a program to print the Inverted Right-Angled Triangle Pattern using for loop.
16. Write a program to print the Inverted Pyramid Pattern using for loop.
17. Write a program to print the Inverted Pyramid Pattern using for loop.
18. Write a program to print the Hollow Square Pattern using for loop.
19. Write a program to print the Diamond Pattern using for loop.
20. Convert temperatures between Celsius and Fahrenheit.

Simple Input Output Functions, Arithmetic/Logical & Relational Operators, Sequence Control, Decision Control, Iteration, Arrays Single/Multi dimensional(Numeric/Character), Functions (Call by value/Call by reference), Recursive functions, Structures, Pointers, Library functions, File streams.

Internet and Web Technology Lab

CCSN-256

L	T	P	Cr
0	0	2	1

Course Outcomes:

At the end of this course, students will demonstrate the ability to:

1. Develop practical skills in creating and designing websites using HTML, CSS, and JavaScript.
2. Implement dynamic web pages by integrating client-side and server-side technologies.
3. Understand and apply web protocols like HTTP, FTP, and web services.
4. Explore database integration for web applications using SQL and backend technologies.
5. Learn to troubleshoot and optimize websites for performance and usability.

List of Programs

1. Create a web page using <h1> to <h6>, <p>, <b>, <i>, and <u> tags to format text.
2. Write a program to display both ordered (<ol>) and unordered (<ul>) lists with multiple list items.
3. Create a table with rows and columns using <table>, <tr>, <th>, and <td> tags.
4. Design your classroom time-table by using the HTML coding and provide a unique color to every subject.
5. Write a program to display an image using the <img> tag and adjust the width and height attributes.
6. Create a page that includes a video using the <video> tag with controls like play, pause, and volume.
7. Create the front page of your lab file by using the coding.
8. Create the index page of your lab file which must contain the university logo and all other necessary elements.
9. Write a program to link different pages using the <a> tag, including both internal and external links.
10. Create a form with various input types like text, password, email, checkbox, radio buttons, and a submit button.
11. Use the CSS properties in any of your program to make it different and attractive.
12. Write a JavaScript program that displays the current date and time on a web page using Date() object.
13. Create a simple web page with an input field and a button to display the length of the entered string using.
14. Add the different popup boxes with your web page.
15. Create buttons that allow the user to change the background color of the web page dynamically.
16. Write a JavaScript program that displays a countdown timer for a given time duration.

Computer Graphics Lab

CCSN-352

L	T	P	Cr
0	0	2	1

Course Outcomes:
At the end of this course, students will demonstrate the ability to:

1. Understand basic concepts of computer graphics and its applications.
2. Implement algorithms for drawing shapes and curves.
3. Apply 2D and 3D transformations in graphics programming.
4. Develop simple graphical applications using graphics libraries.
5. Explore concepts of clipping, shading, and animation.

List of Programs

1. Program to set and display a single pixel on the screen using basic plotting functions.
2. Implement the Digital Differential Analyzer (DDA) algorithm to draw straight lines between two points.
3. Create a program to draw lines using the efficient Bresenham's line algorithm.
4. Implement a function to draw rectangles by specifying the top-left and bottom-right coordinates.
5. Implement a function to draw a triangle using specified coordinates.
6. Fill a rectangle with a solid color using basic pixel manipulation.
7. Draw a polygon by specifying its vertices.
8. Draw any image by your choice and fill that with solid and different colors.
9. Program to translate shapes like circles, rectangles, or polygons by a given distance along the x and y axes.
10. Rotate a shape (e.g., triangle or square) around a specified point or the origin.
11. Scale a shape (e.g., rectangle or polygon) with respect to a given factor in x and y directions.
12. Animate a single point moving from one side of the window to the other.

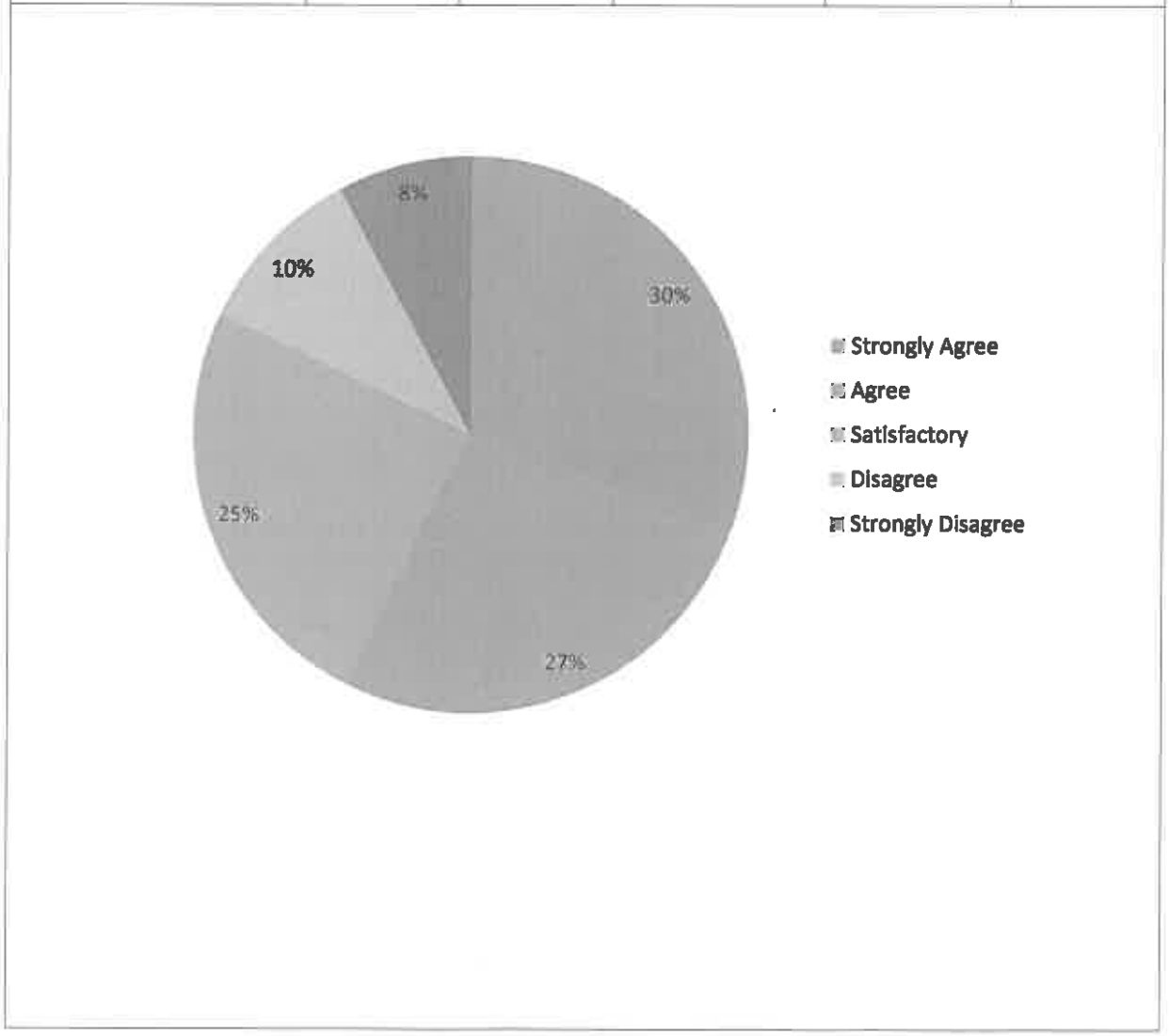
Shobhit University
EDUCATION EMPOWERS
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23rd Meeting of BOS (Item No. 23.4 Annexure -4)

Analysis of Alumni' Feedback of School of Engineering and Technology through Table and Pie Chart

Q.1 The courses based on state of art trends and recent developments?

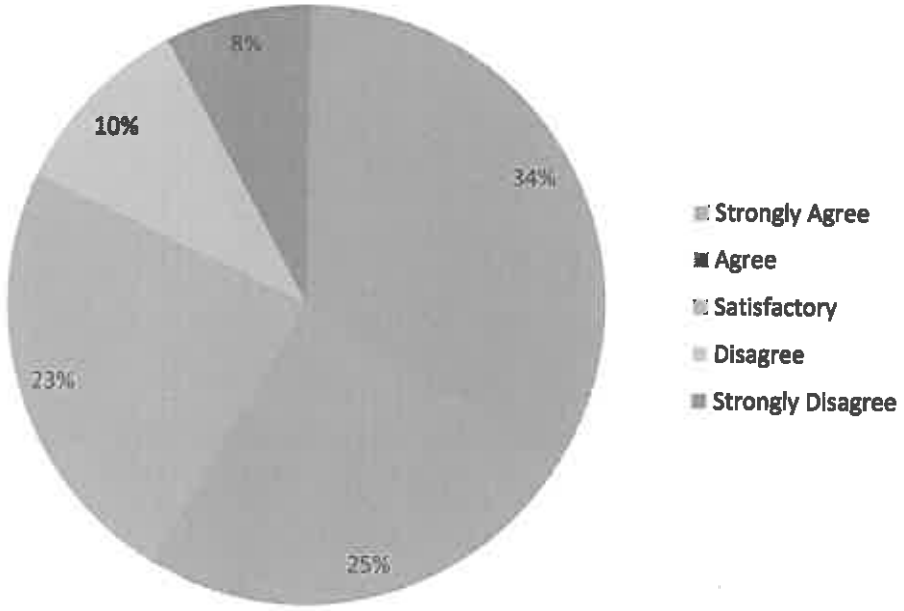
The courses based on state of art trends and recent developments	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	30.34	26.97	24.72	10.11	7.87



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Q.2 The courses found to be helpful in developing skills and knowledge in respective domain?

The courses found to be helpful in developing skills and knowledge in respective domain	Strongly Agree	Agree	satisfactory	Disagree	Strongly Disagree
Response (%)	33.71	24.72	23.60	10.11	7.87

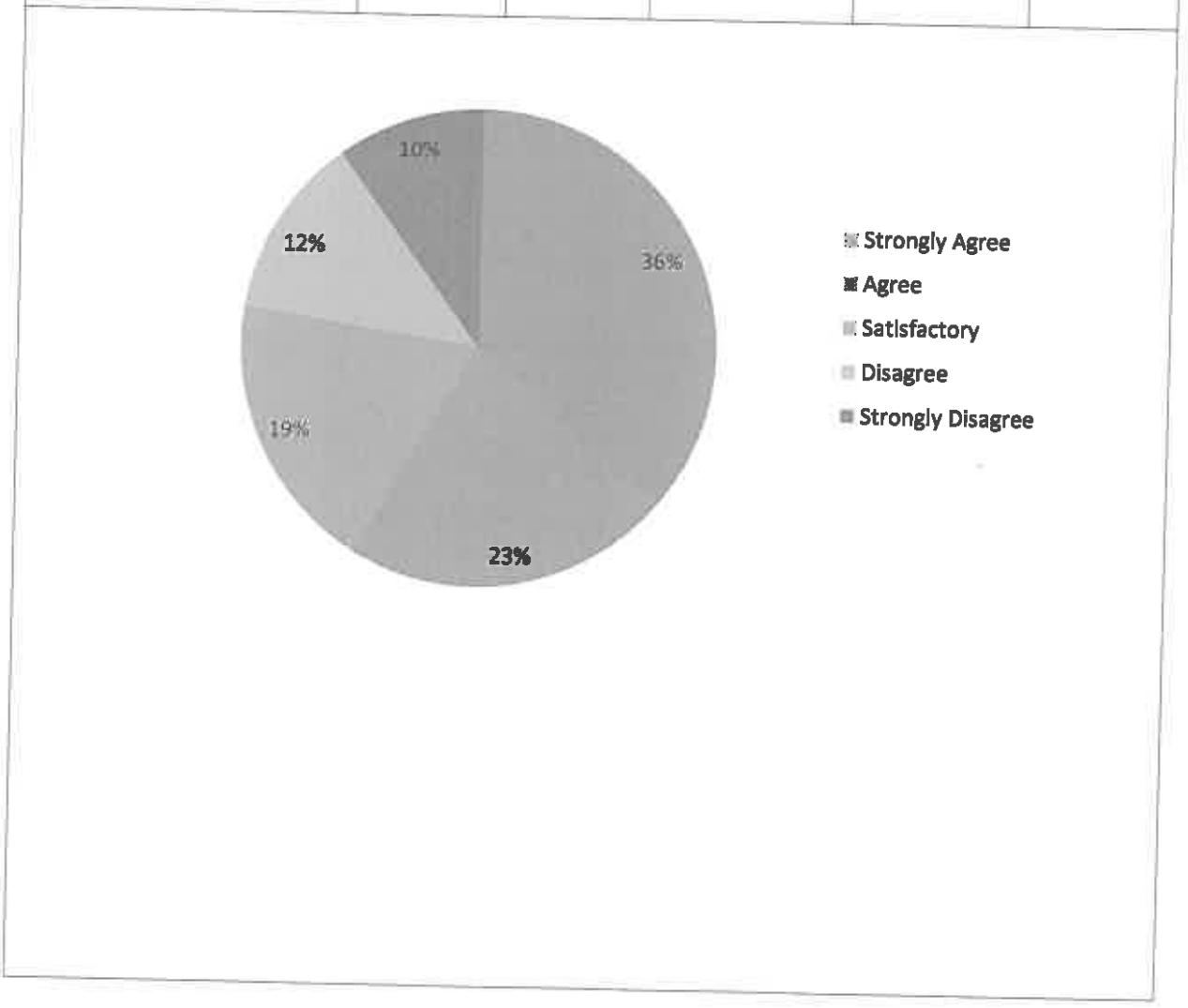


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Q.3 The courses found to be productive in competing professionally at national/international level?

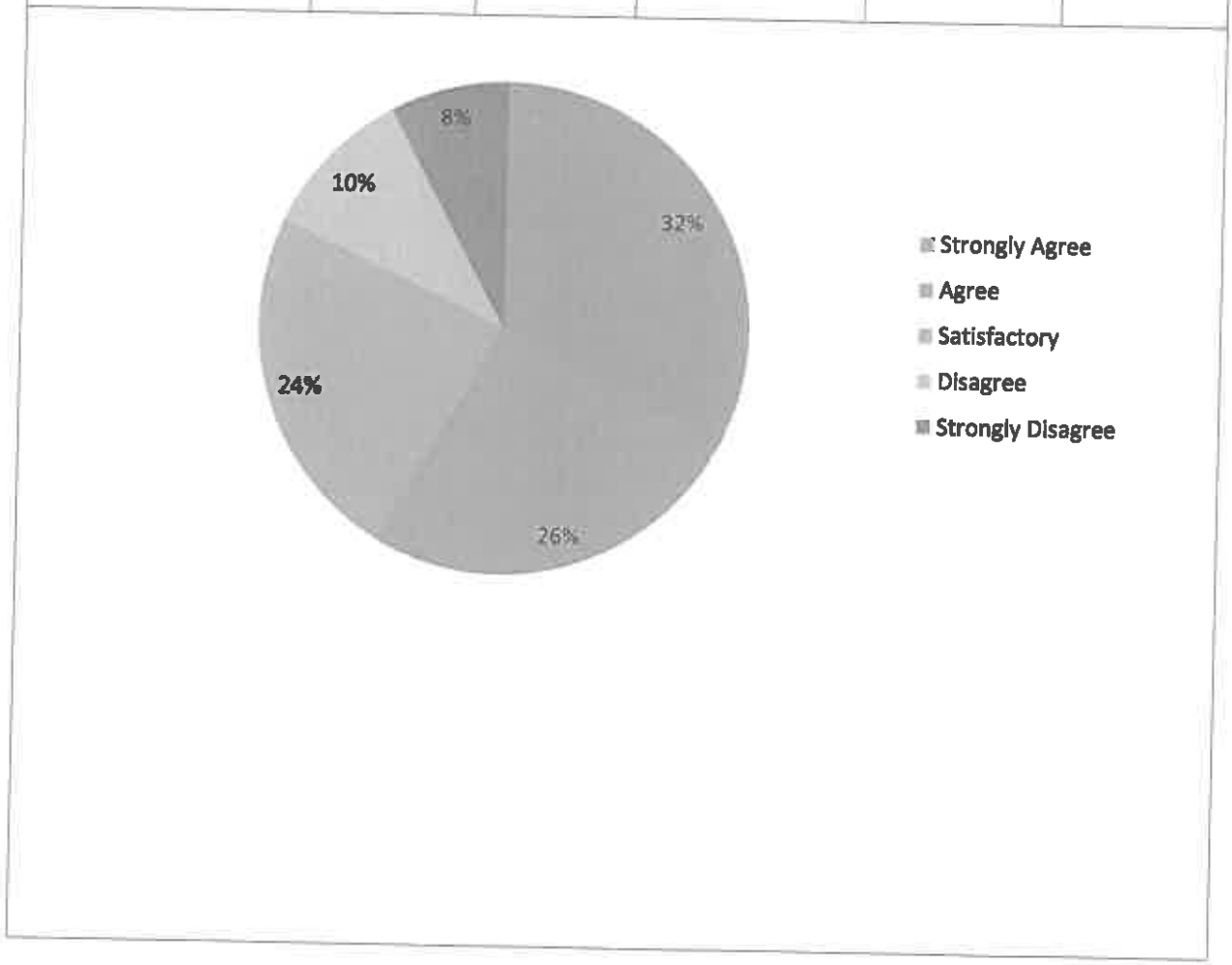
The courses found to be productive in competing professionally at national/international level	Strongly Agree	Agree	satisfactory	Disagree	Strongly Disagree
Response (%)	35.96	22.47	19.10	12.36	10.11



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Q.4 The courses found to be appropriate in motivating students towards nation building by inculcating ethical and professional values?

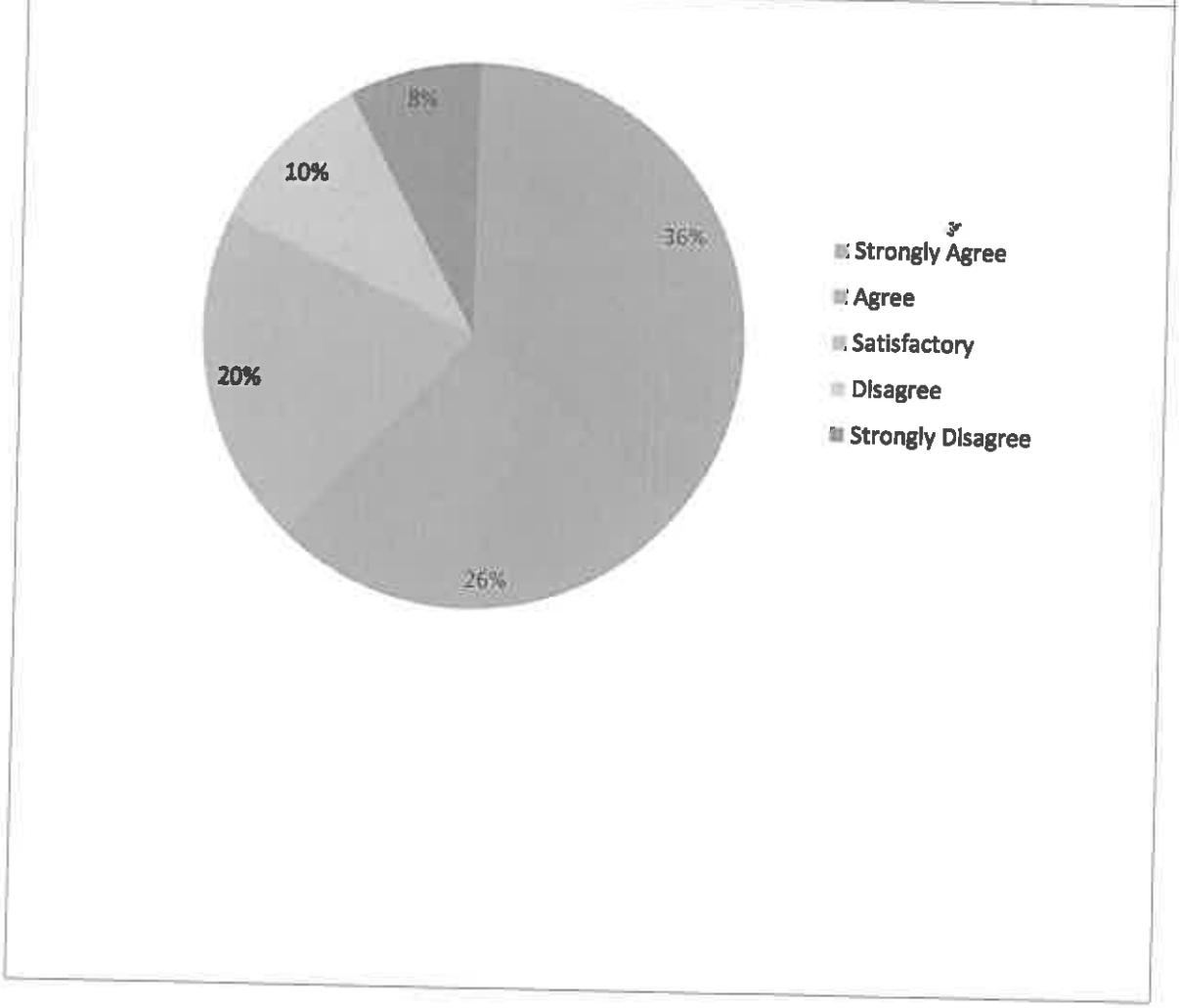
The courses found to be appropriate in motivating students towards nation building by inculcating ethical and professional values	Strongly Agree	Agree	satisfactory	Disagree	Strongly Disagree
Response (%)	32.58	25.84	23.60	10.11	7.87



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Q.5 Theprogramme helped to understand the impact of domain knowledge in social and global context?

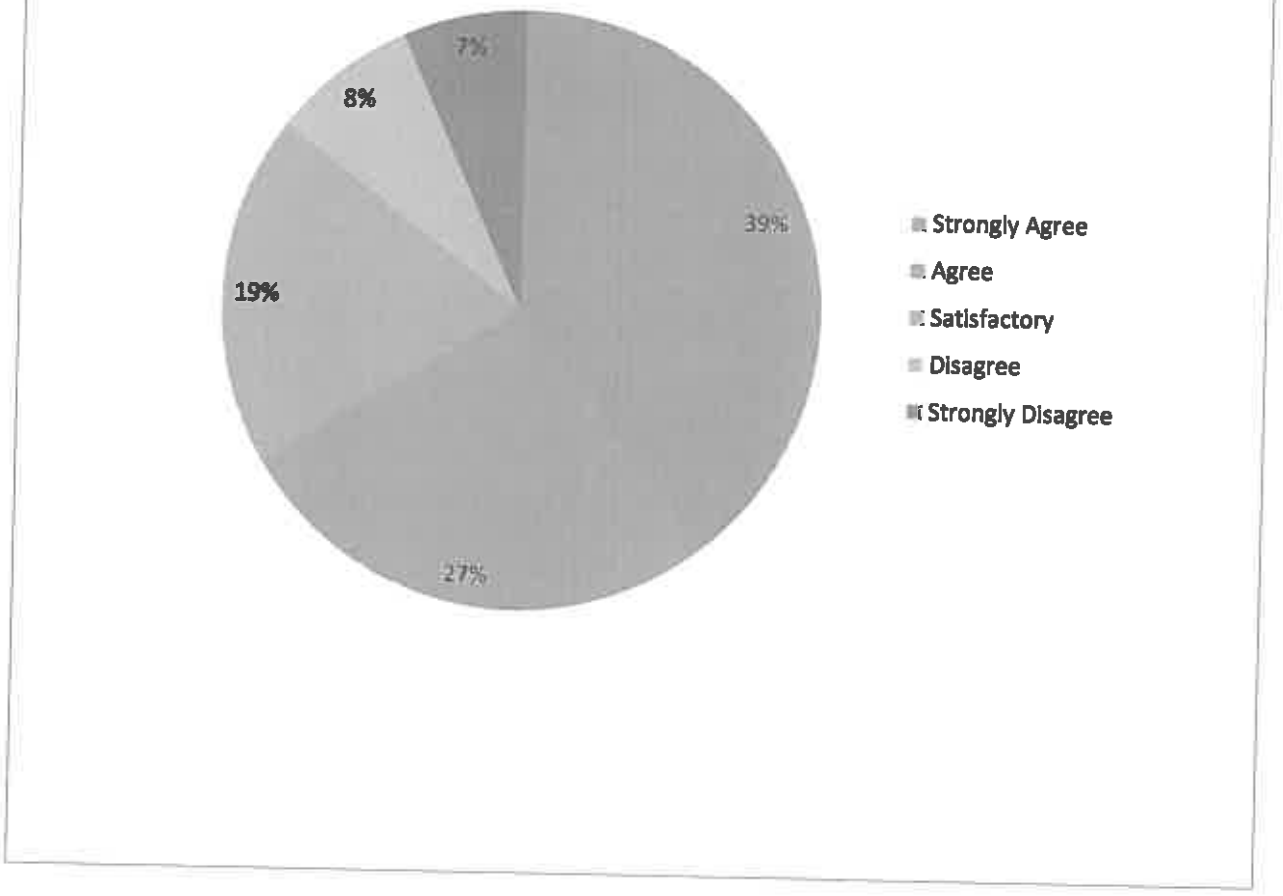
The programme helped to understand the impact of domain knowledge in social and global context	Strongly Agree	Agree	satisfactory	Disagree	Strongly Disagree
Response (%)	35.96	25.84	20.22	10.11	7.87



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Q.6 Theprogramme provided awareness on recent advancements and innovations?

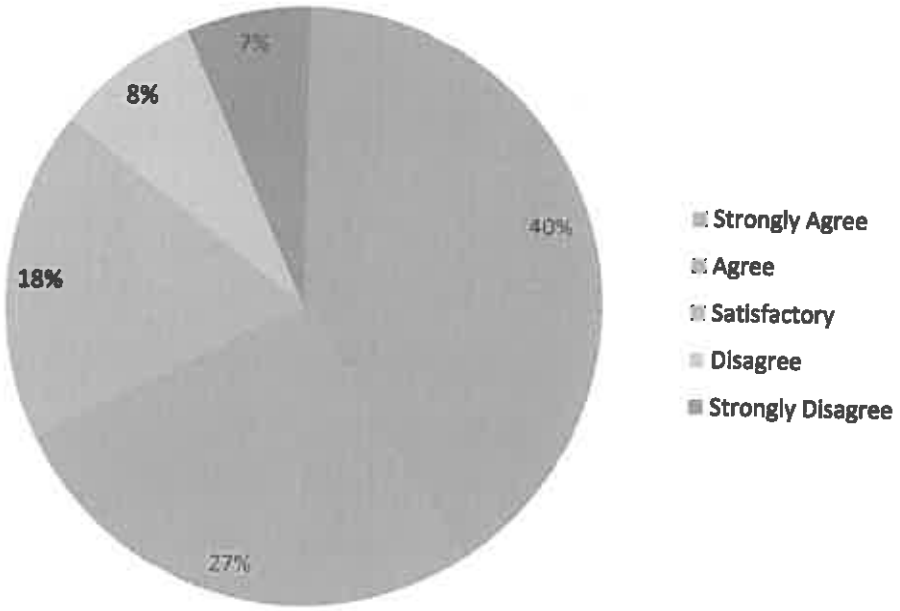
The programme provided awareness on recent advancements and innovations	Strongly Agree	Agree	satisfactory	Disagree	Strongly Disagree
Response (%)	39.33	26.97	19.10	7.87	6.74



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Q.7 Theprogramme improved critical thinking ability and problem-solving aptitude.

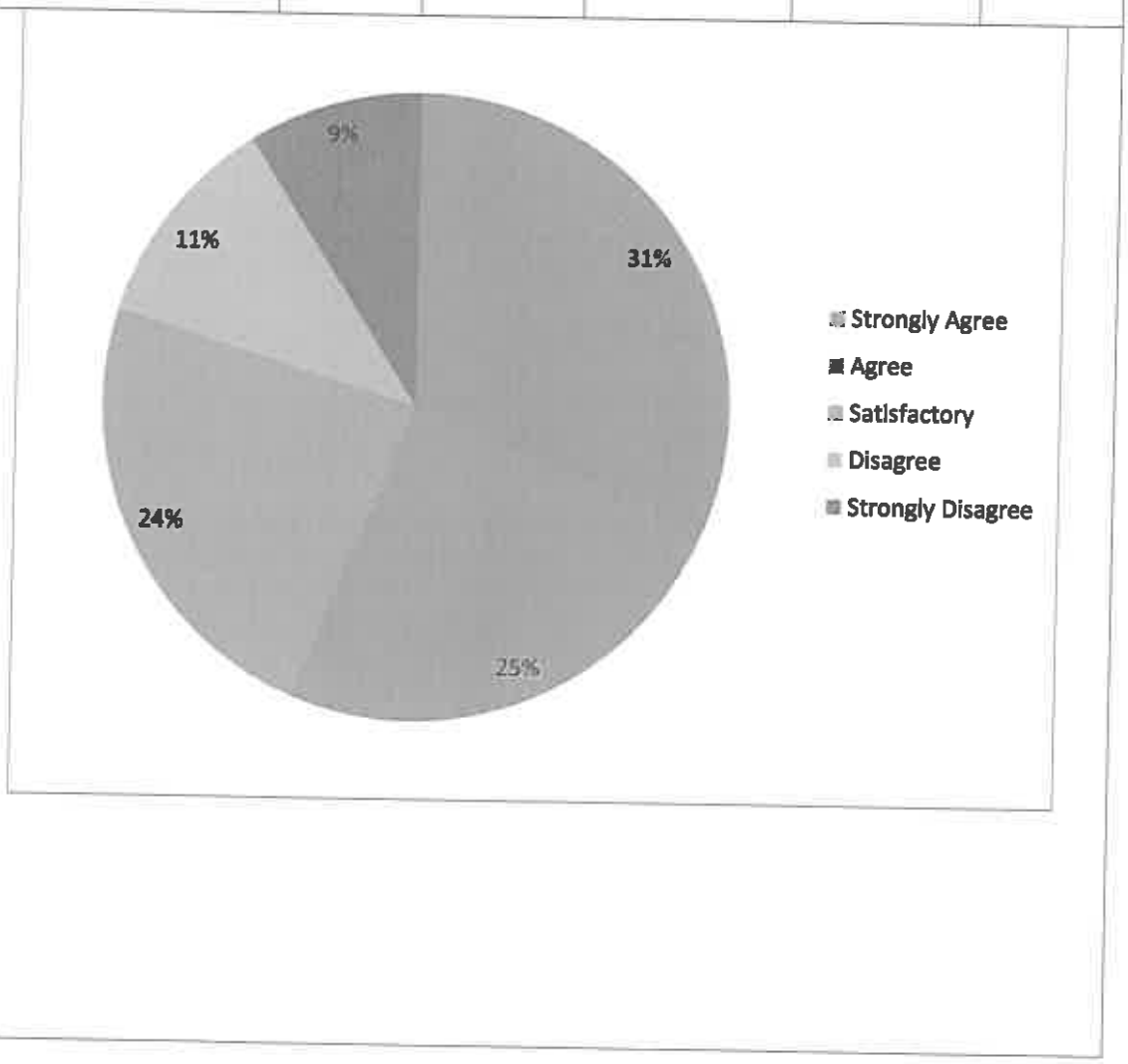
The programme improved critical thinking ability and problem-solving aptitude.	Strongly Agree	Agree	satisfactory	Disagree	Strongly Disagree
Response (%)	40.45	26.97	17.98	7.87	6.74



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Q.8 Theprogramme helped to take independent decisions and perform managerial &administerial functions diligently?

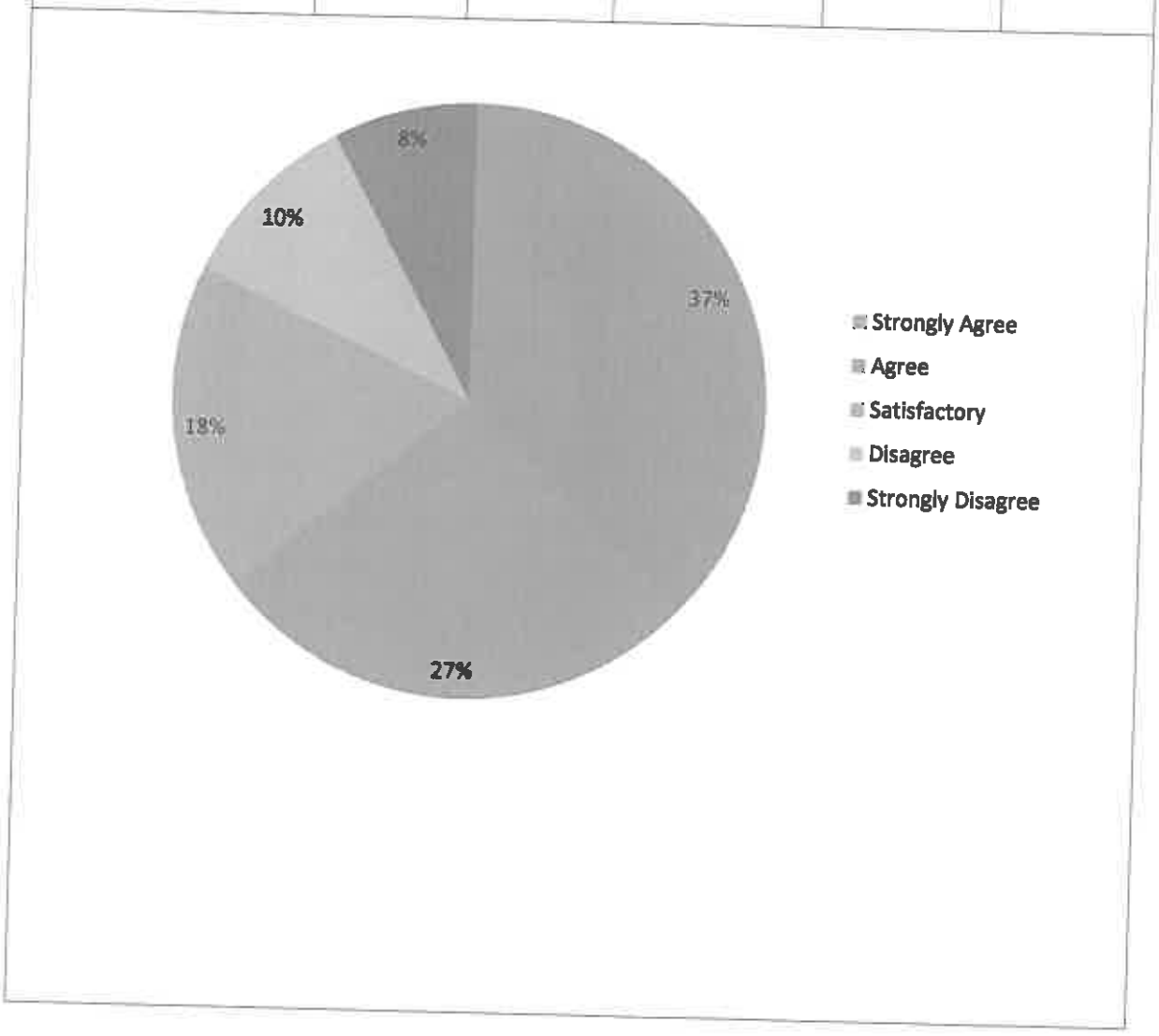
The programmehelped to take independent decisions and perform managerial &administerial functions diligently.	Strongly Agree	Agree	satisfactory	Disagree	Strongly Disagree
Response (%)	31.46	24.72	23.60	11.24	8.99



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Q.9 The curriculum was helpful in acquiring advance level knowledge to pursue research and higher studies?

The curriculum was helpful in acquiring advance level knowledge to pursue research and higher studies	Strongly Agree	Agree	satisfactory	Disagree	Strongly Disagree
Response (%)	37.08	26.97	17.98	10.11	7.87



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School of Engineering & Technology (89)

Sr No	Questions	Details	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
1	The courses based on state of art trends and recent developments?	No of Alumni	27	24	22	9	7
		Percentage	30.34	26.97	24.72	10.11	7.87
2	The courses found to be helpful in developing skills and knowledge in respective domain?	No of Alumni	30	22	21	9	7
		Percentage	33.71	24.72	23.60	10.11	7.87
3	The courses found to be productive in competing professionally at national/international level?	No of Alumni	32	20	17	11	9
		Percentage	35.96	22.47	19.10	12.36	10.11
4	The courses found to be appropriate in motivating students towards nation building by inculcating ethical and professional values?	No of Alumni	29	23	21	9	7
		Percentage	32.58	25.84	23.60	10.11	7.87
5	The programme helped to understand the impact of domain knowledge in social and global context?	No of Alumni	32	23	18	9	7
		Percentage	35.96	25.84	20.22	10.11	7.87
6	The programme provided awareness on recent advancements and innovations?	No of Alumni	35	24	17	7	6
		Percentage	39.33	26.97	19.10	7.87	6.74
7	The programme improved critical thinking ability and problem-solving aptitude.	No of Alumni	36	24	16	7	6
		Percentage	40.45	26.97	17.98	7.87	6.74
8	The programme helped to take independent decisions and perform managerial &administerial functions diligently?	No of Alumni	28	22	21	10	8
		Percentage	31.46	24.72	23.60	11.24	8.99
9	The curriculum was helpful in acquiring advance level knowledge to pursue research and higher studies?	No of Alumni	33	24	16	9	7
		Percentage	37.08	26.97	17.98	10.11	7.87

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Analysis of the Feedback

The alumni feedback reflects a generally positive view of the curriculum, with a few areas for improvement. High ratings (82.02%) were given for aspects such as developing domain-specific skills and knowledge, fostering ethical and professional values, promoting managerial competencies, and preparing students for both professional success and nation-building. These areas indicate that the curriculum is well-aligned with foundational career skills and ethical leadership. However, the feedback also highlights several areas where the curriculum may need enhancement. Lower ratings, particularly in the alignment with state-of-the-art trends (73.00%), global competitiveness (73.00%), critical thinking and problem-solving (73.00%), and research readiness (73.00%), suggest that the curriculum could benefit from stronger integration of cutting-edge developments, deeper engagement with global challenges, and a greater focus on advanced academic inquiry. The relatively low score (69.00%) for understanding the impact of domain knowledge in a social and global context further underscores the need for a broader, more interdisciplinary approach. Overall, while the curriculum is effective in building practical skills and professional values, there is room to improve its relevance to contemporary trends and its ability to foster higher-level critical thinking and research capabilities.

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Action Taken Report

(School of Engineering & Technology)

Sr. No.	Suggestions	Action taken	Outcome
1	Improve alignment with state-of-the-art trends and technological advancements.	Integrated cutting-edge topics such as artificial intelligence, machine learning, blockchain technology, renewable energy systems, and Industry 4.0 into the curriculum. Introduced lab sessions focusing on emerging technologies and hands-on experience with the latest tools and software.	Students gained practical exposure to advanced technologies, enhancing their readiness for future industry needs; better alignment with current industry trends.
2	Strengthen global competitiveness and prepare students for international engineering challenges.	Established partnerships with international universities and engineering firms for student exchanges, internships, and joint research projects. Developed a curriculum that includes global engineering standards and practices.	Increased international exposure for students; more alumni securing roles in global engineering firms; better understanding of international engineering practices.
3	Enhance focus on critical thinking, problem-solving, and research readiness.	Introduced advanced courses in engineering problem-solving, creative design thinking, and research methodology. Promoted student participation in research projects, hackathons, and engineering competitions.	Improved student performance in engineering design challenges and competitions; enhanced problem-solving and critical thinking skills across the student body.
4	Broaden understanding of the social and global impact of engineering knowledge.	Added modules on the social, ethical, and environmental implications of engineering projects. Conducted seminars on sustainable engineering practices, engineering ethics, and the role of engineers in global development.	Students developed a deeper understanding of the broader impacts of their work on society and the environment; greater participation in sustainability and ethics initiatives.

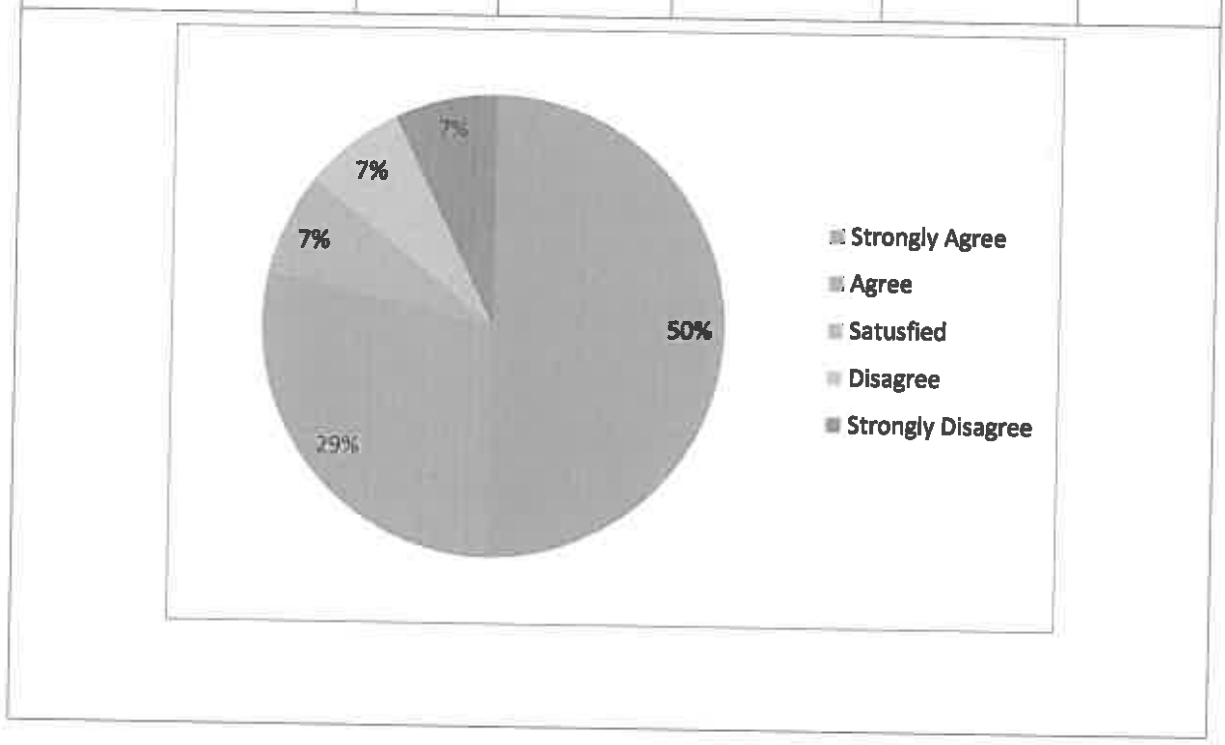
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Area Gangoh, Distt. Saharanpur (U.P.)
247341, India
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E-mail: registrargangoh@shobhituniversity.ac.in
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Analysis of Employer's Feedback of School of Engineering and Technology through Table and Pie Chart

Q.1 curriculum assists the students to acquire necessary entry level skills in industrial sector.

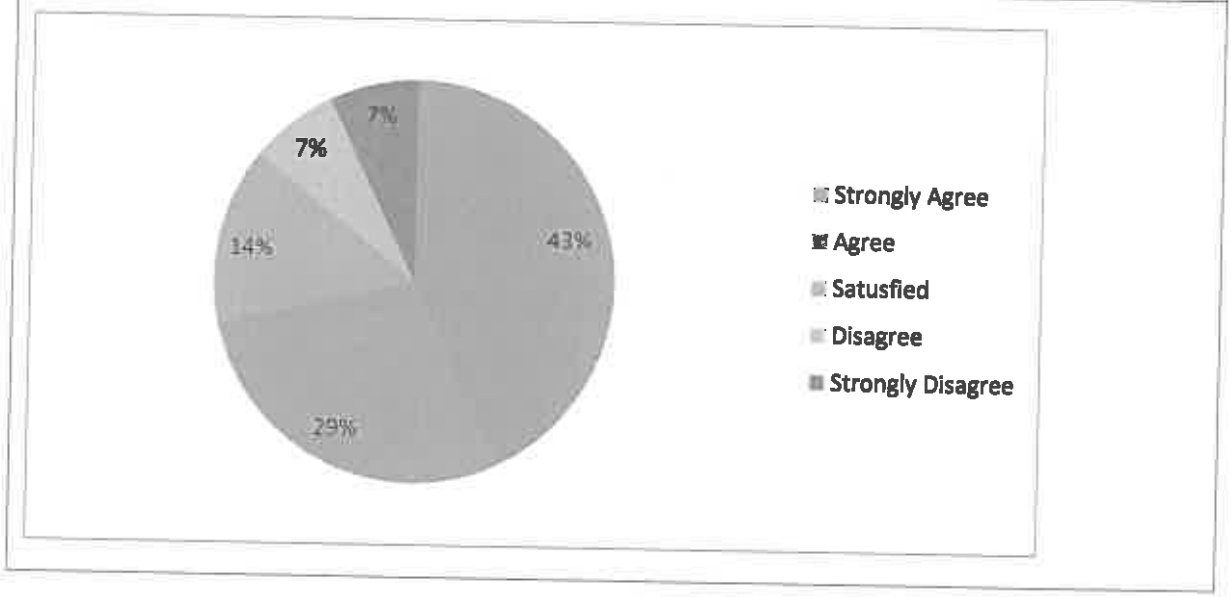
The curriculum assists the students to acquire necessary entry level skills in industrial sector.	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	50.0	28.6	7.1	7.1	7.1



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Q.2 The curriculum offers adequate scope for life-long learning and higher-level aptitude for new technology/tools.

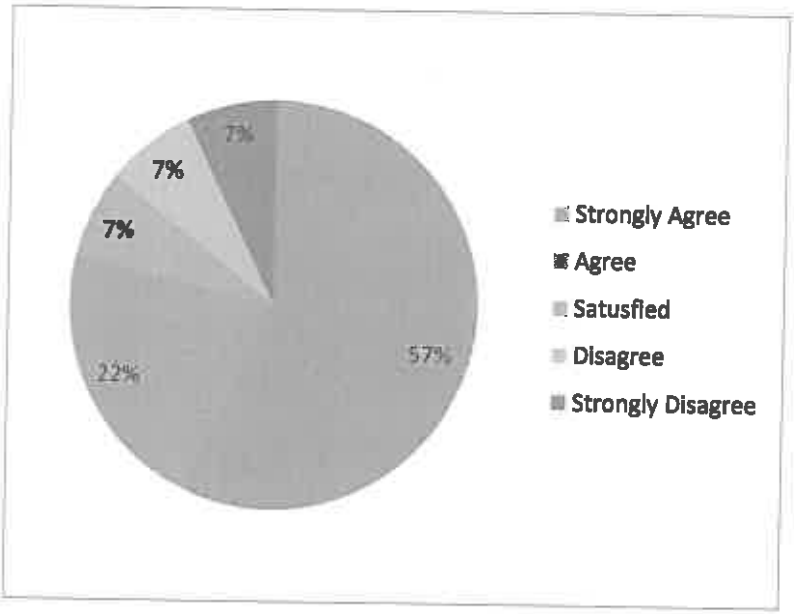
The curriculum offers adequate scope for life-long learning and higher-level aptitude for new technology/tools.	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	42.86	28.57	14.29	7.14	7.14



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Q.3 The curriculum has adequate scope for multidisciplinary knowledge and sufficient number of elective courses.

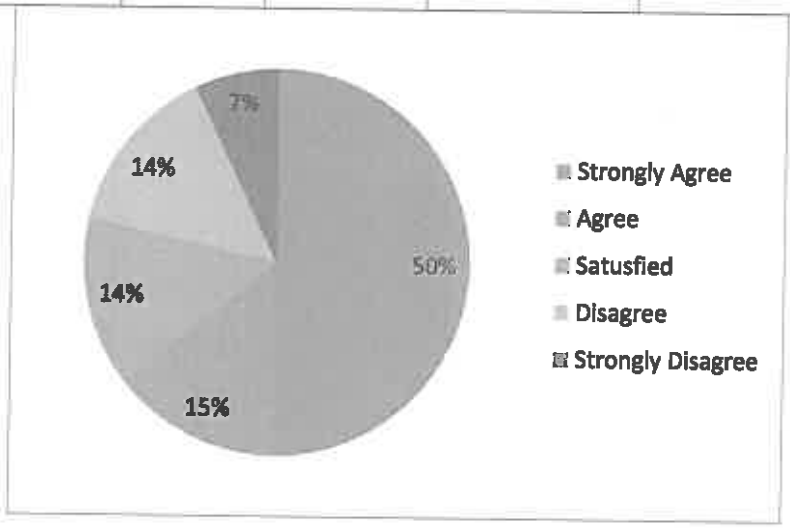
The curriculum has adequate scope for multidisciplinary knowledge and sufficient number of elective courses.	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	57.14	21.43	7.14	7.14	7.14



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Q.4 The curriculum has relevant content to assist students to work independently as well in a team with high level of adaptability.

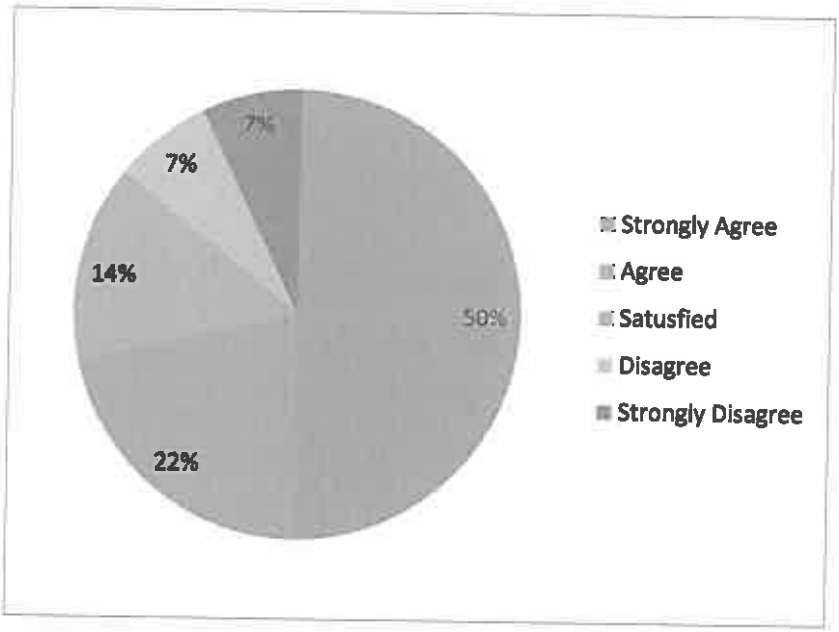
The curriculum has relevant content to assist students to work independently as well in a team with high level of adaptability	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	50.00	14.29	14.29	14.29	7.14



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Q.5 The curriculum provides enough scope for improving entrepreneurial skill as well as industry readiness.

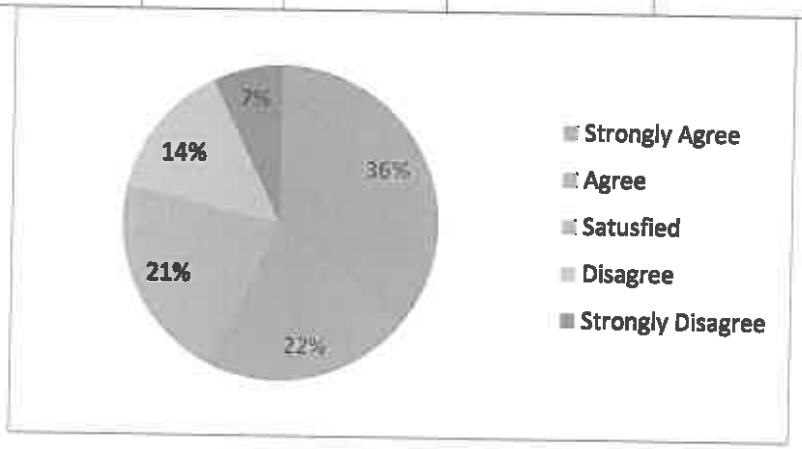
The curriculum provides enough scope for improving entrepreneurial skill as well as industry readiness.	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	50.00	21.43	14.29	7.14	7.14



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Q.6 The curriculum provides ample knowledge for increased employability and to promote students for higher education.

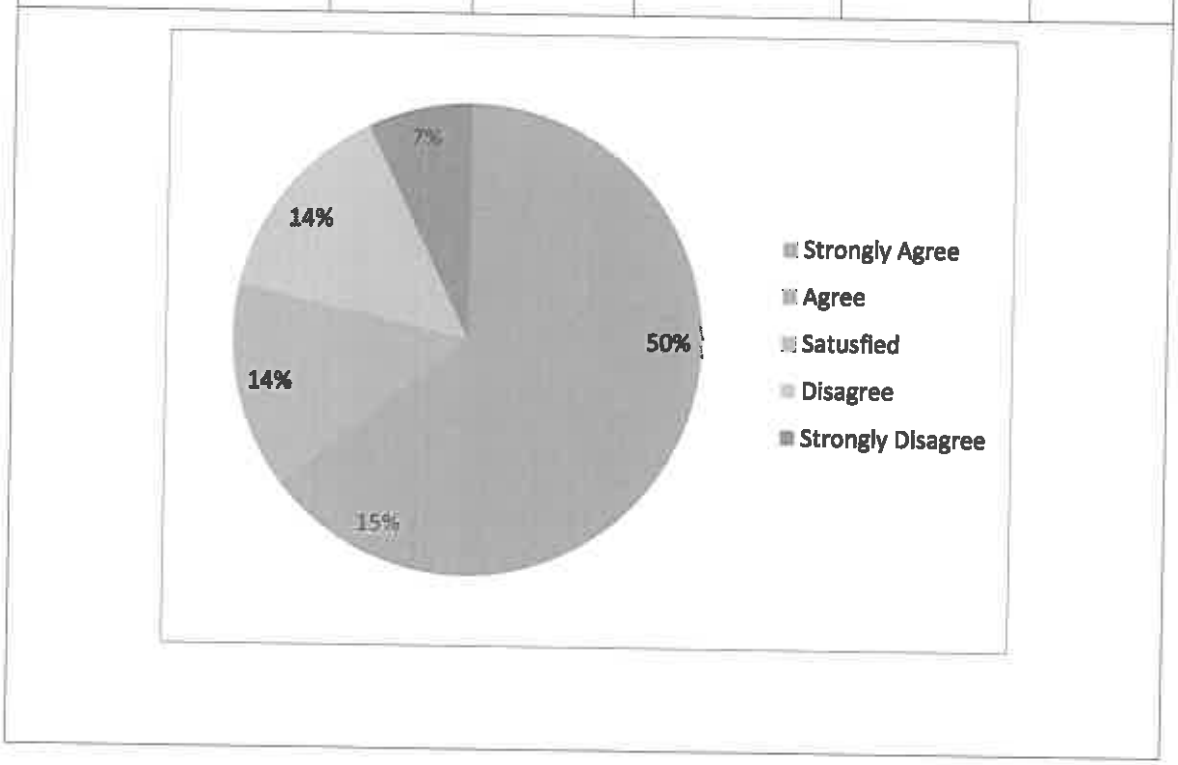
The curriculum provides ample knowledge for increased employability and to promote students for higher education.	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	35.71	21.43	21.43	14.29	7.14



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Q.7 The curriculum has focus on personality development by presence of courses on human values and professional ethics.

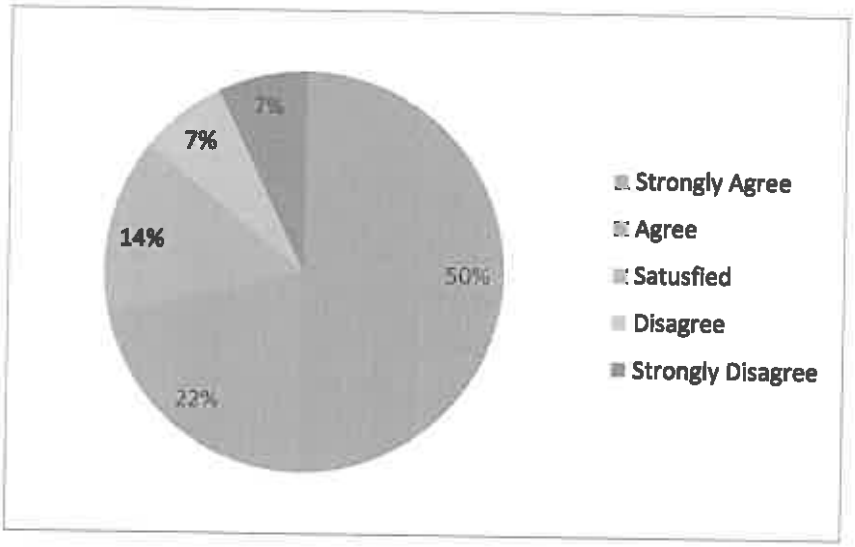
The curriculum has focus on personality development by presence of courses on human values and professional ethics	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	50.00	14.29	14.29	14.29	7.14



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Q.8 The curriculum is well organized and balanced for the programme with proper credit allocation.

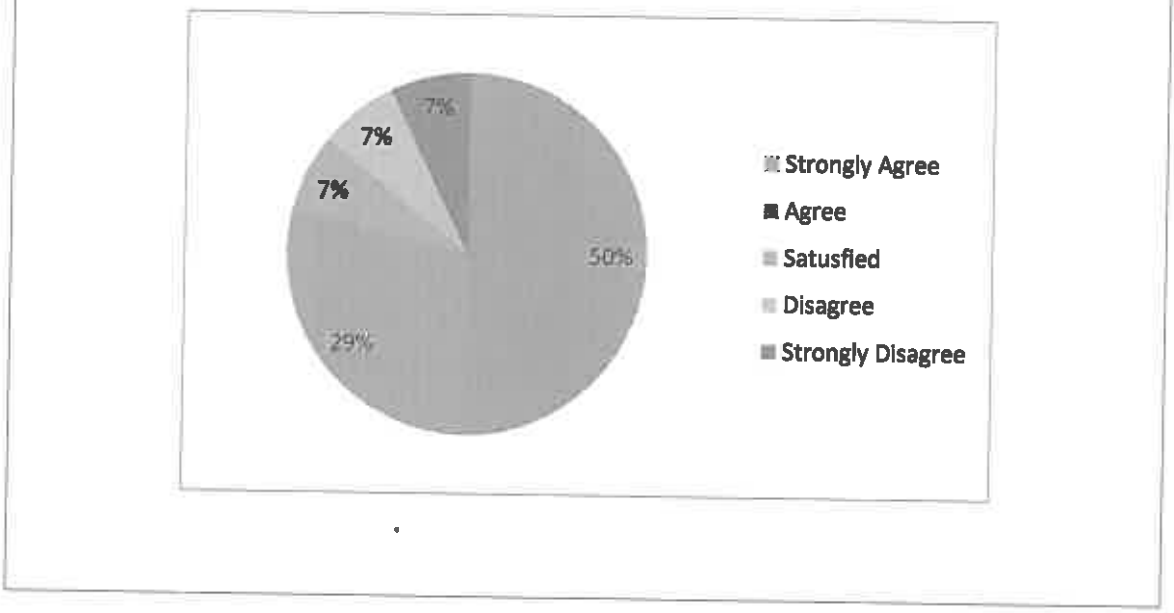
The curriculum is well organized and balanced for the programme with proper credit allocation.	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	50.0	21.4	14.3	7.1	7.1



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Q.9 The courses have adequate balance between theory and application for a student's holistic development.

The courses have adequate balance between theory and application for student's holistic development	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	50.0	28.6	7.1	7.1	7.1



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School of Engineering & Technology (14)						
Total no. of Employer: 14		Strongly Agree	Agree	Satisfied	Disagree	Strongly Disagree
The curriculum assists the students to acquire necessary entry level skills in industrial sector.	No. of Academicians	7	4	1	1	1
	Percentage	50.00	28.57	7.14	7.14	7.14
The curriculum offers adequate scope for life-long learning and higher-level aptitude for new technology/tools.	No. of Academicians	6	4	2	1	1
	Percentage	42.86	28.57	14.29	7.14	7.14
The curriculum has adequate scope for multidisciplinary knowledge and sufficient number of elective courses.	No. of Academicians	8	3	1	1	1
	Percentage	57.14	21.43	7.14	7.14	7.14
The curriculum has relevant content to assist students to work independently as well in a team with high level of adaptability	No. of Academicians	7	2	2	2	1
	Percentage	50.00	14.29	14.29	14.29	7.14
The curriculum provides enough scope for improving entrepreneurial skill as well as industry readiness.	No. of Academicians	7	3	2	1	1
	Percentage	50.00	21.43	14.29	7.14	7.14
The curriculum provides ample knowledge for increased employability and to promote students	No. of Academicians	5	3	3	2	1
	Percentage	35.71	21.43	21.43	14.29	7.14

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for higher education.						
The curriculum has focus on personality development by presence of courses on human values and professional ethics	No. of Academicians	7	2	2	2	1
	Percentage	50.00	14.29	14.29	14.29	7.14
The curriculum is well organized and balanced for the programme with proper credit allocation.	No. of Academicians	7	3	2	1	1
	Percentage	50.00	21.43	14.29	7.14	7.14
The courses have adequate balance between theory and application for student's holistic development	No. of Academicians	7	4	1	1	1
	Percentage	50.00	28.57	7.14	7.14	7.14

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Analysis of Feedback:

Based on the employers' feedback, the curriculum demonstrates a strong alignment with industry needs, particularly in preparing students with essential entry-level skills, evident from the consistent **80%** satisfaction in most areas. Employers acknowledge the curriculum's effectiveness in fostering multidisciplinary knowledge, promoting higher education, and enhancing employability. Additionally, the structure and organization of the curriculum, along with its emphasis on theoretical and practical balance, are well-received. However, slightly lower ratings of **70%** were given for the curriculum's capacity to support life-long learning, adoption of new technologies/tools, and entrepreneurship development, indicating areas for improvement. Overall, the feedback reflects a solid curriculum foundation with good industry relevance, while highlighting opportunities to strengthen aspects related to innovation and future readiness.

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Action Taken Report

(School of Engineering and Technology)

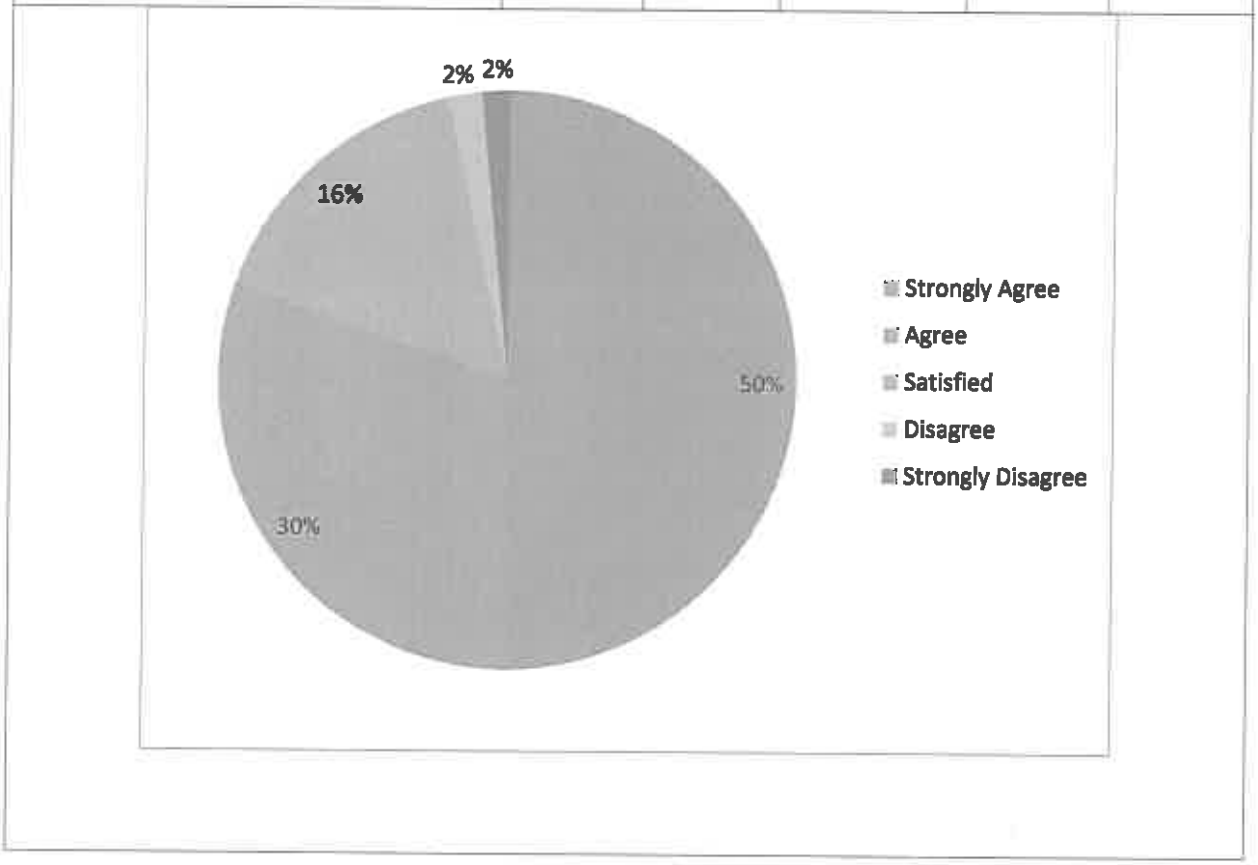
Sr. No.	Suggestions	Action Taken	Outcome
1.	Strengthen the integration of life-long learning by introducing continuous professional development modules.	Introduced specialized workshops and certifications on emerging technologies like AI, machine learning, and renewable energy.	Students and graduates now have access to ongoing learning opportunities, enhancing their skills and staying up-to-date with industry trends.
2.	Enhance the adoption of new technologies and tools by updating course content and providing hands-on training.	Updated curriculum to include more practical sessions using current technologies, such as IoT (Internet of Things), robotics, and advanced CAD software.	Students developed proficiency in the latest tools and technologies, making them better prepared for the rapidly evolving engineering and tech sectors.
3.	Improve entrepreneurial skill development through focused initiatives that bridge engineering with business.	Launched an entrepreneurial track offering courses on startup management, engineering product design, and market analysis.	Students gained insight into the entrepreneurial process, with several pursuing tech-based startups and innovation-driven projects.
4.	Increase collaboration with industries for real-world exposure and practical training in specialized fields.	Established partnerships with leading tech companies for internships, joint research, and industry-led projects.	Students gained hands-on experience and industry-relevant skills, increasing their employability and readiness for industry roles.

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Analysis of Students' Feedback of School of Engineering and Technology through Table and Pie Chart

Q.1. Whether the curriculum has depth of the subjects and clears the concept?

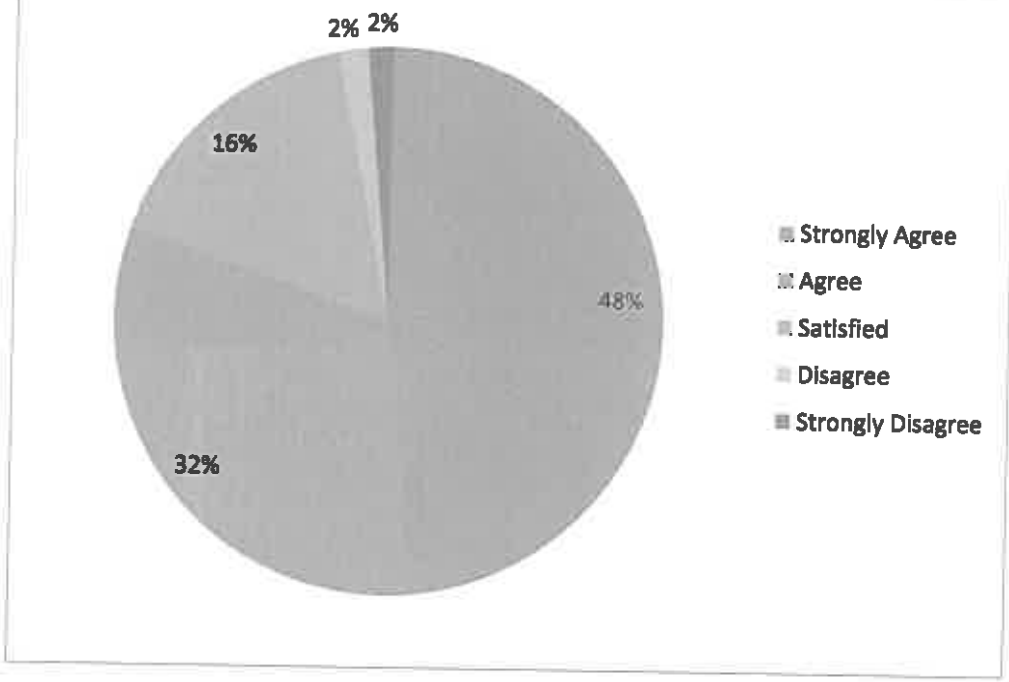
Curriculum has depth of the subjects and clears the concept	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	50	30.32258	16.12903	1.935484	1.612903



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Q.2. How do you rate the course outcomes and relevance to the course content?

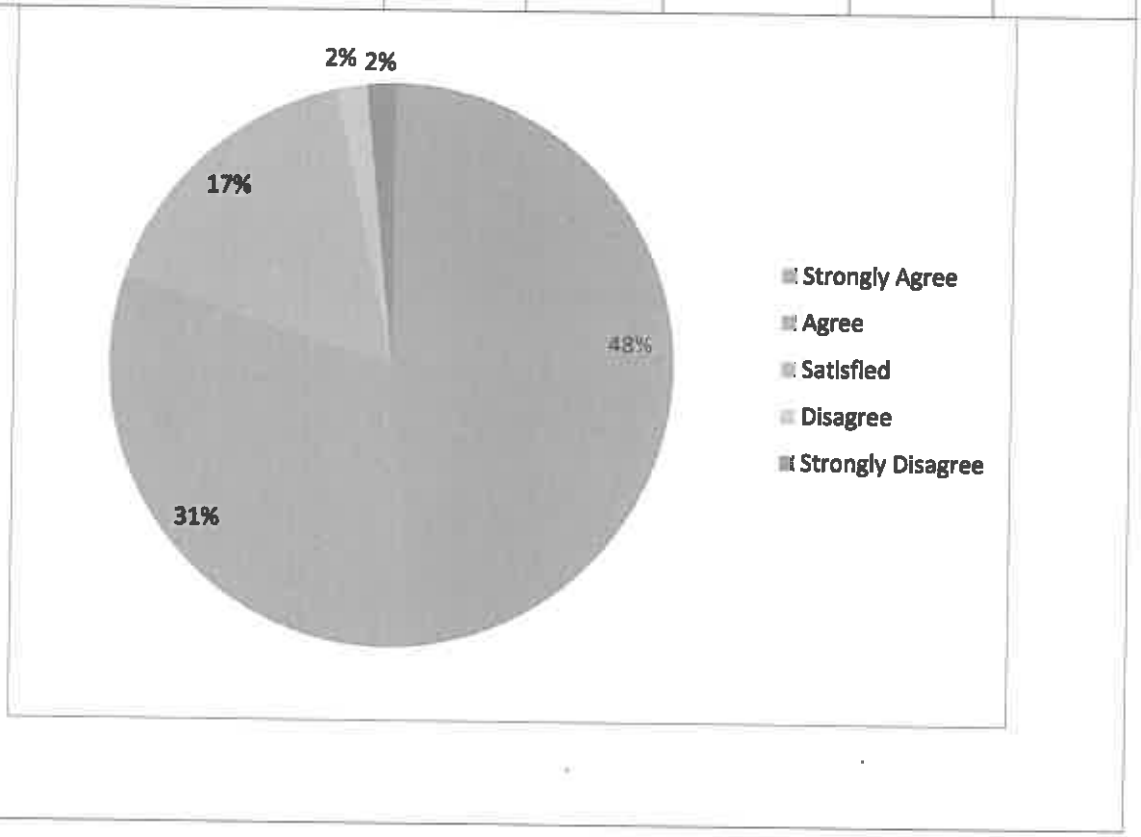
Rate the course outcomes and relevance to the course content	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	48.3871	32.09677	16.29032	1.774194	1.451613



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Q.3. How do you rate the sequence of units in the courses?

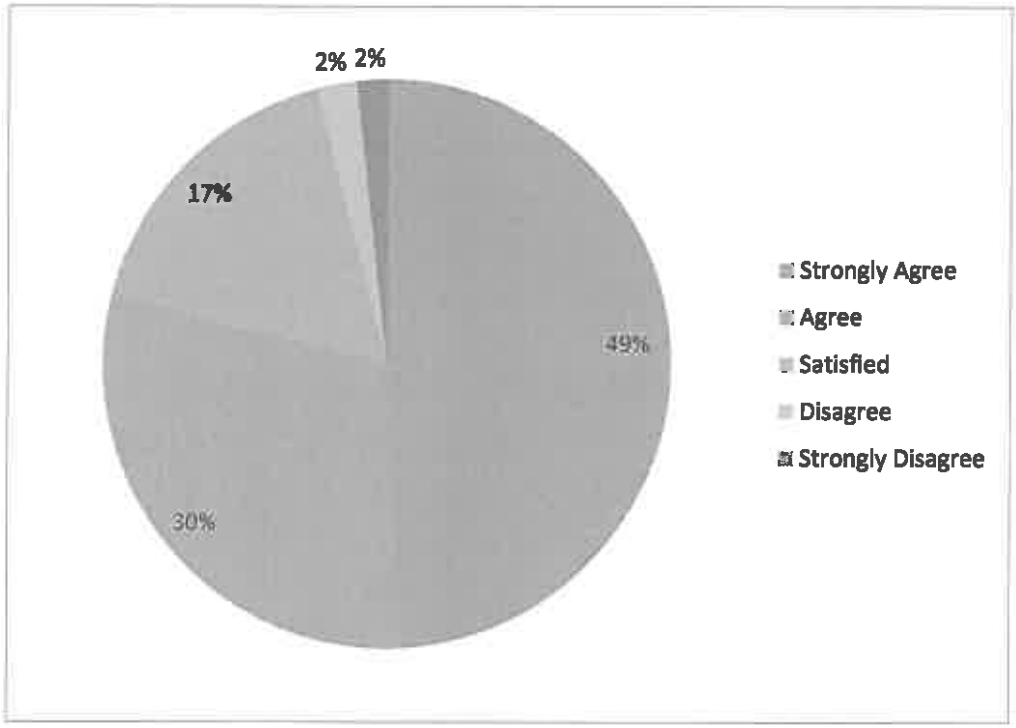
Rate the sequence of units in the courses	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	48.54839	31.45161	16.6129	1.774194	1.612903



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Q.4. How do you rate the credits allotted to individual courses?

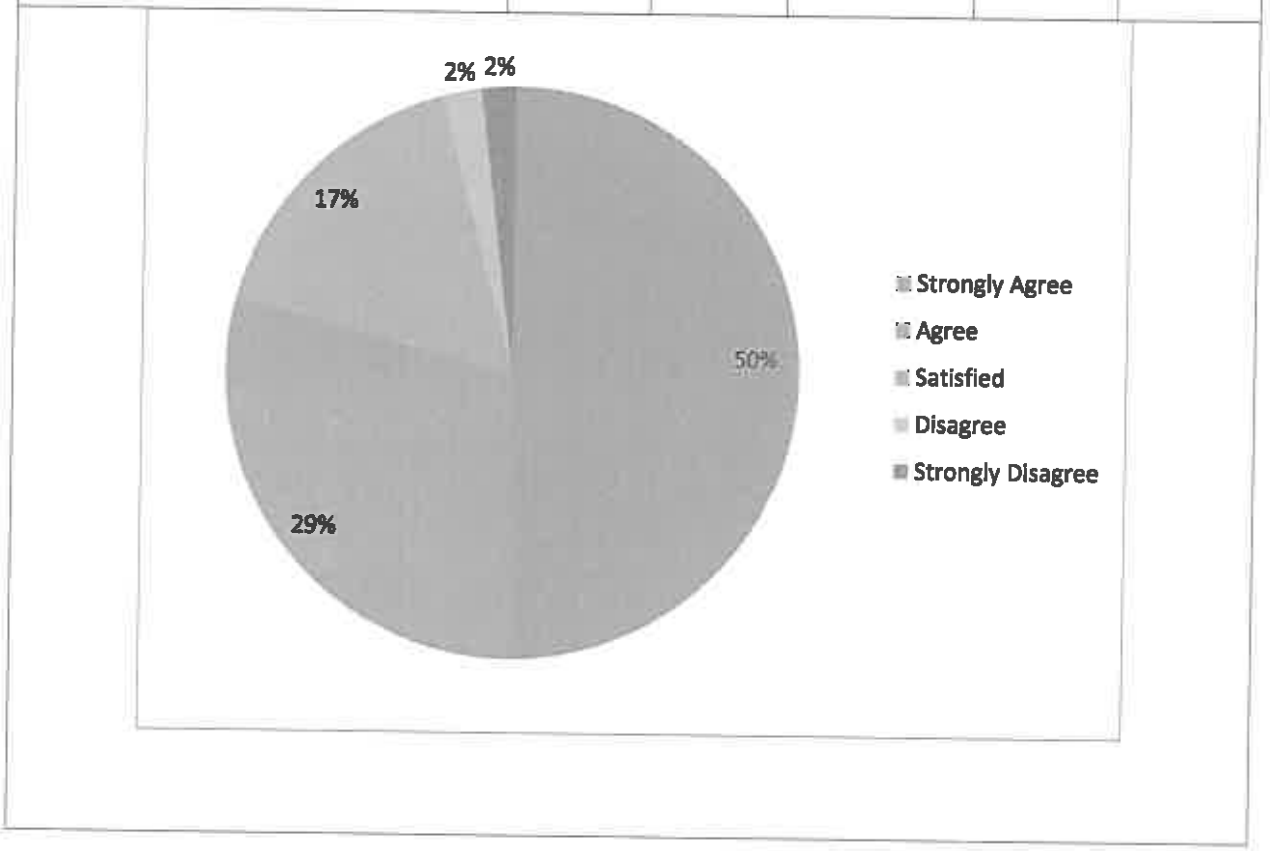
Rate the credits allotted to individual courses	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	49.03226	29.83871	17.09677	2.258065	1.774194



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Q.5. Does the curriculum focus on employability/career orientation?

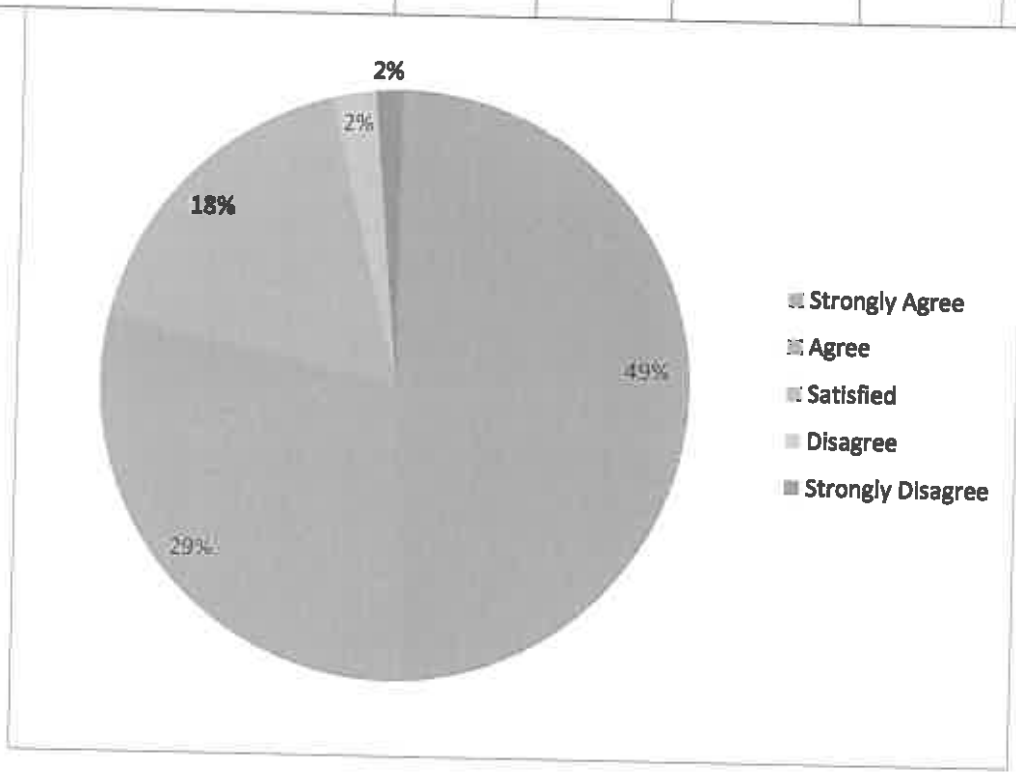
Curriculum focus on employability/career orientation	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	49.67742	29.35484	16.77419	2.258065	1.935484



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Q.6. Does the curriculum focus on skill development/entrepreneurship?

Curriculum focus on skill development/entrepreneurship	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	49.19355	29.35484	17.58065	2.419355	1.451613

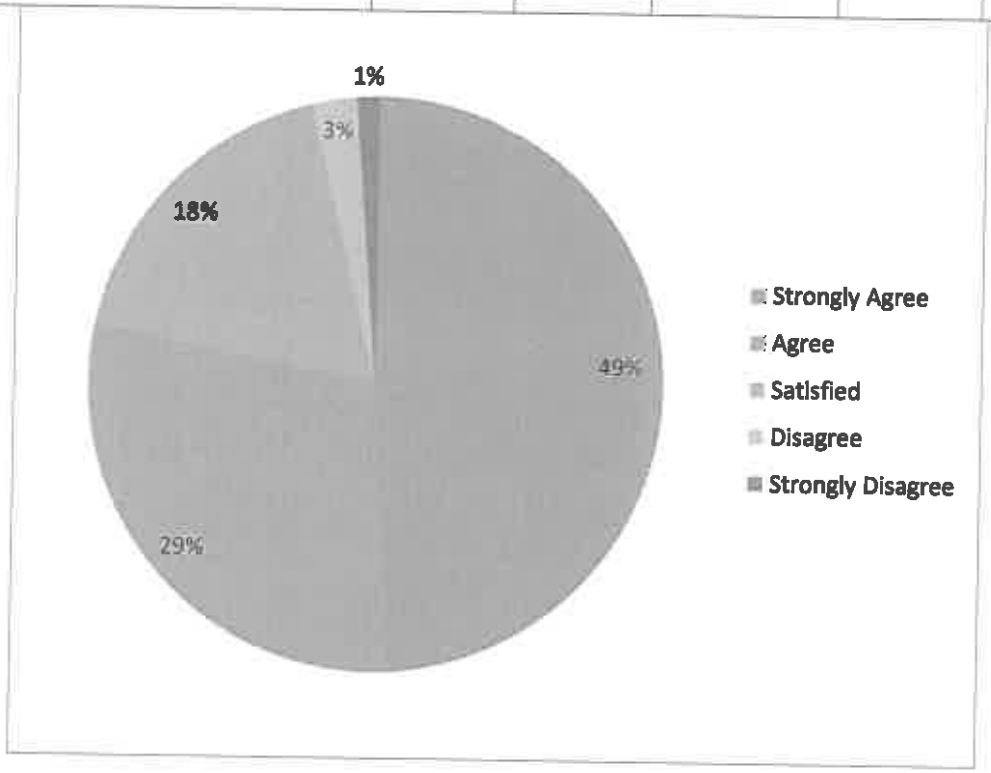


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Q.7. Does the curriculum have satisfactory number of elective courses?

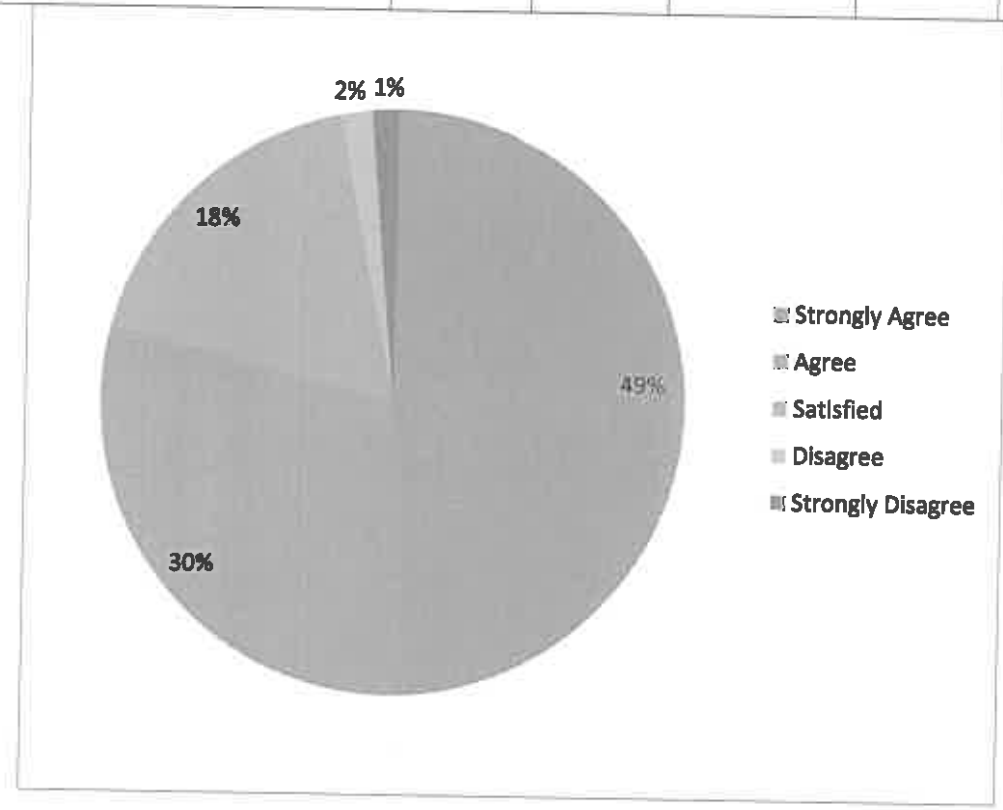
Curriculum have satisfactory number of elective courses	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	49.03226	29.19355	17.90323	2.580645	1.290323



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Q.8. Does the curriculum focus on life skill or help in value addition?

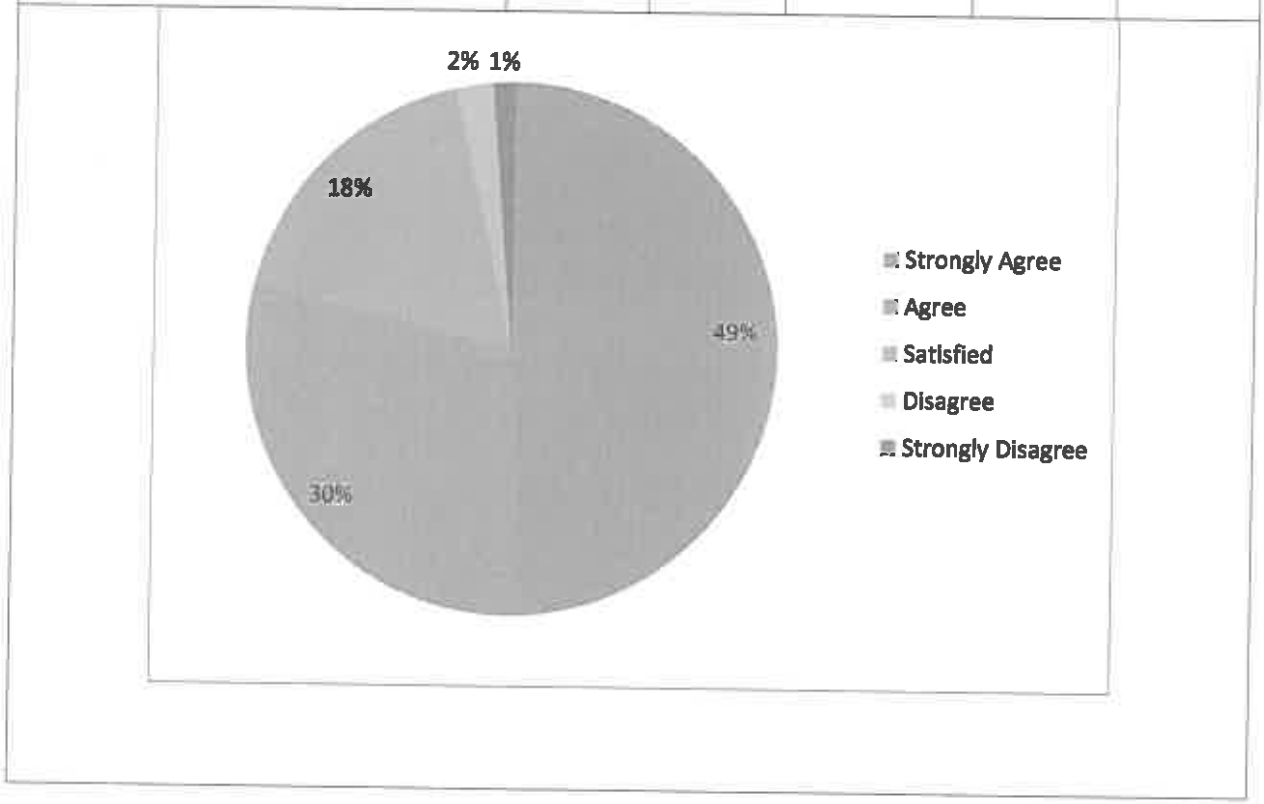
Curriculum focus on life skill or help in value addition	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	48.87097	30.16129	17.74194	1.774194	1.451613



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Q.9. Do the theory subjects are properly linked to the laboratories/provide real-life exposure?

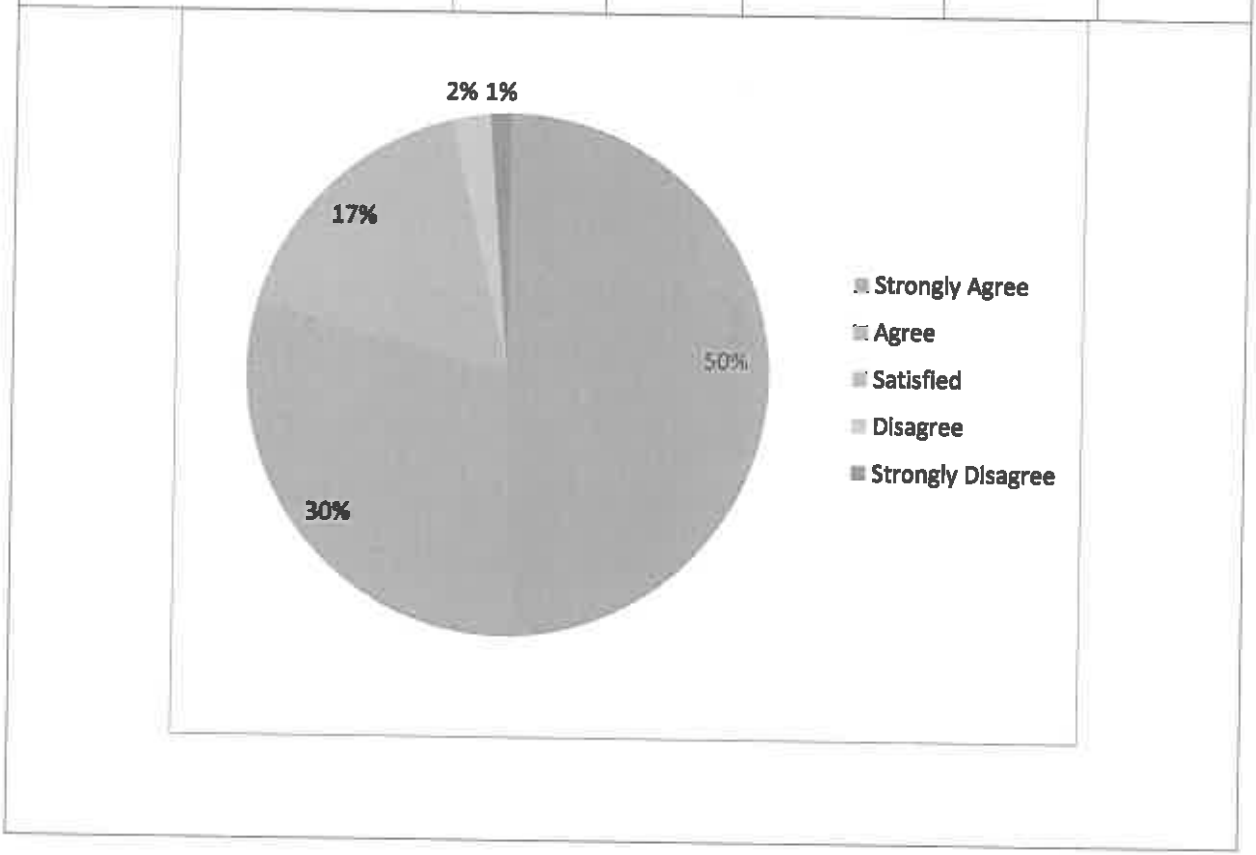
Theory subjects are properly linked to the laboratories/provide real-life exposure	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	49.03226	29.67742	17.74194	2.258065	1.290323



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Q.10. Does the curriculum provide multidisciplinary knowledge/information to a student?

Curriculum provide multidisciplinary knowledge/information to a student	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	49.51613	29.83871	16.93548	2.419355	1.290323



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School of Engineering & Technology (620)						
Question	**Details**	**Strongly Agree**	**Agree**	**Satisfactory**	**Disagree**	**Strongly Disagree**
Whether the curriculum has depth of the subjects and clears the concept?	No of Students	310	188	100	12	10
	Percentage	50	30.32258	16.12903	1.935484	1.612903
How do you rate the course outcomes and relevance to the course content?	No of Students	300	199	101	11	9
	Percentage	48.3871	32.09677	16.29032	1.774194	1.451613
How do you rate the sequence of units in the courses?	No of Students	301	195	103	11	10
	Percentage	48.54839	31.45161	16.6129	1.774194	1.612903
How do you rate the credits allotted to individual courses?	No of Students	304	185	106	14	11
	Percentage	49.03226	29.83871	17.09677	2.258065	1.774194
Does the curriculum focus on employability/career orientation?	No of Students	308	182	104	14	12
	Percentage	49.67742	29.35484	16.77419	2.258065	1.935484
Does the curriculum focus on skill development/entrepreneurship?	No of Students	305	182	109	15	9
	Percentage	49.19355	29.35484	17.58065	2.419355	1.451613
Does the curriculum have satisfactory number of elective courses?	No of Students	304	181	111	16	8
	Percentage	49.03226	29.19355	17.90323	2.580645	1.290323
Does the curriculum focus on life skill or help in value addition?	No of Students	303	187	110	11	9
	Percentage	48.87097	30.16129	17.74194	1.774194	1.451613
Do the theory subjects are properly linked to the laboratories/provide real-life exposure?	No of Students	304	184	110	14	8
	Percentage	49.03226	29.67742	17.74194	2.258065	1.290323
Does the curriculum provide multidisciplinary knowledge information to a student?	No of Students	307	185	105	15	8
	Percentage	49.51613	29.83871	16.93548	2.419355	1.290323

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Analysis of Feedback:

Based on the feedback from 620 students of the School of Engineering & Technology, the curriculum is generally well-received, with a significant majority expressing positive responses across various parameters. Half of the students *strongly agree* that the curriculum has adequate depth and helps in concept clarification (50%), and 48.4% believe the course outcomes are relevant to the course content. The sequence of units in the courses is considered logical by 48.5% of the students, while 49% find the credit allocation appropriate. A considerable portion of students appreciates the curriculum's focus on employability and career orientation (49.7%) as well as on skill development and entrepreneurship (49.2%). Around 49% of the students agree that the curriculum provides a satisfactory number of electives and focuses on life skills and value addition (48.9%). The linkage between theory and lab work is acknowledged by 49%, and 49.5% of the students recognize the curriculum's effort in providing multidisciplinary knowledge. While the feedback indicates overall satisfaction, with most students rating the aspects as either "strongly agree" or "agree," there is still scope to enhance practical integration, soft skill development, and innovation-oriented learning, to ensure an even more impactful academic experience.

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Action Taken Report

(School of Engineering and Technology)

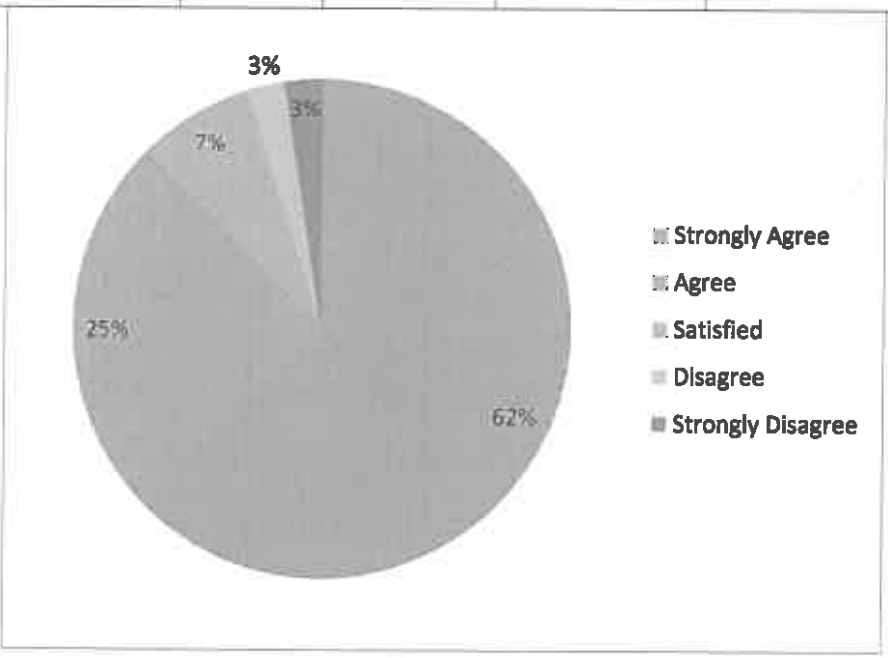
Sr. No.	Suggestions	Action Taken	Outcome
1	Strengthen conceptual depth with clearer subject foundations	Curriculum revised to include more foundational modules and concept-based tutorials	Improved clarity in technical subjects and stronger academic performance
2	Increase alignment between course outcomes and content delivery	Regular curriculum audits and faculty workshops to align teaching methods with defined outcomes	More consistent learning outcomes and better student comprehension
3	Enhance focus on employability and industry-readiness	Career development programs, mock interviews, and increased internship tie-ups with industry	Improved placement rates and student confidence in job interviews
4	Expand practical exposure through labs and real-world projects	Introduction of industry-linked capstone projects and lab enhancements in core subjects	Better real-life application of theoretical knowledge and increased student engagement

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Analysis of Teacher's Feedback of School of Engineering and Technology through Table and Pie Chart

Q.1 The curriculum is well organized and balanced for the programme with proper credit allocation.

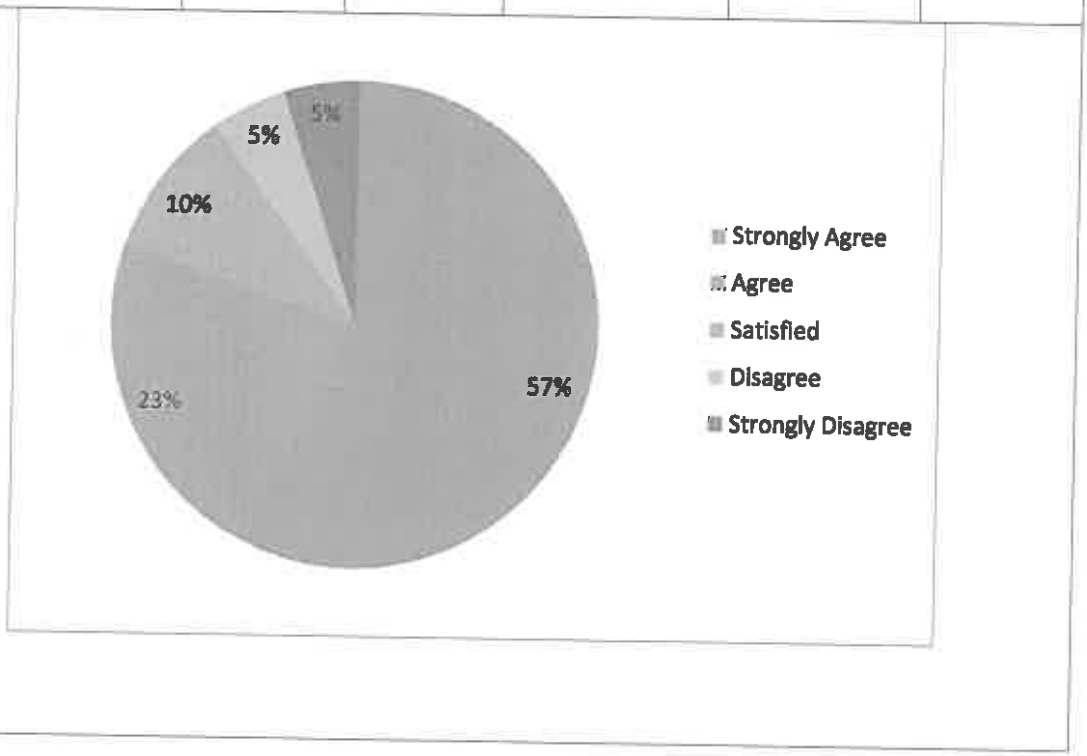
The curriculum is well organized and balanced for the programme with proper credit allocation	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	62.5	25	7.5	2.5	2.5



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Q.2 The courses have adequate balance between theory and application for student's holistic development.

The courses have adequate balance between theory and application for student's holistic development.	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	57.5	22.5	10	5	5

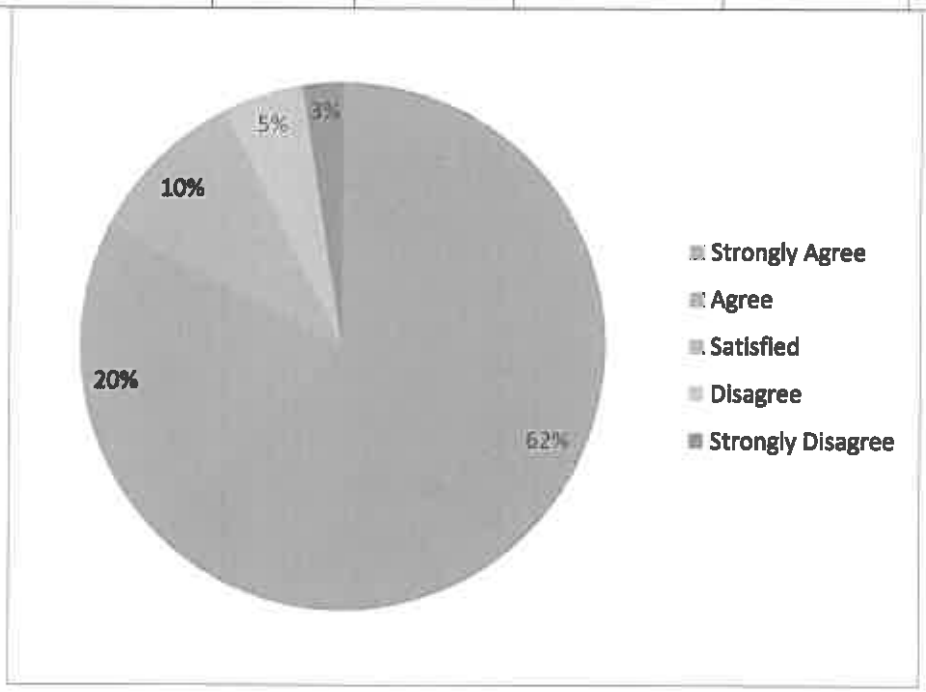


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Q.3 The curriculum has adequate scope for multidisciplinary knowledge and sufficient number of elective courses.

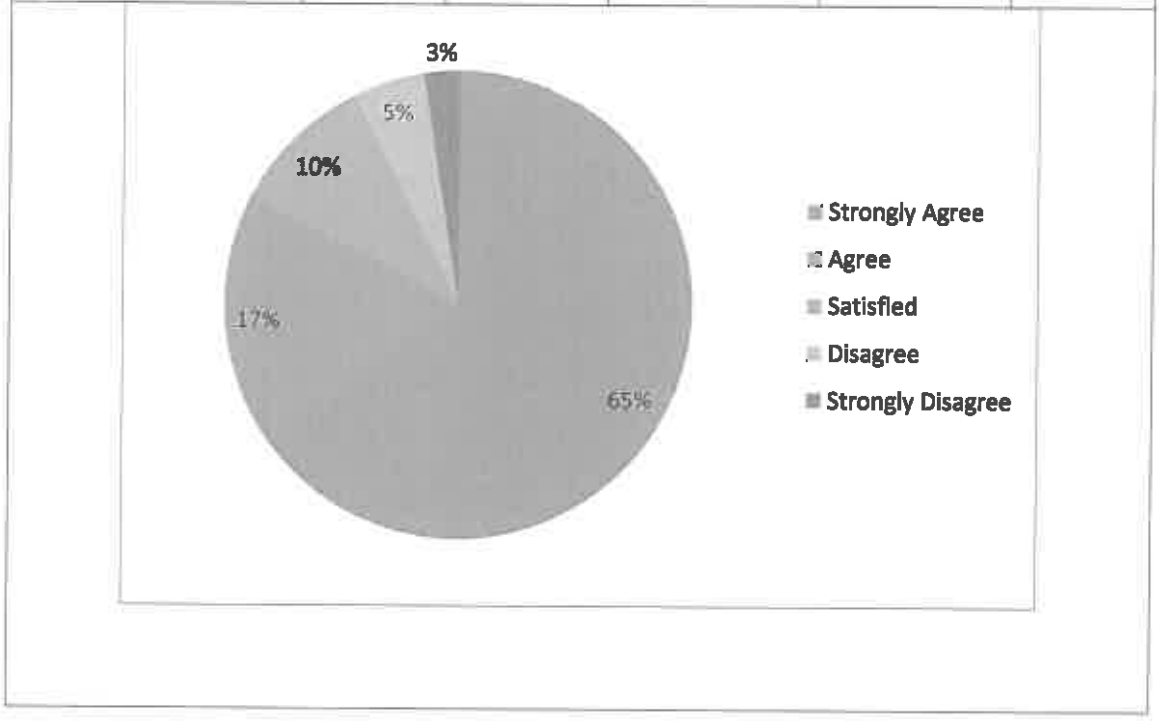
The curriculum has adequate scope for multidisciplinary knowledge and sufficient number of elective courses.	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	62.5	20	10	5	2.5



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Q.4 The curriculum has focus on personality development by presence of courses on human values and professional ethics

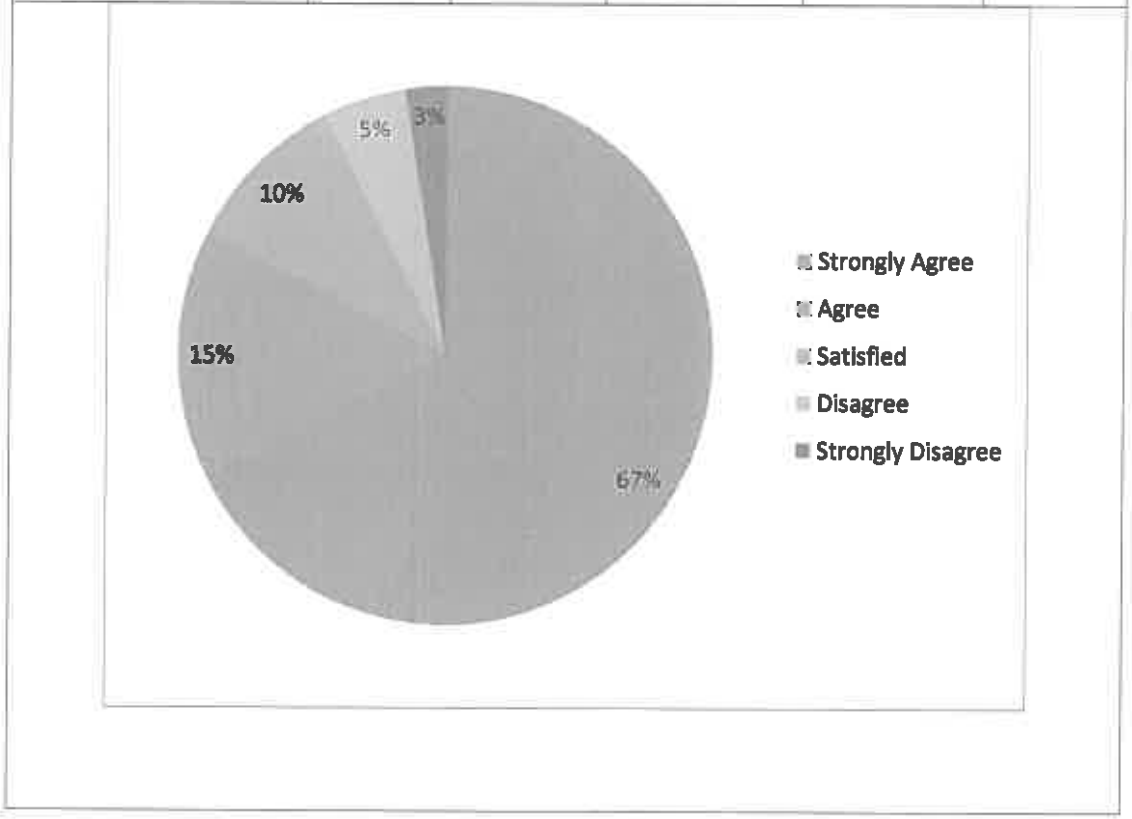
The curriculum has focus on personality development by presence of courses on human values and professional ethics.	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	65	17.5	10	5	2.5



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Q.5 The curriculum provides enough scope for improving entrepreneurial skill as well as industry readiness.

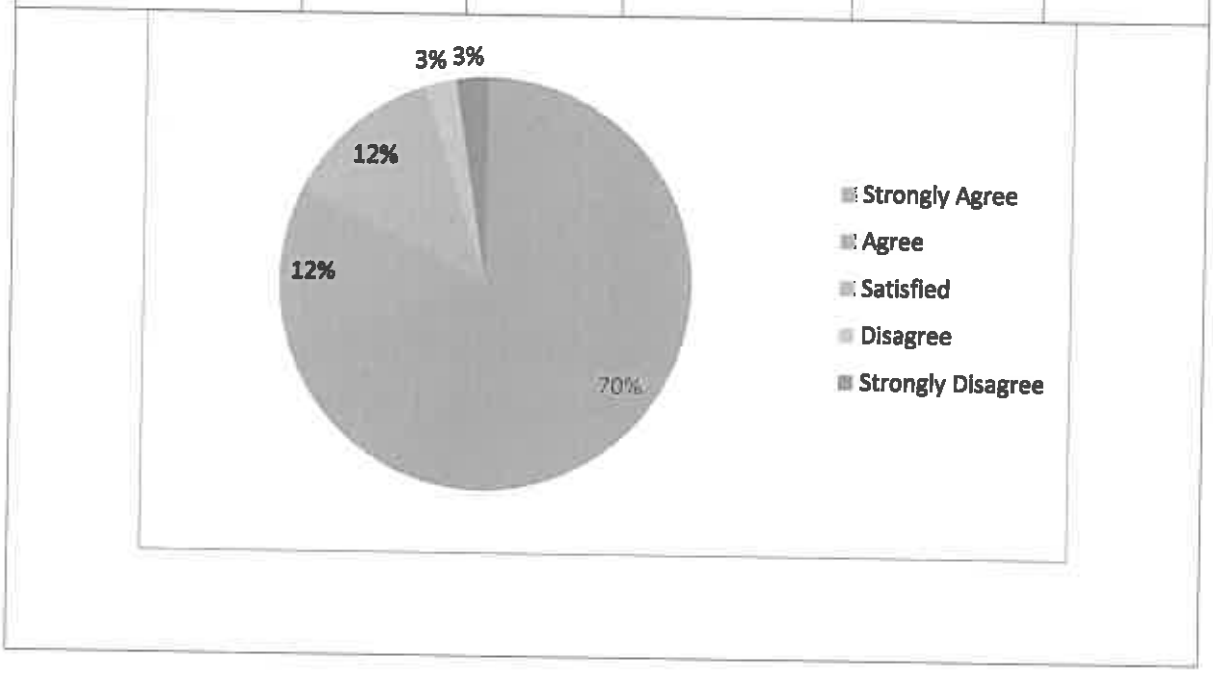
The curriculum provides enough scope for improving entrepreneurial skill as well as industry readiness.	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	67.5	15	10	5	2.5



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Q.6 The curriculum provides ample knowledge for increased employability and to promote students for higher education.

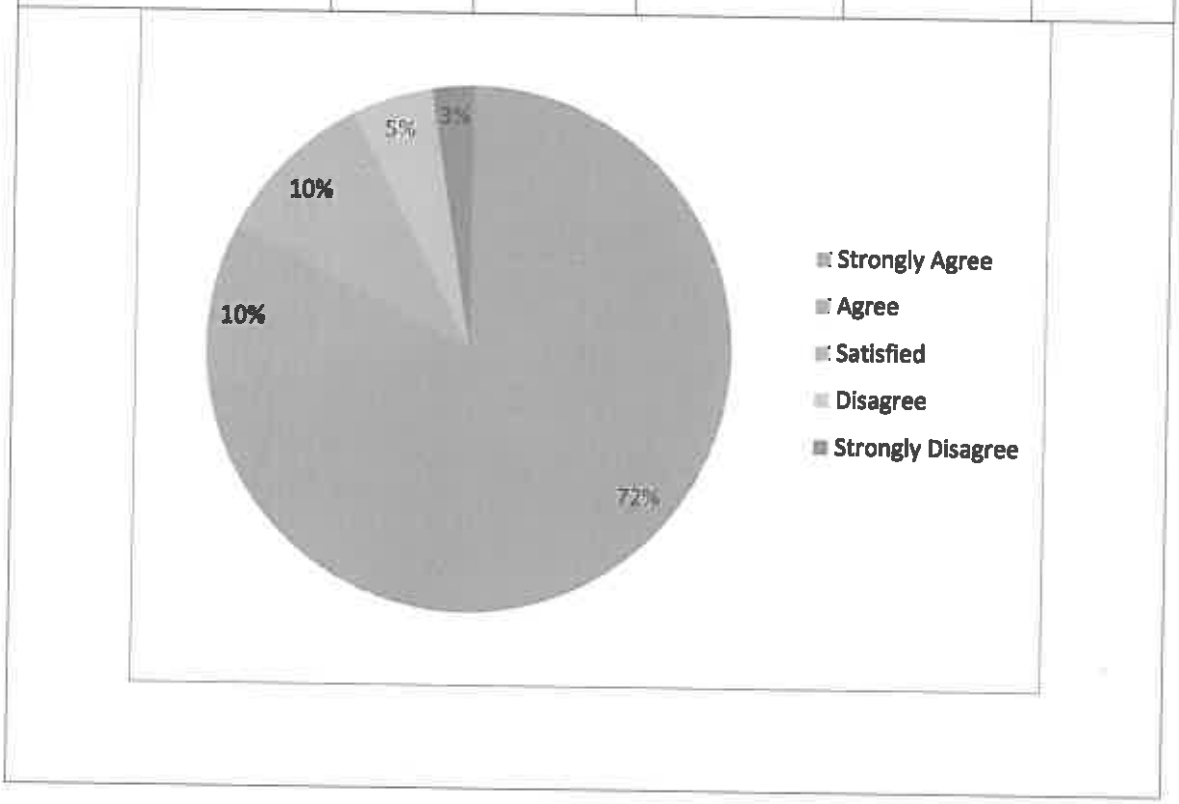
The curriculum provides ample knowledge for increased employability and to promote students for higher education.	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	70	12.5	12.5	2.5	2.5



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Q.7 The curriculum helps in enhancing problem solving capability related to local/global societal issues.

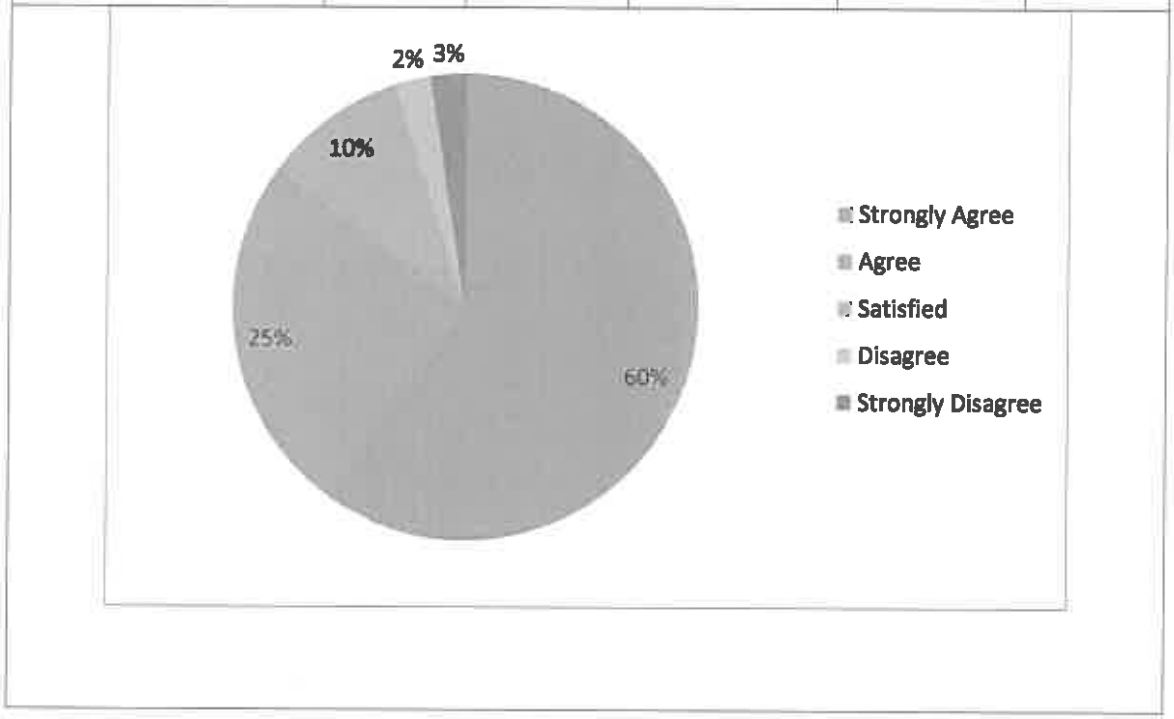
The curriculum helps in enhancing problem solving capability related to local/global societal issues.	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	72.5	10	10	5	2.5



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Q.8 Adequate freedom is given to offer opinion on design & development of curriculum.

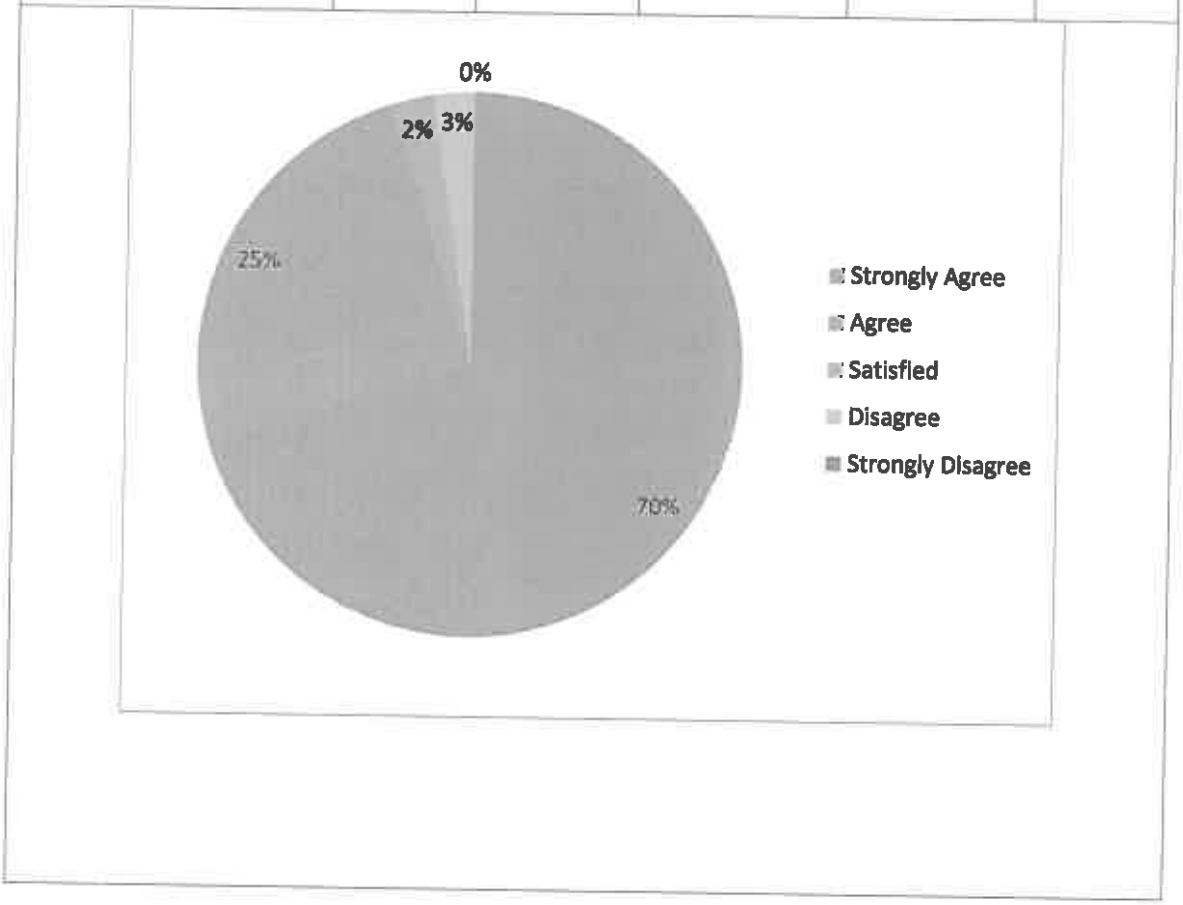
Adequate freedom is given to offer opinion on design & development of curriculum.	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	60	25	10	2.5	2.5



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Q.9 The existing system for curriculum revision is found to be effective.

The existing system for curriculum revision is found to be effective.	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	70	25	2.5	2.5	0



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School of Engineering and Technology(40)

Total no. of Teachers : 40		Strongly Agree	Agree	Satisfied	Disagree	Strongly Disagree
The curriculum is well organized and balanced for the programme with proper credit allocation.	No. of Teachers	25	10	3	1	1
	Percentage	62.5	25	7.5	2.5	2.5
The courses have adequate balance between theory and application for student's holistic development.	No. of Teachers	23	9	4	2	2
	Percentage	57.5	22.5	10	5	5
The curriculum has adequate scope for multidisciplinary knowledge and sufficient number of elective courses.	No. of Teachers	25	8	4	2	1
	Percentage	62.5	20	10	5	2.5
The curriculum has focus on personality development by presence of courses on human values and professional ethics	No. of Teachers	26	7	4	2	1
	Percentage	65	17.5	10	5	2.5
The curriculum provides enough scope for improving entrepreneurial skill as well as industry	No. of Teachers	27	6	4	2	1
	Percentage	67.5	15	10	5	2.5

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readiness.						
The curriculum provides ample knowledge for increased employability and to promote students for higher education.	No. of Teachers	28	5	5	1	1
	Percentage	70	12.5	12.5	2.5	2.5
The curriculum helps in enhancing problem solving capability related to local/global societal issues	No. of Teachers	29	4	4	2	1
	Percentage	72.5	10	10	5	2.5
Adequate freedom is given to offer opinion on design & development of curriculum.	No. of Teachers	24	10	4	1	1
	Percentage	60	25	10	2.5	2.5
The existing system for curriculum revision is found to be effective.	No. of Teachers	28	10	1	1	0
	Percentage	70	25	2.5	2.5	0

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Analysis of Feedback:

The feedback from the 40 teachers at the School of Engineering and Technology reveals a predominantly positive view of the curriculum, with some areas for further enhancement. A significant portion of faculty members (62.5%) strongly agree that the curriculum is well-organized and balanced with proper credit allocation, while 25% agree and 7.5% are satisfied, indicating a high level of satisfaction but also some potential for improvement. Regarding the balance between theory and application, 57.5% of teachers strongly agree, 22.5% agree, and 10% are satisfied, reflecting a solid consensus that the curriculum supports holistic student development, though there is room for refinement in practical learning.

In terms of multidisciplinary knowledge and elective courses, 62.5% of teachers strongly agree that the curriculum provides adequate opportunities, with 20% agreeing and 10% satisfied, signaling broad approval but a potential need for even more interdisciplinary options. The curriculum's focus on personality development, particularly through courses on human values and professional ethics, is highly regarded by 65% of faculty, with 17.5% agreeing and 10% satisfied, suggesting that this aspect of the curriculum is strong but could be further enhanced.

The inclusion of entrepreneurial skills and industry readiness is well-received, with 67.5% of teachers strongly agreeing, 15% agreeing, and 10% satisfied. This indicates that the curriculum is generally effective in fostering these competencies, although more attention may be needed to further develop these areas. Regarding employability and promoting higher education, 70% of teachers strongly agree, 12.5% agree, and 12.5% are satisfied, reflecting strong confidence in the curriculum's effectiveness in this regard.

In terms of problem-solving abilities related to societal issues, 72.5% of teachers strongly agree, 10% agree, and 10% are satisfied, signaling that the curriculum is highly effective in this area. Regarding faculty involvement in curriculum design, 60% of teachers strongly agree that they have adequate freedom to provide input, with 25% agreeing and 10% satisfied. Lastly, the system for curriculum revision is seen as effective by 70% of faculty, with 25% agreeing and only 2.5% dissatisfied, indicating a high level of satisfaction with the revision process. Overall, the feedback is largely positive, though areas such as further expansion of electives and strengthening industry readiness could be areas for further development.

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Babu Vijendra Marg, Adarsh Institutional
Area Gangoh, Distt. Saharanpur (U.P.)
247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

Action Taken Report

(School of Engineering and Technology)

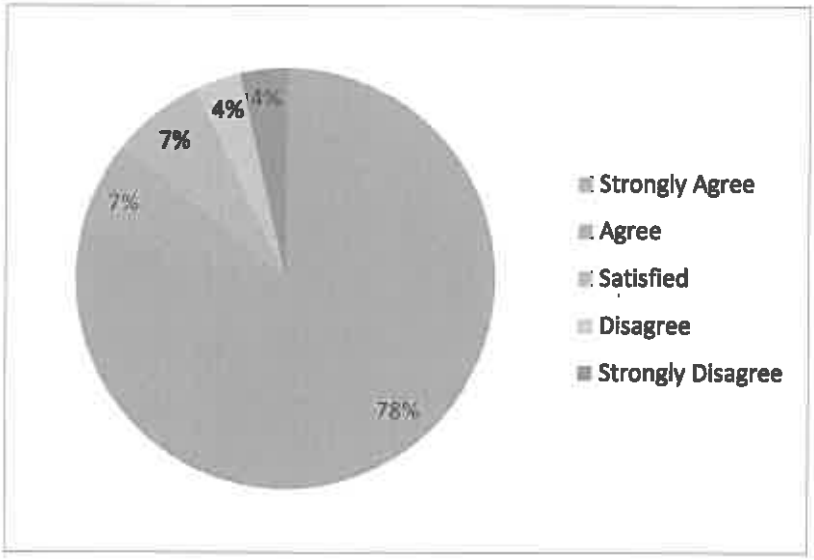
Sr. No.	Suggestions	Action taken	Outcome
1	Expand the range of interdisciplinary electives and options	Introduced new elective courses in emerging fields such as Artificial Intelligence, Robotics, and Sustainability Engineering. Expanded collaborations with other departments to offer cross-disciplinary electives.	Enhanced flexibility and student exposure to a broader range of interdisciplinary topics, allowing students to tailor their learning according to evolving industry needs.
2	Further enhance industry readiness and entrepreneurial skills development	Established partnerships with local industries for internships, projects, and guest lectures. Launched workshops on entrepreneurial skills and innovation.	Improved industry engagement and real-world experience for students, boosting their readiness for both employment and entrepreneurial endeavors.
3	Strengthen focus on practical learning and application of theory	Increased the number of laboratory sessions, practical workshops, and industry collaboration projects. Enhanced the use of real-world case studies in coursework.	More opportunities for hands-on experience and practical application of theoretical knowledge, ensuring students are better equipped for industry challenges.
4	Foster greater faculty involvement in the curriculum design and review process	Instituted regular faculty workshops for feedback on curriculum updates, and created a platform for faculty to propose new course offerings and content revisions.	Greater faculty involvement in shaping the curriculum, ensuring it remains relevant, responsive, and reflective of industry needs and academic advancements.

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Analysis of Peer Academicians' Feedback of School of Engineering and Technology through Table and Pie Chart

Q.1 The syllabus of the courses are proper in relation to the competencies expected out of the programme.

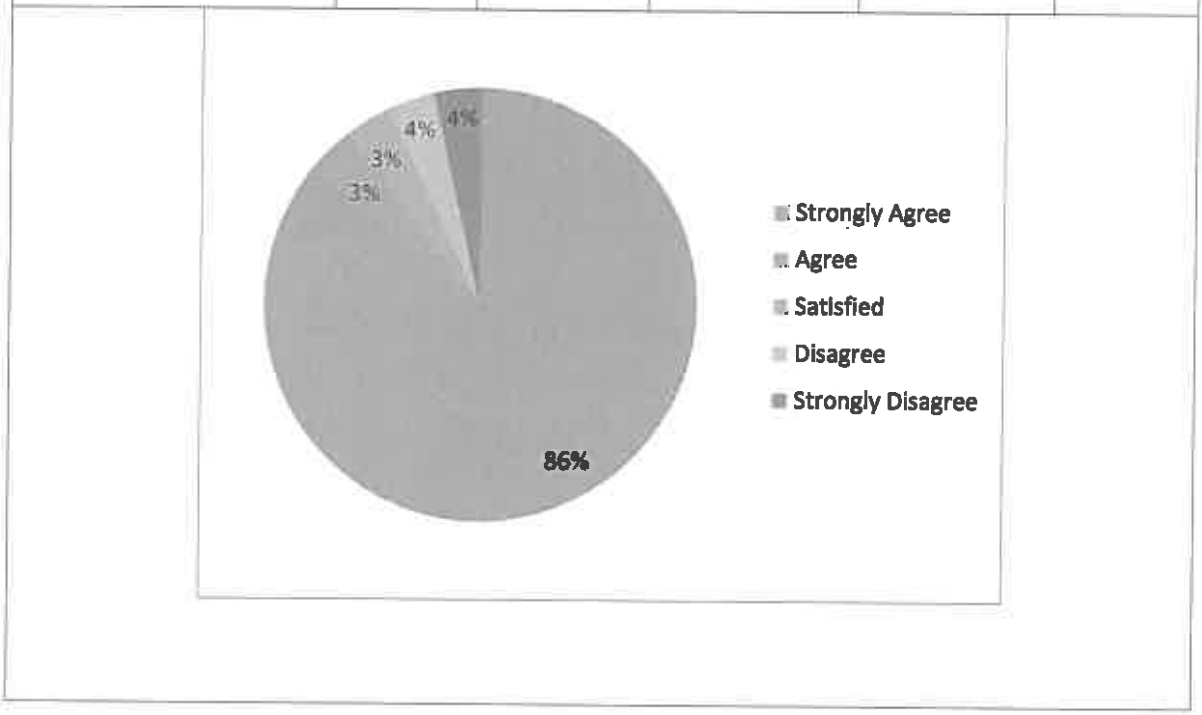
The syllabus of the courses are proper in relation to the competencies expected out of the programme.	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	78.57	7.14	7.14	3.57	3.57



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Q.2 The sequence and overall organization of the courses is proper in the curriculum.

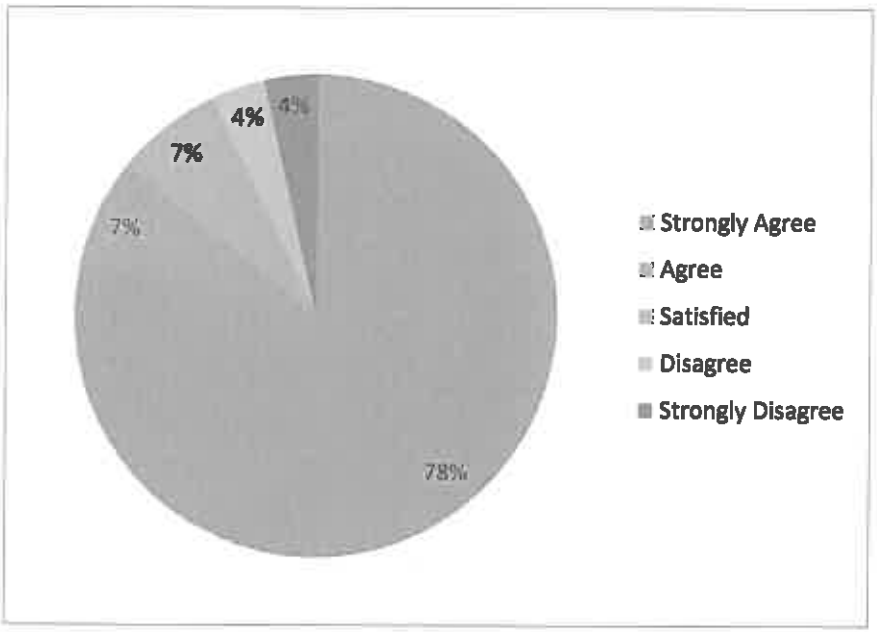
The sequence and overall organization of the courses is proper in the curriculum.	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	85.71	3.57	3.57	3.57	3.57



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Q.3 The curriculum has adequate scope for multidisciplinary knowledge and sufficient number of elective courses.

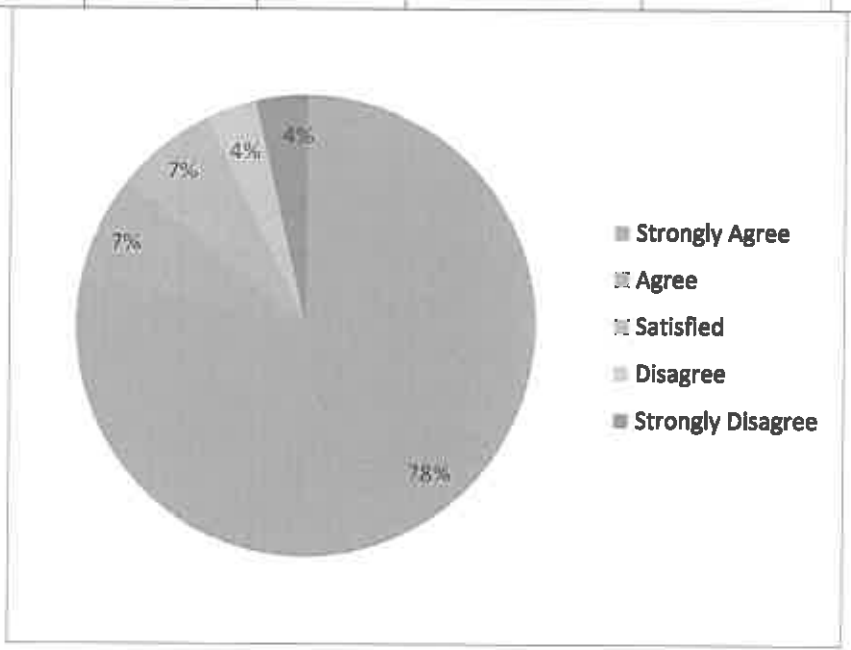
The curriculum has adequate scope for multidisciplinary knowledge and sufficient number of elective courses.	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	78.57	7.14	7.14	3.57	3.57



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Q.4 Extra care has been taken for extra learning or self-learning while designing the courses.

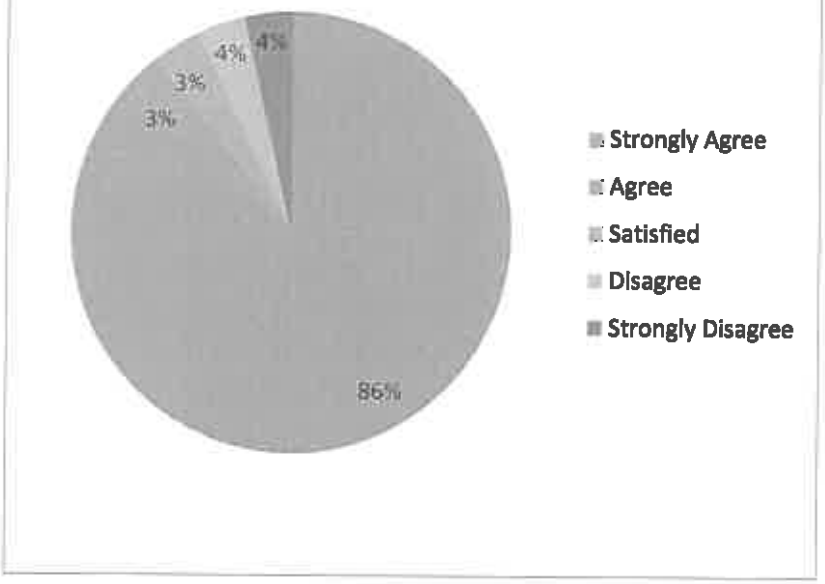
Extra care has been taken for extra learning or self-learning while designing the courses.	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	78.57	7.14	7.14	3.57	3.57



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U.: www.sug.ac.in

Q.5 The curriculum provides enough scope for improving entrepreneurial skill as well as industry readiness.

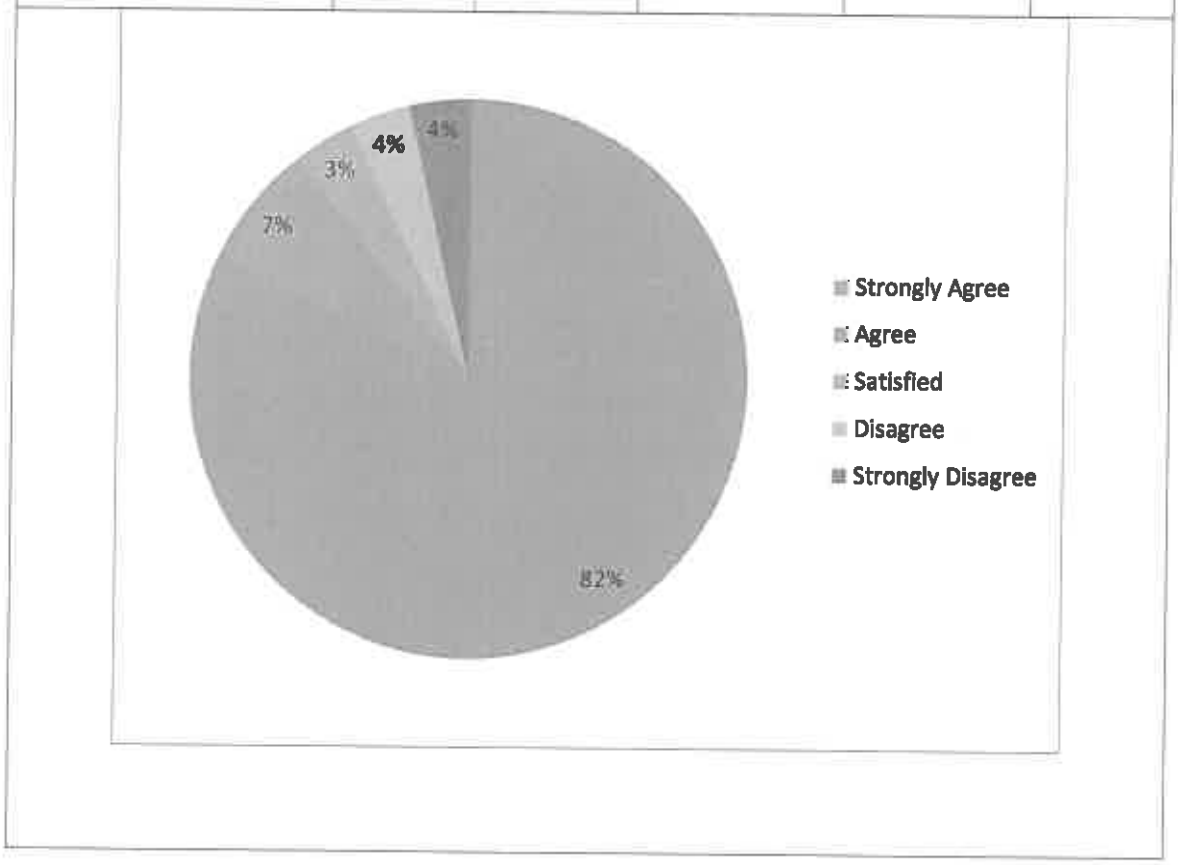
The curriculum provides enough scope for improving entrepreneurial skill as well as industry readiness.	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	85.71	3.57	3.57	3.57	3.57



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Q.6 The curriculum provides ample knowledge for increased employability and to promote students for higher education.

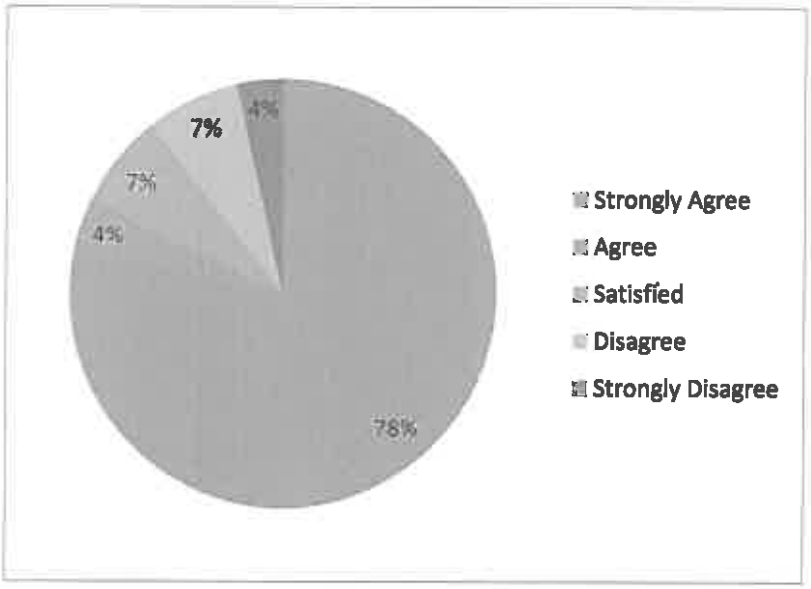
The curriculum provides ample knowledge for increased employability and to promote students for higher education.	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	82.14	7.14	3.57	3.57	3.57



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Q.7 The curriculum has focus on personality development by presence of courses on human values and professional ethics

The curriculum has focus on personality development by presence of courses on human values and professional ethics	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	78.57	3.57	7.14	7.14	3.57

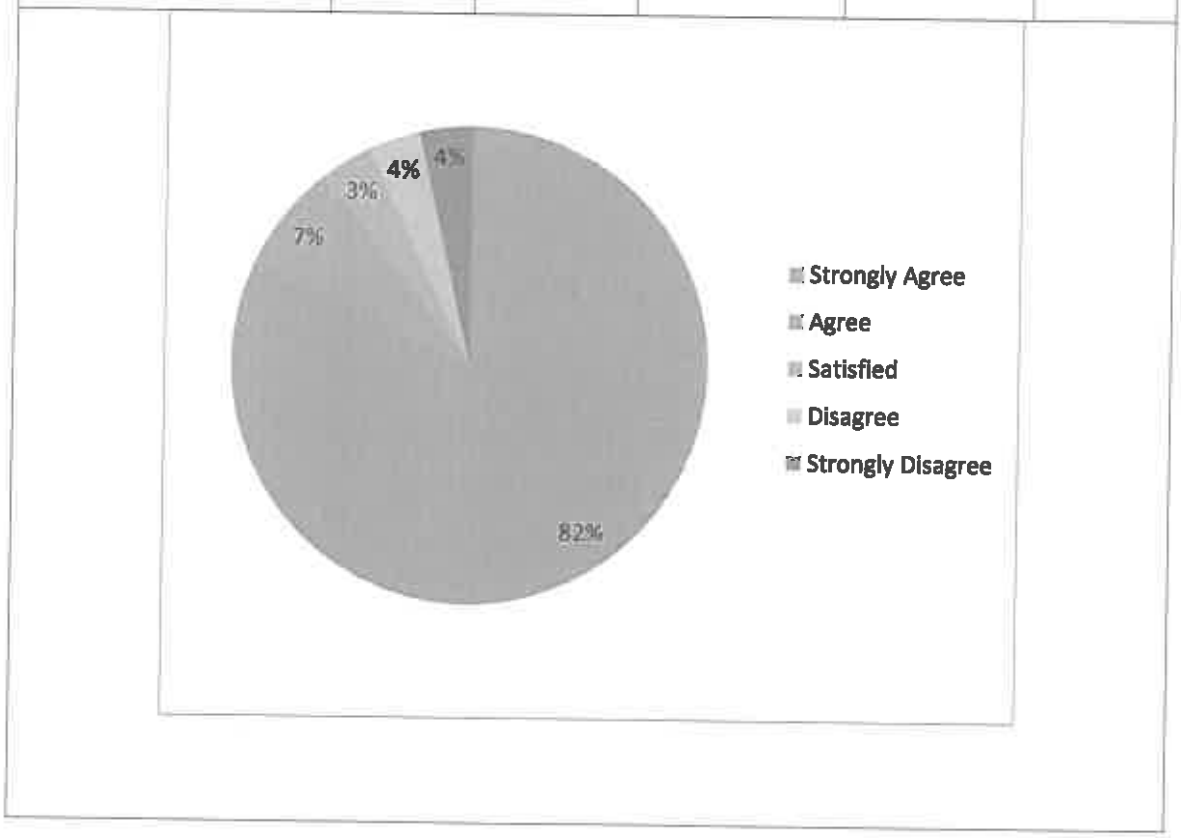


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Q.8 The curriculum is well organized and balanced for the programme with proper credit allocation.

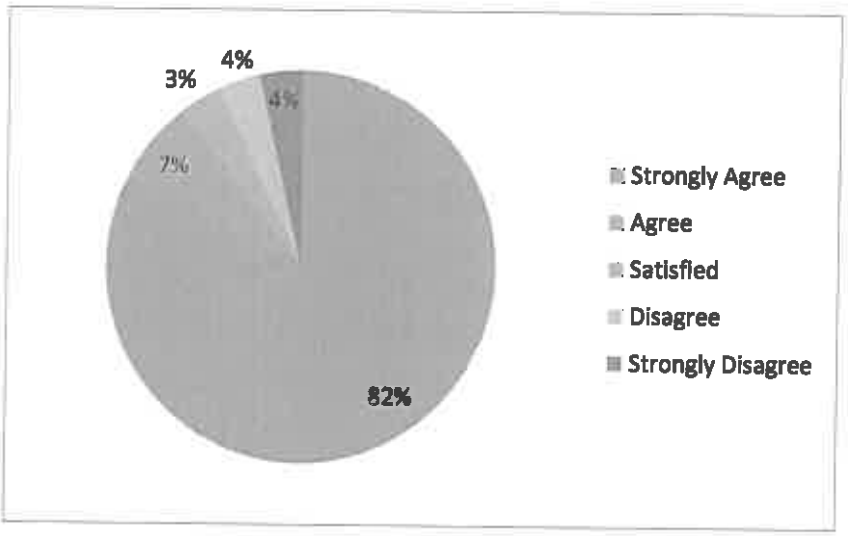
The curriculum is well organized and balanced for the programme with proper credit allocation.	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	82.14	7.14	3.57	3.57	3.57



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Q.9 The courses have adequate balance between theory and application for a student's holistic development.

The courses have adequate balance between theory and application for a student's holistic development.	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	82.14	7.14	3.57	3.57	3.57



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School of Engineering & Technology (28)

Total no. of Peer Academicians: 28		Strongly Agree	Agree	Satisfied	Disagree	Strongly Disagree
The syllabus of the courses are proper in relation to the competencies expected out of the programme.	No. of Academicians	22.00	2.00	2.00	1.00	1.00
	Percentage	78.57	7.14	7.14	3.57	3.57
The sequence and overall organization of the courses is proper in the curriculum	No. of Academicians	24.00	1.00	1.00	1.00	1.00
	Percentage	85.71	3.57	3.57	3.57	3.57
The curriculum has adequate scope for multidisciplinary knowledge and sufficient number of elective courses	No. of Academicians	22.00	2.00	2.00	1.00	1.00
	Percentage	78.57	7.14	7.14	3.57	3.57
Extra care has been taken for extra learning or self-learning while designing the courses.	No. of Academicians	22.00	2.00	2.00	1.00	1.00
	Percentage	78.57	7.14	7.14	3.57	3.57
The curriculum provides enough scope for improving entrepreneurial skill as well as industry readiness.	No. of Academicians	24.00	1.00	1.00	1.00	1.00
	Percentage	85.71	3.57	3.57	3.57	3.57
The curriculum provides ample knowledge for increased employability and to promote students for higher education.	No. of Academicians	23.00	2.00	1.00	1.00	1.00
	Percentage	82.14	7.14	3.57	3.57	3.57
The curriculum has focus	No. of	22.00	1.00	2.00	2.00	1.00

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on personality development by presence of courses on human values and professional ethics	Academicians					
	Percentage	**78.57**	**3.57**	**7.14**	**7.14**	**3.57**
The curriculum is well organized and balanced for the programme with proper credit allocation.	No. of Academicians	**23.00**	**2.00**	**1.00**	**1.00**	**1.00**
	Percentage	**82.14**	**7.14**	**3.57**	**3.57**	**3.57**
The courses have adequate balance between theory and application for a student's holistic development.	No. of Academicians	**23.00**	**2.00**	**1.00**	**1.00**	**1.00**
	Percentage	**82.14**	**7.14**	**3.57**	**3.57**	**3.57**

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U.: www.sug.ac.in

Analysis of Feedback:

The peer feedback reveals a high level of satisfaction with the curriculum, with most parameters scoring consistently at 92.85%, indicating a well-structured and thoughtfully designed programme. The syllabus is considered appropriate to the expected competencies, and the curriculum's organization, multidisciplinary scope, and elective offerings are all positively received. Additionally, aspects such as provisions for self-learning, entrepreneurial readiness, employability, and higher education promotion are seen as effectively integrated. The slightly lower score of 89.28% for personality development through human values and professional ethics suggests a minor area for improvement, though still well-regarded. Overall, the curriculum demonstrates a strong balance between theoretical and practical components and reflects a robust alignment with academic and professional goals.

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Action Taken Report

(School of Engineering and Technology)

Sr.No.	Suggestions	Action Taken	Outcome
1	Enhance multidisciplinary knowledge and elective offerings.	Increased the variety of electives across fields like educational psychology, curriculum design, and educational technology to provide students with a broader academic perspective.	Students have more diverse learning opportunities, enriching their educational experience and broadening their understanding of the education sector.
2	Strengthen the focus on self-learning and independent study.	Introduced self-directed learning modules, including research projects and peer-led discussions, to encourage greater independence in students' learning processes.	Students have shown greater engagement in independent research and critical thinking, fostering a more self-motivated approach to learning.
3	Further integrate employability skills into the curriculum.	Partnered with educational institutions and industry experts to offer workshops, internships, and seminars on career development, teaching methods, and classroom management.	Students have gained practical insights into their future roles as educators and increased confidence in their ability to enter the workforce.
4	Improve personality development through courses on human values and professional ethics.	Developed new courses focusing on emotional intelligence, leadership in education, and ethical practices for educators.	Students reported improvements in their communication skills, ethical decision-making, and leadership abilities, preparing them for their professional careers.

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23rd Meeting of BOS (Item No. 23.5 Annexure -5)

SHOBHIT UNIVERSITY GANGOH
SCHOOL OF ENGINEERING AND TECHNOLOGY
List of Examiners (2024-2025)

Sr. No.	Course code with Title	Name, Designation, Institution and Correspondence address of the Paper Setter/Examiner	Contact number with E. Mail ID
1.	Fundamental of Computer and C Programming (BCA-101)	External Examiner	
		1. Dr. Arun Giri	arungiri123@yahoo.com, 9818809053
		2. Dr. Nidhi Tyagi 3. Dr. Maheep Singh	nidhi.tyagi9785@gmail.com, 9927007273 kingmaheep@gmail.com, 9411293327
		Internal Examiner 1. Dr. Tarun Kumar Sharma	Tarun.sharma@shobhituniversity.ac.in, 9456086759
		2. Dr. Varun Bansal	Varun.bansal@shobhituniversity.ac.in, 9411295559
2	Problem Solving using Computer (BCA-102)	External Examiner 1. Dr. Abahay Bhatia	dr.abhay@ritrookee.ac.in, 9837386973
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com, 97604492192
		3. Dr. Mamta	mamta.bansal345@gmail.com, 9997025606
		Internal Examiner 1. Mr. Kuldeep Chauhan	Kuldeep.chauhan@shobhituniversity.ac.in, 9756997090
		2. Mr. Vinod Kumar	Vinod.kumar@shobhituniversity.ac.in, 9758749227

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3	Professional Communication(BCA-103)	External Examiner 1. Dr. Abahay Bhatia	dr.abhay@ritrookee.ac.in, 9837386973
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com, 97604492192
		3. Dr. Mamta	mamta.bansal345@gmail.com,9997025606
		Internal Examiner 1.Dr. Varun Bansal	Varun.bansal@shobhituniversity.ac.in, 9411295559
		2.Mr. Nitin Kumar	nitin.kumar@shobhituniversity.ac.in, 9758170029
4	Mathematics(BCA-104)	External Examiner 1. Dr. Abahay Bhatia	dr.abhay@ritrookee.ac.in, 9837386973
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com, 97604492192
		3. Dr. Mamta	mamta.bansal345@gmail.com,9997025606
		Internal Examiner 1. Dr. Varun Bansal	Varun.bansal@shobhituniversity.ac.in, 9411295559
		2. Mr. Kuldeep Chauhan	Kuldeep.chauhan@shobhituniversity.ac.in, 9756997090
5	Fundamental of Computer and C Programming Lab(BCA-151)	External Examiner 1. Dr. Abahay Bhatia	dr.abhay@ritrookee.ac.in, 9837386973
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com, 97604492192
		3. Dr. Mamta	mamta.bansal345@gmail.com,9997025606
		Internal Examiner 1.Dr. Varun Bansal	Varun.bansal@shobhituniversity.ac.in, 9411295559

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		2.Sumika Jain	Sumika.jai@shobhituniversity.ac.in, 9456666326
6	Software Lab using Python(BCA-152)	External Examiner 1. Dr. Abahay Bhatia	dr.abhay@ritrookee.ac.in, 9837386973
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com, 97604492192
		3. Dr. Mamta	mamta.bansal345@gmail.com,9997025606
		Internal Examiner 1. Dr. Tarun Kumar Sharma	Tarun.sharma@shobhituniversity.ac.in, 9456086759
		2. Mr. Vinod Kumar	Vinod.kumar@shobhituniversity.ac.in, 9758749227
7	English Communication Lab(BCA-153)	External Examiner 1. Dr. Abahay Bhatia	dr.abhay@ritrookee.ac.in, 9837386973
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com, 97604492192
		3. Dr. Mamta	mamta.bansal345@gmail.com,9997025606
		Internal Examiner 1. Dr. Tarun Kumar Sharma	Tarun.sharma@shobhituniversity.ac.in, 9456086759
		2. Mr. Vinod Kumar	Vinod.kumar@shobhituniversity.ac.in, 9758749227
8	Seminar Based on Learning (BCA-154)	External Examiner 1 Dr. Abahay Bhatia	dr.abhay@ritrookee.ac.in, 9837386973
		3. Dr. Ankit Sharma	gurukul.ankit@gmail.com, 97604492192
		4. Dr. Mamta	mamta.bansal345@gmail.com,9997025606
		Internal Examiner	

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		1. Dr. Tarun Kumar Sharma	Tarun.sharma@shobhituniversity.ac.in, 9456086759
		2. Mr. Vinod Kumar	Vinod.kumar@shobhituniversity.ac.in, 9758749227
9	Operating Systems(BCA-301)	External Examiner 1.Dr Mamta	mamta.bansal345@gmail.com,9997025606
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com, 97604492192
		3. Dr. Abahay Bhatia	dr.abhay@ritrookee.ac.in, 9837386973
		Internal Examiner 1. Ms. Sumika Jain	Sumika.jai@shobhituniversity.ac.in, 9456666326
		2. Mr. Vinod Kumar	Vinod.kumar@shobhituniversity.ac.in, 9758749227
10	HTML, DHTML and CSS Programming(BCA-302)	External Examiner 1. Dr. Abahay Bhatia	dr.abhay@ritrookee.ac.in, 9837386973
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com, 97604492192
		3. Dr. Mamta	mamta.bansal345@gmail.com,9997025606
		Internal Examiner 1. Dr. Varun Bansal	Varun.bansal@shobhituniversity.ac.in, 9411295559
		2. Mr. Kuldeep Chauhan	Kuldeep.chauhan@shobhituniversity.ac.in, 9756997090
11	Theory of Computation(BCA-303)	External Examiner 1. Dr. Mamta	mamta.bansal345@gmail.com,9997025606
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com, 97604492192

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		3. Dr. Abahay Bhatia	dr.abhay@ritrookee.ac.in, 9837386973
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		2. Mr. Vinod Kumar	Vinod.kumar@shobhituniversity.ac.in, 9758749227
12	Multimedia and Applications(BCA-304)	External Examiner 1. Dr. Ankit Sharma	gurukul.ankit@gmail.com, 97604492192
		2. Dr. Mamta	mamta.bansal345@gmail.com,9997025606
		3. Dr. Abahay Bhatia	dr.abhay@ritrookee.ac.in, 9837386973
		Internal Examiner 1. Mr. Kuldeep Chauhan	Kuldeep.chauhan@shobhituniversity.ac.in, 9756997090
		2. Mr. Nitin Kumar	nitin.kumar@shobhituniversity.ac.in, 9758170029
13	Optimization Techniques(BCA-305)	External Examiner 1. Dr. Abahay Bhatia	dr.abhay@ritrookee.ac.in, 9837386973
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com, 97604492192
		3. Dr. Mamta	mamta.bansal345@gmail.com,9997025606
		Internal Examiner 1. Mr. Vinod Kumar	Vinod.kumar@shobhituniversity.ac.in, 9758749227
		2. Ms. Sumika Jain	Sumika.jai@shobhituniversity.ac.in, 9456666326
14	Operating Systems	External Examiner	

Shobhit University
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E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

	Lab(BCA-351)	1. Dr. Abahay Bhatia	dr.abhay@ritrookee.ac.in, 9837386973
		2. Dr. Mamta	mamta.bansal345@gmail.com,9997025606
		3. Dr. Ankit Sharma	gurukul.ankit@gmail.com, 97604492192
		Internal Examiner 1. Mr. Kuldeep Chauhan	Kuldeep.chauhan@shobhituniversity.ac.in, 9756997090
		2. Mr. Nitin Kumar	nitin.kumar@shobhituniversity.ac.in, 9758170029
15	HTML Programming Lab(BCA-352)	External Examiner 1. Dr. Mamta	mamta.bansal345@gmail.com,9997025606
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com, 97604492192
		3. Dr. Abahay Bhatia	dr.abhay@ritrookee.ac.in, 9837386973
		Internal Examiner 1. Ms. Sumika Jain	Sumika.jai@shobhituniversity.ac.in, 9456666326
		2. Mr. Vinod Kumar	Vinod.kumar@shobhituniversity.ac.in, 9758749227
16	Seminar Based on Learning(BCA-353)	External Examiner 1. Dr. Abahay Bhatia	dr.abhay@ritrookee.ac.in, 9837386973
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com, 97604492192
		3. Dr. Mamta	mamta.bansal345@gmail.com,9997025606
		Internal Examiner 3. Mr. Kuldeep Chauhan	Kuldeep.chauhan@shobhituniversity.ac.in, 9756997090
		4. Mr. Nitin Kumar	nitin.kumar@shobhituniversity.ac.in,

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

			9758170029
17	Software Engineering(BCA-501)	External Examiner 1. Dr. Abahay Bhatia	dr.abhay@ritrookee.ac.in, 9837386973
		2. Dr. Mamta	mamta.bansal345@gmail.com,9997025606
		3. Dr. Ankit Sharma	gurukul.ankit@gmail.com, 97604492192
		Internal Examiner 1. Dr. Varun Bansal	Varun.bansal@shobhituniversity.ac.in, 9411295559
		2. Mr. Vinod Kumar	Vinod.kumar@shobhituniversity.ac.in, 9758749227
18	Analysis of Algorithms & Data Structures(BCA-502)	External Examiner 1. Dr. Ankit Sharma	gurukul.ankit@gmail.com, 97604492192
		2. Dr. Mamta	mamta.bansal345@gmail.com,9997025606
		3. Dr. Abahay Bhatia	dr.abhay@ritrookee.ac.in, 9837386973
		Internal Examiner 1. Mr. Kuldeep Chauhan	Kuldeep.chauhan@shobhituniversity.ac.in, 9756997090
		2. Mr. Nitin Kumar	nitin.kumar@shobhituniversity.ac.in, 9758170029
19	Mobile Computing(BCA-503)	External Examiner 1. Dr. Mamta	mamta.bansal345@gmail.com,9997025606
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com, 97604492192
		3. Dr. Abahay Bhatia	dr.abhay@ritrookee.ac.in, 9837386973

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sng.ac.in

		Internal Examiner 1. Dr. Varun Bansal	Varun.bansal@shobhituniversity.ac.in, 9411295559
		2. Mr. Vinod Kumar	Vinod.kumar@shobhituniversity.ac.in, 9758749227
20	Big Data and Machine Learning(BCA-504)	External Examiner 1. Dr. Ankit Sharma	gurukul.ankit@gmail.com, 97604492192
		2. Dr. Mamta	mamta.bansal345@gmail.com 9997025606
		3. Dr. Abahay Bhatia	dr.abhay@ritrookee.ac.in, 9837386973
		Internal Examiner 1. Mr. Kuldeep Chauhan	Kuldeep.chauhan@shobhituniversity.ac.in, 9756997090
		2. Mr. Nitin Kumar	nitin.kumar@shobhituniversity.ac.in, 9758170029
21	Software Engineering Lab(BCA-551)	External Examiner 1. Dr. Mamta	mamta.bansal345@gmail.com 9997025606
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com, 97604492192
		3. Dr. Abahay Bhatia	dr.abhay@ritrookee.ac.in, 9837386973
		Internal Examiner 3. Dr. Varun Bansal	Varun.bansal@shobhituniversity.ac.in, 9411295559
		4. Mr. Vinod Kumar	Vinod.kumar@shobhituniversity.ac.in, 9758749227
22	Algorithms and Data	External Examiner	

Shobhit University
EDUCATION EMPOWERS

Babu Vijendra Marg, Adarsh Institutional
Area Gangoh, Distt. Saharanpur (U.P.)
247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sng.ac.in

	Structures with C++ Lab (BCA-552)	1. Dr. Ankit Sharma	gurukul.ankit@gmail.com, 97604492192
		2. Dr. Abahay Bhatia	dr.abhay@ritrookee.ac.in, 9837386973
		3. Dr. Mamta	mamta.bansal345@gmail.com 9997025606
		Internal Examiner 1. Dr. Varun Bansal	Vinod.kumar@shobhituniversity.ac.in, 9758749227
		2. Mr. Vinod Kumar	Vinod.kumar@shobhituniversity.ac.in, 9758749227
23	Research Project-I(BCA-558)	External Examiner 1. Dr. Abahay Bhatia	dr.abhay@ritrookee.ac.in, 9837386973
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com, 97604492192
		3. Dr. Mamta	mamta.bansal345@gmail.com 9997025606
		Internal Examiner 1. Dr. Varun Bansal	Varun.bansal@shobhituniversity.ac.in, 9411295559
		2. Mr. Vinod Kumar	Vinod.kumar@shobhituniversity.ac.in, 9758749227

MCA List of Examiners (2024-2025)

Sr. No.	Course code with Title	Name, Designation, Institution and Correspondence address of the Paper Setter/Examiner	Contact number with E. Mail ID
1.	Java (MCA-101)	External Examiner 4. Dr. Abhay Bhatia	Dr.abhay@ritroorkee.ac.in 9837386973 Dr.abhay@ritroorkee.ac.in 9837386973
		5. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional
Area Gangoh, Distt. Saharanpur (U.P.)
247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

		6. Dr. Mamta Singh	Mamta.bansal345@gmail.com 9997025606
		Internal Examiner 3. Mr. Jitendra K. Saini	Jitendra.saini@shobhituniversity.ac.in 7669110295
		4. Mr. Shahnawaaj	Mohd.shahnawaz@shobhituniversity.ac.in 9536940100
2	Advanced DBMS (MCA-102)	External Examiner 4. Dr. Ankit Sharma	Gurukul.ankit@gmail.com 9760492192
		5. Dr. Arun Giri	Arungiri123@yahoo.com 981880953
		6. Dr. Nidhi Tyagi	Nidhi.tyagi9785@gmail.com 9927007273
		Internal Examiner 3. Dr. Varun Bansal	Varun.bansal@shobhituniversity.ac.in 9675478559
		4. Mr. Shubham Kumar	Shubham.k@shobhituniversity.ac.in 7895408519
3	Advanced DAA (MCA-103)	External Examiner 1. Dr. Mamta Bansal	Mamta.bansal345@gmail.com 9997025606
		2. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		3. Dr. Abhay Bhatia	Dr.abhay@ritroorkee.ac.in 9837386973
		Internal Examiner 1. Ms. Sumika Jain	Sumika.jain@shobhituniversity.ac.in 9456666326
		2. Mr. Kuldeep Chauhan	Kuldeep.chauhan@shobhituniversity.ac.in 9756997090
4	Network Fundamentals (MCA-	External Examiner 1. Dr. Abhay Bhati	Dr.abhay@ritroorkee.ac.in 9837386973

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional
Area Gangoh, Distt. Saharanpur (U.P.)
247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

	104)	2. Dr. Ankit Sharma	Gurukul.ankit@gmail.com 9760492192
		3. Dr. Mamta Bansal	Mamta.bansal345@gmail.com 9997025606
		Internal Examiner 1. Ms. Sumika Jain	Sumika.jain@shobhituniversity.ac.in 9456666326
		2. Mr. Kuldeep Chauhan	Kuldeep.chauhan@shobhituniversity.ac.in 9756997090
5	Optimization Techniques (MCA-133)	External Examiner 1. Dr. Abhay Bhati	Dr.abhay@ritroorkee.ac.in 9837386973
		2. Dr. Ankit Sharma	Gurukul.ankit@gmail.com 9760492192
		3. Dr. Mamta Bansal	Mamta.bansal345@gmail.com 9997025606
		Internal Examiner 1. Ms. Sumika Jain	Sumika.jain@shobhituniversity.ac.in 9456666326
		2. Mr. Kuldeep Chauhan	Kuldeep.chauhan@shobhituniversity.ac.in 9756997090
6	Lab JAVA (MCA-151)	External Examiner 1. Dr. Ankit Sharma	Gurukul.ankit@gmail.com 9760492192
		2. Dr. Arun Giri	Arungiri123@yahoo.com 981880953
		3. Dr. Nidhi Tyagi	Nidhi.tyagi9785@gmail.com 9927007273
		Internal Examiner 1. Dr. Varun Bansal	Varun.bansal@shobhituniversity.ac.in 9675478559
		2. Mr. Shubham Kumar	Shubham.k@shobhituniversity.ac.in 7895408519
7	Lab Advanced DBMS	External Examiner 1. Dr. Abhay Bhatia	Dr.abhay@ritroorkee.ac.in 9837386973

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

	(MCA-152)	2. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		3. Dr. Mamta Bansal	Mamta.bansal345@gmail.com 9997025606
		Internal Examiner 1. Mr. Jitendra K. Saini	Jitendra.saini@shobhituniversity.ac.in 7669110295
		2. Mr. Shahnawaaj	Mohd.shahnawaz@shobhituniversity.ac.in 9536940100
8	Lab Design and analysis of Algorithm (MCA-153)	External Examiner 1. Dr. Nidhi Tyagi	Nidhi.tyagi9785@gmail.com 9927007273
		2. Dr. Mamta Bansal	Mamta.bansal345@gmail.com 9997025606
		3. Dr. Abhay Bhatia	Dr.abhay@ritroorkee.ac.in 9837386973
		Internal Examiner 1. Mr. Jitendra K. Saini	Jitendra.saini@shobhituniversity.ac.in 7669110295
		2. Dr. Tarun Kumar Sharma	Tarun.sharma@shobhituniversity.ac.in 9456086759
9.	PHP (MCA-301)	External Examiner 1. Dr. Ankit Sharma	Gurukul.ankit@gmail.com 9760492192
		2. Dr. Arun Giri	Arungiri123@yahoo.com 981880953
		3. Dr. Nidhi Tyagi	Nidhi.tyagi9785@gmail.com 9927007273
		Internal Examiner 1. Dr. Varun Bansal	Varun.bansal@shobhituniversity.ac.in 9675478559
		2. Ms. Sumika Jain	Sumika.jain@shobhituniversity.ac.in 9456666326
10.	Data Science (MCA-302)	External Examiner 1. Dr. Mamta Bansal	Mamta.bansal345@gmail.com 9997025606
		2. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		3. Dr. Abhay Bhatia	Dr.abhay@ritroorkee.ac.in 9837386973

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

		Internal Examiner 1. Dr. Varun Bansal	Varun.bansal@shobhituniversity.ac.in 9675478559
		2. Ms. Sumika Jain	Sumika.jain@shobhituniversity.ac.in 9456666326
11.	Cryptography and Network Security(MCA-304)	External Examiner 1. Dr. Ankit Sharma	Gurukul.ankit@gmail.com 9760492192
		2. Dr. Arun Giri	Arungiri123@yahoo.com 981880953
		3. Dr. Nidhi Tyagi	Nidhi.tyagi9785@gmail.com 9927007273
		Internal Examiner 1. Mr. Nitin Kumar	Nitin.kumar@shobhituniversity.ac.in 9758170029
		2. Ms. Sumika Jain	Sumika.jain@shobhituniversity.ac.in 9456666326
12.	Compiler Design(MCA-322)	External Examiner 1. Dr. Ankit Sharma	Gurukul.ankit@gmail.com 9760492192
		2. Dr. Arun Giri	Arungiri123@yahoo.com 981880953
		3. Dr. Nidhi Tyagi	Nidhi.tyagi9785@gmail.com 9927007273
		Internal Examiner 1. Dr. Varun Bansal	Varun.bansal@shobhituniversity.ac.in 9675478559
		2. Mr. Shubham Kumar	Shubham.k@shobhituniversity.ac.in 7895408519
13.	Lab PHP(MCA-351)	External Examiner 1. Dr. Abhay Bhatia	Dr.abhay@ritroorkee.ac.in 9837386973
		2. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional
Area Gangoh, Distt. Saharanpur (U.P.)
247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.suy.ac.in

		3. Dr. Mamta Bansal	Mamta.bansal345@gmail.com 9997025606
		Internal Examiner 1. Mr. Vinod Kumar	Vinod.kumar@shobhituniversity.ac.in 9758749227
		2. Mr. Anuj Kumar	Anju.k@shobhituniverstiy.ac.in 7249989555
14.	Lab Data Science(MCA-352)	External Examiner 1. Dr. Arun Giri	Arungiri123@yahoo.com 981880953
		2. Dr. Nidhi Tyagi	Nidhi.tyagi9785@gmail.com 9927007273
		3. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		Internal Examiner 1. Mr. Vinod Kumar	Vinod.kumar@shobhituniversity.ac.in 9758749227
		2. Mr. Anuj Kumar	Anju.k@shobhituniverstiy.ac.in 7249989555
15.	Lab Cryptography and Network Security(MCA-353)	External Examiner 1. Dr. Abhay Bhati	Dr.abhay@ritroorkee.ac.in 9837386973
		2. Dr. Ankit Sharma	Gurukul.ankit@gmail.com 9760492192
		3. Dr. Mamta Bansal	Mamta.bansal345@gmail.com 9997025606
		Internal Examiner 1. Ms. Sumika Jain	Sumika.jain@shobhituniversity.ac.in 9456666326
		2. Mr. Kuldeep Chauhan	Kuldeep.chauhan@shobhituniversity.ac.in 9756997090
24.	Minor Project (MCA-	External Examiner 1. Dr. Arun Giri	Arungiri123@yahoo.com 981880953

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional
Area Gangoh, Distt. Saharanpur (U.P.)
247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

	354)	2. Dr. Nidhi Tyagi	Nidhi.tyagi9785@gmail.com 9927007273
		3. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		Internal Examiner 1. Mr. Vinod Kumar	Vinod.kumar@shobhituniversity.ac.in 9758749227
		2. Mr. Anuj Kumar	Anju.k@shobhituniverstiy.ac.in 7249989555
25.	Seminar Based on Learning(MCA-355)	External Examiner 1. Dr. Ankit Sharma	Gurukul.ankit@gmail.com 9760492192
		2. Dr. Nidhi Tyagi	Nidhi.tyagi9785@gmail.com 9927007273
		3. Dr. Arun Giri	Arungiri123@yahoo.com 981880953
		Internal Examiner 1. Mr. Nitin Kumar	Nitin.kumar@shobhituniversity.ac.in 9758170029
		2. Mr. Vinod Kumar	Vinod.kumar@shobhituniversity.ac.in 9758749227

M.Tech List of Examiners (2024-2025)

Sr. No.	Course code with Title	Name, Designation, Institution and Correspondence address of the Paper Setter/Examiner	Contact number with E. Mail ID
1.	Software Engineering Methodologies CE- 501	External Examiner 7. Dr. Arun Giri	arungiri123@yahoo.com 9818809053
		8. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		9. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		Internal Examiner 1. Mr. Kuldeep Chauhan	kuldeep.chauhan@shobhituniversity.ac.in 9756997090

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

		2. Mr. Vinod Kumar	vinod.kumar@shobhituniversity.ac.in 9758749227
2.	Analysis and Design of Algorithms CE-503	External Examiner 7. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		8. Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192
		9. Dr. Mamta Bansal	mamta.bansal345@gmail.com 9997025606
		Internal Examiner 5. Ms. Sumika Jain	sumika.jain@shobhituniversity.ac.in 9456666326
		2. Mr. Raveendra Kr. Bharati	raveendra.bharati@shobhituniversity.ac.in 9953328744
3.	Advanced Database Management Systems CE- 505	External Examiner 1. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		2. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		3. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		Internal Examiner 1. Mr. Raveendra Kr. Bharati	raveendra.bharati@shobhituniversity.ac.in 9953328744
		2. Mr. Nitin Kumar	nitin.kumar@shobhituniversity.ac.in 9758170029
4.	Computer Communication and	External Examiner 1. Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional
Area Gangoh, Distt. Saharanpur (U.P.)
247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

	Networks CE- 507	2. Dr. Mamta Bansal	mamta.bansal345@gmail.com 9997025606
		3. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		Internal Examiner 1. Mr. Raveendra Kr. Bharati	anil.nishad@shobhituniversity.ac.in 8171418088
		2. Mr. Kuldeep Chauhan	kuldeep.chauhan@shobhituniversity.ac.in 9756997090
5.	Fundamental of Computer Programming (Audit) CE- 509	External Examiner 1. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192
		3. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		Internal Examiner 1. Mr. Vinod Kumar	vinod.kumar@shobhituniversity.ac.in 9758749227
		2. Ms. Sumika Jain	sumika.jain@shobhituniversity.ac.in 9456666326
6.	Fundamental of Mathematics (Audit) CE- 511	External Examiner 1. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192
		3. Dr. Mamta Bansal	mamta.bansal345@gmail.com 9997025606

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional
Area Gangoh, Distt. Saharanpur (U.P.)
247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

		Internal Examiner 1. Mr. Madhav P. Namdev	Madhav.namdev@shobhituniversity.ac.in 94572731592
		2. Mr. Raveendra Kr. Bharati	raveendra.bharati@shobhituniversity.ac.in 9953328744
7.	Algorithms Lab CE-551	External Examiner 1. Dr. Arun Giri	arungiri123@yahoo.com 9818809053
		2. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		3. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		Internal Examiner 1. Mr. Vinod Kumar	vinod.kumar@shobhituniversity.ac.in 9758749227
		2. Mr. Raveendra Kr. Bharati	raveendra.bharati@shobhituniversity.ac.in 9953328744
8.	Seminar-I CE- 581	External Examiner 1. Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192
		2. Dr. Mamta Bansal	mamta.bansal345@gmail.com 9997025606
		3. Dr. Arun Giri	arungiri123@yahoo.com 9818809053
		Internal Examiner 1. Mr. Varun Bansal	varun.bansal@shobhituniversity.ac.in 9675478559
		2. Ms. Sumika Jain	sumika.jain@shobhituniversity.ac.in

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional
Area Gangoh, Distt. Saharanpur (U.P.)
247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

			9456666326
9	Data Mining and Warehousing CE-601	External Examiner	
		1. Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192
		2. Dr. Mamta Bansal	mamta.bansal345@gmail.com 9997025606
		3. Dr. Arun Giri	arungiri123@yahoo.com 9818809053
		Internal Examiner 1. Mr. Vinod Kumar	vinod.kumar@shobhituniversity.ac.in 9758749227
		2. Mr. Raveendra Kr. Bharati	raveendra.bharati@shobhituniversity.ac.in 9953328744
10	Internet and Web Technology CE- 603	External Examiner	
		1. Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192
		2. Dr. Mamta Bansal	mamta.bansal345@gmail.com 9997025606
		3. Dr. Arun Giri	arungiri123@yahoo.com 9818809053
		Internal Examiner 1. Mr. Varun Bansal	varun.bansal@shobhituniversity.ac.in 9675478559
		2. Ms. Sumika Jain	sumika.jain@shobhituniversity.ac.in 9456666326
11	Medical Image	External Examiner	

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional
Area Gangoh, Distt. Saharanpur (U.P.)
247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

	Processing CE- 605	1. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192
		3. Dr. Mamta Bansal	mamta.bansal345@gmail.com 9997025606
		Internal Examiner 1. Mr. Madhav P. Namdev	Madhav.namdev@shobhituniversity.ac.in 94572731592
		2. Mr. Raveendra Kr. Bharati	raveendra.bharati@shobhituniversity.ac.in 9953328744
12	Software Verification, Validation and Testing CE- 607	External Examiner	
		1. Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192
		2. Dr. Mamta Bansal	mamta.bansal345@gmail.com 9997025606
		3. Dr. Arun Giri	arungiri123@yahoo.com 9818809053
		Internal Examiner 1. Ms. Sumika Jain	sumika.jain@shobhituniversity.ac.in 9456666326
		2. Mr. Raveendra Kr. Bharati	raveendra.bharati@shobhituniversity.ac.in 9953328744
13	Network Security CE-625	External Examiner	
		1. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional
Area Gangoh, Distt. Saharanpur (U.P.)
247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192
		3. Dr. Mamta Bansal	mamta.bansal345@gmail.com 9997025606
		Internal Examiner 1. Mr. Vinod Kumar	vinod.kumar@shobhituniversity.ac.in 9758749227
		2. Mr. Raveendra Kr. Bharati	raveendra.bharati@shobhituniversity.ac.in 9953328744
14	Minor Project CE-671	External Examiner	
		1. Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192
		2. Dr. Mamta Bansal	mamta.bansal345@gmail.com 9997025606
		3. Dr. Arun Giri	arungiri123@yahoo.com 9818809053
		Internal Examiner 1. Mr. Kuldeep Chauhan	kuldeep.chauhan@shobhituniversity.ac.in 9756997090
		2. Mr. Vinod Kumar	vinod.kumar@shobhituniversity.ac.in 9758749227

B.tech CSE List of Examiners (2024-2025)

Sr. No.	Course code with Title	Name, Designation, Institution and Correspondence address of the Paper Setter/Examiner	Contact number with E. Mail ID
1.	MATHEMATICS-I	External Examiner 10. Dr. Arun Giri	arungiri123@yahoo.com

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

	(CMAN 101)		9818809053
		11. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		12. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		Internal Examiner 5. Mr. Raveendra Kr. Bharati	raveendra.bharati@shobhituniversity.ac.in 9953328744
		6. Mr. Abdulla Khan	abdulla.khan@shobhituniversity.ac.in 7454976780
2.	ENGINEERING MECHANICS (CMEN 101)	External Examiner 10. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		11. Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192
		12. Dr. Mamta Bansal	mamta.bansal345@gmail.com 9997025606
		Internal Examiner 1. Mr. Shoyab Hussain	shoyab.hussain@shobhituniversity.ac.in 9837446390
		2. Mr. Anil Kumar Joshi	anil.joshi@shobhituniversity.ac.in 9690758787
3.	FUNDAMENTALS OF ELECTRONICS (CECN 101)	External Examiner 4. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		5. Dr. Maheep Singh	kingmaheep@gmail.com

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional
Area Gangoh, Distt. Saharanpur (U.P.)
247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

			9411293327
		6. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		Internal Examiner 1. Dr. Jasvir Singh Rana	jasvirsingh.rana@shobhituniversity.ac.in 9759233859
		2. Mr. Hamid Ali	hamid.ali@shobhituniversity.ac.in 9759302770
4.	ENGINEERING CHEMISTRY AND ENVIRONMENTAL (CESN 101)	External Examiner 1. Dr. Arun Giri	arungiri123@yahoo.com 9818809053
		2. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		3. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		Internal Examiner 1. Mr. Y.P Malik	yp.malik@shobhituniversity.ac.in 8650145236
		2. Ms. Abhilasha R. Goel	abhilasha.goel@shobhituniversity.ac.in 6396705043
5.	PRESENTATION AND COMMUNICATION SKILLS (CPCN 101)	External Examiner 1. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192
		3. Dr. Mamta Bansal	mamta.bansal345@gmail.com

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

			9997025606
		Internal Examiner 1. Ms. Abhilasha R. Goel	abhilasha.goel@shobhituniversity.ac.in 6396705043
		2. Ms. Sumika Jain	sumika.jain@shobhituniversity.ac.in 9456666326
6.	ENGINEERING WORKSHOP PRACTICE (CMEN 151)	External Examiner 7. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		8. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		9. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		Internal Examiner 1. Mr. Shoyab Hussain	shoyab.hussain@shobhituniversity.ac.in 9837446390
		2. Mr. Anil Kumar Joshi	anil.joshi@shobhituniversity.ac.in 9690758787
7.	ENGINEERING GRAPHICS LAB (CMEN 153)	External Examiner 1. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192
		3. Dr. Mamta Bansal	mamta.bansal345@gmail.com 9997025606
		Internal Examiner	jasvirsingh.rana@shobhituniversity.ac.in

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

		1. Dr. Jasvir Singh Rana	9759233859
		2. Mr. Hamid Ali	hamid.ali@shobhituniversity.ac.in 9759302770
8.	COMMUNICATION LAB (CPCN 151)	External Examiner 1. Dr. Arun Giri	arungiri123@yahoo.com 9818809053
		2. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		3. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		Internal Examiner 1. Dr. Shri Kant Gupta	shrikant.gupta@shobhituniversity.ac.in 8279909590
		2. Mr. Varun Bansal	varun.bansal@shobhituniversity.ac.in 9675478559
9.	DATA STRUCTURE USING 'C' (CCSN 201)	External Examiner 1. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		2. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		3. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		Internal Examiner 1. Mr. Varun Bansal	varun.bansal@shobhituniversity.ac.in 9675478559

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

		2. Ms. Sumika Jain	sumika.jain@shobhituniversity.ac.in 9456666326
10.	DBMS (CCSN 203)	External Examiner 1. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192
		3. Dr. Mamta Bansal	mamta.bansal345@gmail.com 9997025606
		Internal Examiner 1. Dr. Tarun Kumar Sharma	tarun.sharma@shobhituniversity.ac.in 9456086759
		2. Mr. Nitin Kumar	nitin.kumar@shobhituniversity.ac.in 9758170029
11.	OPERATING SYSTEMS (UNIX PROGRAMMING) (CCSN 205)	External Examiner 1. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		2. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		3. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		Internal Examiner 1. Ms. Sumika Jain	sumika.jain@shobhituniversity.ac.in 9456666326
		2. Mr. Nitin Kumar	nitin.kumar@shobhituniversity.ac.in 9758170029

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional
Area Gangoh, Distt. Saharanpur (U.P.)
247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

12.	JAVA PROGRAMMING (CCSN 207)	External Examiner 1. Dr. Arun Giri	arungiri123@yahoo.com 9818809053
		2. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		3. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		Internal Examiner 1. Mr. Vinod Kumar	vinod.kumar@shobhituniversity.ac.in 9758749227
		2. Mr. Varun Bansal	varun.bansal@shobhituniversity.ac.in 9675478559
13.	DISCRETE MATHEMATICS (CCSN 209)	External Examiner 1. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192
		3. Dr. Mamta Bansal	mamta.bansal345@gmail.com 9997025606
		Internal Examiner 1. Dr. Vishvas Chand	vishvas.chand@shobhituniversity.ac.in 9286093196
		2. Ms. Abhilasha R. Goel	abhilasha.goel@shobhituniversity.ac.in 6396705043
14.	VALUE EDUCATION, HUMAN RIGHTS	External Examiner 1. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional
Area Gangoh, Distt. Saharanpur (U.P.)
247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

	ANDLEGISLATIVE PROCEDURES (CBSN 201)	2. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		3. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		Internal Examiner 1. Dr. Shri Kant Gupta	shrikant.gupta@shobhituniversity.ac.in 8279909590
		2. Ms. Taruna Pahuja	
15.	DATA STRUCTURE USING 'C' LAB (CCSN 251)	External Examiner 1. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		2. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		3. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		Internal Examiner 1. Mr. Varun Bansal	varun.bansal@shobhituniversity.ac.in 9675478559
		2. Ms. Sumika Jain	sumika.jain@shobhituniversity.ac.in 9456666326
16.	DBMS LAB (CCSN 253)	External Examiner 1. Dr. Arun Giri	arungiri123@yahoo.com 9818809053
		2. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		3. Dr. Maheep Singh	kingmaheep@gmail.com

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional
Area Gangoh, Distt. Saharanpur (U.P.)
247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

			9411293327
		Internal Examiner 1. Dr. Tarun Kumar Sharma	tarun.sharma@shobhituniversity.ac.in 9456086759
		2. Mr. Nitin Kumar	nitin.kumar@shobhituniversity.ac.in 9758170029
17.	JAVA PROGRAMMING LAB (CCSN 255)	External Examiner 1. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		2. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		3. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		Internal Examiner 1. Mr. Vinod Kumar	vinod.kumar@shobhituniversity.ac.in 9758749227
		2. Mr. Varun Bansal	varun.bansal@shobhituniversity.ac.in 9675478559
18.	SOFTWARE ENGINEERING (CCSN 301)	External Examiner 1. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		2. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		3. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		Internal Examiner	tarun.sharma@shobhituniversity.ac.in

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional
Area Gangoh, Distt. Saharanpur (U.P.)
247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

		1. Dr. Tarun Kumar Sharma	9456086759
		2. Mr. Varun Bansal	varun.bansal@shobhituniversity.ac.in 9675478559
19.	COMPILER DESIGN (CCSN 303)	External Examiner 4. Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192
		5. Dr. Mamta Bansal	mamta.bansal345@gmail.com 9997025606
		6. Dr. Arun Giri	arungiri123@yahoo.com 9818809053
		Internal Examiner 1. Mr. Varun Bansal	varun.bansal@shobhituniversity.ac.in 9675478559
		2. Mr. Nitin Kumar	nitin.kumar@shobhituniversity.ac.in 9758170029
20.	OBJECT ORIENTED ANALYSIS AND DESIGN (CCSN 305)	External Examiner 1. Dr. Arun Giri	arungiri123@yahoo.com 9818809053
		2. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		3. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		Internal Examiner 1. Mr. Vinod Kumar	vinod.kumar@shobhituniversity.ac.in 9758749227
		2. Ms. Sumika Jain	sumika.jain@shobhituniversity.ac.in

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional
Area Gangoh, Distt. Saharanpur (U.P.)
247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

			9456666326
21.	CRYPTOGRAPHY & INFORMATION SECURITY (CCSN 307)	External Examiner 1. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		2. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		3. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		Internal Examiner 1. Ms. Sumika Jain	sumika.jain@shobhituniversity.ac.in 9456666326
		2. Mr. Kuldeep Chauhan	kuldeep.chauhan@shobhituniversity.ac.in 9756997090
22.	CLOUD COMPUTING (CUCS 345)	External Examiner 1. Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192
		2. Dr. Mamta Bansal	mamta.bansal345@gmail.com 9997025606
		3. Dr. Arun Giri	arungiri123@yahoo.com 9818809053
		Internal Examiner 1. Dr. Tarun Kumar Sharma	tarun.sharma@shobhituniversity.ac.in 9456086759
		2. Mr. Varun Bansal	varun.bansal@shobhituniversity.ac.in 9675478559
23.	ENERGY STUDIES	External Examiner	dr.abhay@ritroorkee.ac.in

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

	(CBSN 301)	1.Dr. Abhay Bhatia	9837386973
		2.Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192
		3. Dr. Mamta Bansal	mamta.bansal345@gmail.com 9997025606
		Internal Examiner 1. Dr. Mahipal Singh	registrargangh@shobhituniversity.ac.in 9759174581
		2. Dr. Shri Kant Gupta	shrikant.gupta@shobhituniversity.ac.in 8279909590
24.	SOFTWARE ENGINEERING LAB (CCSN 351	External Examiner 1. Dr. Arun Giri	arungiri123@yahoo.com 9818809053
		2. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		3. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		Internal Examiner 1. Dr. Tarun Kumar Sharma	tarun.sharma@shobhituniversity.ac.in 9456086759
		2. Mr. Varun Bansal	varun.bansal@shobhituniversity.ac.in 9675478559
25.	COMPILER DESIGN LAB (CCSN 353)	External Examiner 1. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		2. Dr. Maheep Singh	kingmaheep@gmail.com

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional
Area Gangoh, Distt. Saharanpur (U.P.)
247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

			9411293327
		3. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		Internal Examiner 1. Mr. Varun Bansal	varun.bansal@shobhituniversity.ac.in 9675478559
		2. Mr. Nitin Kumar	nitin.kumar@shobhituniversity.ac.in 9758170029
26.	OBJECT ORIENTED ANALYSIS AND DESIGN LAB (CCSN 355)	External Examiner 1. Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192
		2. Dr. Mamta Bansal	mamta.bansal345@gmail.com 9997025606
		3. Dr. Arun Giri	arungiri123@yahoo.com 9818809053
		Internal Examiner 1. Mr. Vinod Kumar	vinod.kumar@shobhituniversity.ac.in 9758749227
		2. Ms. Sumika Jain	sumika.jain@shobhituniversity.ac.in 9456666326
27.	ARTIFICIAL INTELLIGENCE (CCSN 401)	External Examiner 1. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192
		3. Dr. Mamta Bansal	mamta.bansal345@gmail.com

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional
Area Gangoh, Distt. Saharanpur (U.P.)
247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

			9997025606
		Internal Examiner 1. Ms. Sumika Jain	sumika.jain@shobhituniversity.ac.in 9456666326
		2. Mr. Anil Kumar	anil.joshi@shobhituniversity.ac.in 9690758787
28.	DISTRIBUTED COMPUTING SYSTEMS (CCSN 403)	External Examiner 1. Dr. Arun Giri	arungiri123@yahoo.com 9818809053
		2. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		3. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		Internal Examiner 1. Mr. Nitin Kumar	nitin.kumar@shobhituniversity.ac.in 9758170029
		2. Mr. Kuldeep Chauhan	kuldeep.chauhan@shobhituniversity.ac.in 9756997090
29.	ADVANCED COMPUTER SYSTEM ARCHITECTURE (CCSN 405)	External Examiner 1. Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192
		2. Dr. Mamta Bansal	mamta.bansal345@gmail.com 9997025606
		3. Dr. Arun Giri	arungiri123@yahoo.com 9818809053
		Internal Examiner	mohd.ahamad@shobhituniversity.ac.in

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional
Area Gangoh, Distt. Saharanpur (U.P.)
247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

		1. Mohd Ahamad	9548159750
		2. Mr. Hamid Ali	hamid.ali@shobhituniversity.ac.in 9759302770
30.	PYTHON (CCSN 415)	External Examiner 1. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		2. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		3. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		Internal Examiner 1. Mr. Vinod Kumar	vinod.kumar@shobhituniversity.ac.in 9758749227
		2. Mr. Kuldeep Chauhan	kuldeep.chauhan@shobhituniversity.ac.in 9756997090
31.	COMPUTER BASED NUMERICAL & STATISTICAL TECHNIQUES (CUCS 447)	External Examiner 1. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192
		3. Dr. Mamta Bansal	mamta.bansal345@gmail.com 9997025606
		Internal Examiner 1. Mr. Abdulla Khan	abdulla.khan@shobhituniversity.ac.in 7454976780
		2. Mr. Raveendra Kr. Bharati	raveendra.bharati@shobhituniversity.ac.ir

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

			9953328744
32.	LAW FOR ENGINEERS (CBSN 401)	External Examiner 1. Dr. Arun Giri	arungiri123@yahoo.com 9818809053
		2. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		3. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		Internal Examiner 1. Mr. Kuldeep Chauhan	kuldeep.chauhan@shobhituniversity.ac.in 9756997090
		2. Mr. Mahendra Kumar	mahendra.kumar@shobhituniversity.ac.in 9458432303
33.	ARTIFICIAL INTELLIGENCE LAB (CCSN 451)	External Examiner 1. Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192
		2. Dr. Mamta Bansal	mamta.bansal345@gmail.com 9997025606
		3. Dr. Arun Giri	arungiri123@yahoo.com 9818809053
		Internal Examiner 1. Ms. Sumika Jain	sumika.jain@shobhituniversity.ac.in 9456666326
		2. Mr. Anil Kumar	anil.joshi@shobhituniversity.ac.in 9690758787
34.	DISTRIBUTED	External Examiner	dr.abhay@iitroorkee.ac.in

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional
Area Gangoh, Distt. Saharanpur (U.P.)
247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

	COMPUTING SYSTEMS LAB (CCSN 453)	1. Dr. Abhay Bhatia	9837386973
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192
		3. Dr. Mamta Bansal	mamta.bansal345@gmail.com 9997025606
		Internal Examiner 1. Mr. Nitin Kumar	nitin.kumar@shobhituniversity.ac.in 9758170029
		2. Mr. Kuldeep Chauhan	kuldeep.chauhan@shobhituniversity.ac.in 9756997090
35.	SEMINAR & GROUP DISCUSSION (CCSN 481)	External Examiner 1. Dr. Arun Giri	arungiri123@yahoo.com 9818809053
		2. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		3. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		Internal Examiner 1. Dr. Tarun Kumar Sharma	tarun.sharma@shobhituniversity.ac.in 9456086759
		2. Dr. Mahipal Singh	registrargangh@shobhituniversity.ac.in 9759174581

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail:
U: www.su.ac.in

SHOBHIT UNIVERSITY GANGOH
School of Engineering and Technology

Date: 28/11/2024

NOTICE

Subject: Meeting of the Board of Studies

All members of the Board of Studies are hereby informed that a meeting will be held as per the following details:

Date: 10/12/2024
Time: 02.00 PM
Venue: SOET, Shobhit University, Gangoh

Agenda:

1. Confirmation of minutes of the previous meeting
2. **New Interdisciplinary Courses to be added in BCA 2nd semester and MCA 2nd semester w.e.f. the academic session 2024-25**
3. Analysis of the Students' feedback & Action taken report and Analysis of the feedback on curriculum from stakeholders
4. Approval of Examiners (Theory & Practical) and Paper Setters for the even semester courses in BCA, MCA, B.Tech & M.Tech for session **Jan. to June. 2025.**
5. Discussion on the value Added courses offered for students and ratification of the same.
6. Any other matter with the permission of the Chair

All members are requested to make it convenient to attend the meeting and come prepared with relevant documents and suggestions..

Prof.(Dr.) Varun Bansal
Chairperson, Board of Studies
Head of the Department
28/11/2024

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EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
Web: www.sug.ac.in

SHOBHIT UNIVERSITY GANGOH
School of Engineering and Technology

Date: 28/11/2024

To
Dr. Rajesh Kumar Saini
Head of the Department
Dept. of Mathematics Science and Computer Application
Bundelkhand University, Jhansi

Subject: Invitation to Attend the Board of Studies Meeting

Dear Sir

Greetings from School of Engineering and Technology

We are pleased to invite you to participate as an external subject expert in the upcoming meeting of the Board of Studies for the School of Engineering and Technology, scheduled as follows:

Date: 10/12/2024
Time: 02.00 PM
Mode: SOET, Shobhit University, Gangoh

The meeting will deliberate on important academic matters including syllabus revision, new course proposals, and academic planning for the upcoming session. Your expert insights and contributions would be invaluable to the academic enrichment of our programs.

We request you to kindly confirm your availability and mode of attendance at your earliest convenience. For online participation, a meeting link will be shared upon confirmation. If attending in person, necessary hospitality arrangements will be made.

We look forward to your positive response and support.

Thank you.

Warm regards,

Prof. (Dr.) Varun Bansal
Chairperson, Board of Studies

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: [illegible]
U: [illegible]

SHOBHIT UNIVERSITY GANGOH
School of Engineering and Technology

Date: 28/11/2024

To
Dr. Neeraj Singhal
Professor
School of Computer Science and Engineering
Sir Chhotu Ram Institute of Engineering & Technology

Subject: Invitation to Attend the Board of Studies Meeting

Dear Sir

Greetings from School of Engineering and Technology

We are pleased to invite you to participate as an external subject expert in the upcoming meeting of the Board of Studies for the School of Engineering and Technology, scheduled as follows:

Date: 10/12/2024
Time: 02.00 PM
Mode: SOET, Shobhit University, Gangoh

The meeting will deliberate on important academic matters including syllabus revision, new course proposals, and academic planning for the upcoming session. Your expert insights and contributions would be invaluable to the academic enrichment of our programs.

We request you to kindly confirm your availability and mode of attendance at your earliest convenience. For online participation, a meeting link will be shared upon confirmation. If attending in person, necessary hospitality arrangements will be made.

We look forward to your positive response and support.

Thank you.

Warm regards,

Prof.(Dr.) Varun Bansal
Chairperson, Board of Studies

School of Engineering and Technology ★ Shobhit University Gangoh ★

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institution
Arta Gangoh, Distt. Saharanpur (U.P.)
247341, India
Tel: +91 7830810062
E-mail: registrarg
U : www.sug

SHOBHIT UNIVERSITY GANGOH
School of Engineering and Technology

Date: 10/12/2024

Attendance Sheet (School of Engineering and Technology, BOS Meeting on 10/12/2024)

Sr. No	Name	External/Internal Member	Signature
1	Prof.(Dr.) Rajesh Kumar Saini	External Expert	
2	Dr. Neeraj Singhal	External Expert	
3	Dr. Mahipal Singh	Internal Member	
4	Dr. Jasvir Singh Rana	Internal Member	

Chairman

School of Engineering and Technology ★ Shobhit University Gangoh ★

School of Engineering & Technology

Date: 10.12.2024

Minutes of the Meeting of Board of Studies

24th Meeting of the Board of Studies of the School of Engineering and Technology, Shobhit University Gangoh was organized on 10th Dec. 2024 at 02:00 PM onwards. The following members were present in the meeting:

1.	Prof. (Dr.) Varun Bansal Head of the Department Computer Science and Engineering Shobhit University Gangoh	Chairperson
2.	Prof. (Dr.) Rajesh Kumar Saini Head of the Department Dept. of Mathematics Science and Computer Application Bundelkhand University, Jhansi	External expert
3.	Dr. Neeraj Singhal Professor School of Computer Science and Engineering Sir Chhotu Ram Institute of Engineering & Technology	External Expert
4.	Dr. Mahipal Singh, Professor School of Engineering and Technology Shobhit University Gangoh	Member
5.	Dr. Jasvir Singh Rana Professor School of Engineering and Technology Shobhit University Gangoh	Member

Welcome address by Chairman

The Chairman extended a warm welcome to all the members of Board of Studies and the following information was tabled before the members of the Board of Studies:

Input given by the Subject Experts on the Scheme and syllabi of the ongoing Batches.

The following discussed and approved on Choice Based Credit System:

Item BOS 24.1: Approval of the Minutes of the 23rd BOS Meeting held on 14.06.2024 was circulated among the members and the same were notified after the approval of the Board of Studies. {Annexure- 1}

Item BOS 24.2: New Interdisciplinary Courses to be added in BCA 2nd semester and MCA 2nd semester w.e.f. the academic session 2024-25{Annexure-2}

- **BOS members approved the syllabus of BCA-205 D in BCA 2nd semester**
- **BOS members approved the syllabus of MCA-241E in MCA 2nd Semester.**

Item BOS 24.3:Analysis of Students' feedback & Action taken report:

- BOS Chairman has expressed that the student feedback and action taken report process is done at the end of semester. The BOS members noted the same.

Item BOS 24.4: Analysis of the feedback on curriculum from stakeholders:

- The BOS chairman presented the analysis report of stakeholders' feedback on curriculum. The BOS members noted the same and advised to incorporate the suggestions as per the feasibility. The Action Taken Report is enclosed herewith. {Annexure-3}

Item BOS 24.5: Approval of Examiners (Theory & Practical) and Paper Setters for the even semester courses in BCA, MCA , B. Tech & M. Tech for session **Jan. to June 2025.** The same is being sent to the Controller of Examinations, Shobhit University Gangoh, in a sealed cover. {Annexure-4}

Item BOS 24.6: Discussion on the Value Added courses offered for students and ratification of the same.

- BOS members approved the list of Value added courses offered to students.

The meeting ended with a vote of thanks to the Chairman, Board of Studies.

The suggestions given by the panel of BOS have been discussed with the Vice Chancellor and Dean Academics. The action taken on the suggestions has been approved by competent authorities.

Signed by:

SHOBHIT UNIVERSITY ★ 247341 ★ Chairman BOS

SHOBHIT UNIVERSITY (Vice Chancellor) CANCOH ★ 247341 ★

SHOBHIT UNIVERSITY (Dean Academics) ★ 247341 ★

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
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E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

24th Meeting of BOS (Item No. 24.1 Annexure -1)

School of Engineering & Technology

Date: 14.06.2024

Minutes of the Meeting of Board of Studies

23rd Meeting of the Board of Studies of the School of Engineering and Technology, Shobhit University Gangoh was organized on 14th June 2024 at 02:00 PM onwards. The following members were present in the meeting:

1. Prof. (Dr.) Varun Bansal — Chairperson
   Head of the Department
   Computer Science and Engineering
   Shobhit University Gangoh

2. Prof. (Dr.) Rajesh Kumar Saini — External expert
   Head of the Department
   Dept. of Mathematics Science and Computer Application
   Bundelkhand University, Jhansi

3. Dr. Neeraj Singhal — External Expert
   Professor
   School of Computer Science and Engineering
   Sir Chhotu Ram Institute of Engineering & Technology

4. Dr. Mahipal Singh, — Member
   Professor
   School of Engineering and Technology
   Shobhit University Gangoh

5. Dr. Jasvir Singh Rana — Member
   Professor
   School of Engineering and Technology
   Shobhit University Gangoh

Welcome address by Chairman
The Chairman extended a warm welcome to all the members of Board of Studies and the following information was tabled before the members of the Board of Studies:

Input given by the Subject Experts on the Scheme and syllabi of the ongoing Batches.

The following discussed and approved on Choice Based Credit System:

Item BOS 23.1: Approval of the Minutes of the 22nd BOS Meeting held on 21st Dec. 2023 was circulated among the members and the same were notified after the approval of the Board of Studies. {Annexure- 1}

Item BOS 23.2: New Interdisciplinary Courses to be added in M. Tech. 1st semester and B. Tech 1st semester w.e.f. the academic session 2024-25. {Annexure-2}

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.spg.ac.in

- **BOS members approved the syllabus of CE-511E in M. Tech 1st semester**
- **BOS members approved the syllabus of CPCN-101E B. Tech 1st Semester.**

Item BOS 23.3: Approval of Revision in Syllabus of BCA 2nd Semester and B. Tech 2nd, 4th and 6th Semester w. e. f. the academic session 2024-25.

- BOS approved Revision in Syllabus of BCA-252 in BCA 2nd semester.
- BOS approved Revision in Syllabus of CCSN-152, CCSN-256 and CCSN-352 in B. Tech 2nd, 4th semester and 6th Semester. {Annexure-3}

Item BOS 23.4: Analysis of Students' feedback & Action taken report:

- BOS Chairman has expressed that the student feedback and action taken report process is done at the end of semester. The BOS members noted the same.

Item BOS 23.5: Analysis of the feedback on curriculum from stakeholders:

- The BOS chairman presented the analysis report of stakeholders' feedback on curriculum. The BOS members noted the same and advised to incorporate the suggestions as per the feasibility. The Action Taken Report is enclosed herewith. {Annexure-4}

Item BOS 23.6: Approval of Examiners (Theory & Practical) and Paper Setters for the even semester courses in BCA, MCA , B. Tech & M. Tech for session **Jan. to June 2024** The same is being sent to the Controller of Examinations, Shobhit University Gangoh, in a sealed cover. {Annexure-5}

Item BOS 23.7: Discussion on the Value Added courses offered for students and ratification of the same.

- BOS members approved the list of Value added courses offered to students.

The meeting ended with a vote of thanks to the Chairman, Board of Studies.

The suggestions given by the panel of BOS have been discussed with the Vice Chancellor and Dean Academics. The action taken on the suggestions has been approved by competent authorities.

Signed by:

SHOBHIT UNIVERSITY ★ 247341 ★ (Chairman, BOS)

SHOBHIT UNIVERSITY ★ 247341 ★ (Dean Academics)

SHOBHIT UNIVERSITY ★ GANGOH ★ 247341 ★ (Vice Chancellor)

24th Meeting of BOS (Item No. 24.2 Annexure -2)

Shobhit University

EDUCATION EMPOWERS

Shobhit University, Gangoh

(Established by UP Shobhit University Act No. 3, 2012)

School of School of Engineering and Technology

Ordinances, Regulations & Syllabus

For

Bachelor of Computer Application (BCA) Three Year Programme

Semester System

(w.e.f. session 2013-14)

Approved and adopted in the year 2021 (17th Meeting, Board of Studies)

24th Meeting of BOS (Item No. 24.2 Annexure -2)

Shobhit University

EDUCATION EMPOWERS

Shobhit University, Gangoh

(Established by UP Shobhit University Act No. 3, 2012)

School of School of Engineering and Technology

Ordinances, Regulations & Syllabus

For

Bachelor of Computer Application (BCA) Three Year Programme

Semester System

(w.e.f. session 2013-14)

Approved and adopted in the year 2021 (17th Meeting, Board of Studies)

Shobhit University, Gangoh (Saharanpur)
Teaching Scheme
Effective from 2021

II Semester

Subject Code	Subject	L	L	P	Cr.
BCA-201	OOPS Using C++	4			4
BCA-202	Database Management Systems	4			4
BCA-203	Web & E-Commerce Technologies	4			4
BCA-204	Discrete Structures	4			4
BCA-204 A	Set Theory				
BCA-204 B	Graph Theory				
BCA-204 C	Discrete Probability				
BCA-205	Environmental Studies	4			4
BCA-205 A	Environmental Science				
BCA-205 B	Natural Resource Management				
BCA-205 C	Pollution Control				
BCA-205 D	Environmental Policy and Governance				
BCA-251	OOPS Using C++ Lab			4	2
BCA-252	Database Management Systems Lab			4	2
BCA-253	Seminar Based on Learning			4	2
	Total Credits	**20**		**12**	**26**

BCA-205 D

Environmental Policy and Governance

L	T	P	Cr
4	0	0	4

Course Objectives:

1. Understand key principles of environmental policy and governance.
2. Analyze environmental laws, regulations, and frameworks.
3. Examine the role of institutions in environmental management.
4. Develop skills to design and evaluate policy interventions.
5. Promote sustainable decision-making and stakeholder engagement.

Course Outcomes:

1. Demonstrate knowledge of environmental policies and governance structures.
2. Critically assess environmental regulations and their impact.
3. Apply governance concepts to real-world environmental issues.
4. Design effective policy strategies for sustainability challenges.
5. Communicate environmental governance issues clearly to diverse audiences.

Unit 1: Introduction to Environmental Policy and Governance covers the fundamental concepts, definitions, the importance of environmental policies, and their historical development.

Unit 2: Environmental Laws and Regulations focuses on key national and international laws, regulatory frameworks, and mechanisms for compliance and enforcement.

Unit 3: Institutions and Stakeholders in Environmental Governance examines the roles of government agencies, non-governmental organizations, community participation, the private sector, and international bodies.

Unit 4: Policy Formulation and Implementation explores the policy-making process, various tools and instruments used in environmental policy, and the challenges faced during implementation.

Unit 5: Sustainable Development and Future Directions emphasizes integrating sustainability into governance, emerging trends and innovations, and includes relevant case studies and best practices.

Scheme of Teaching

TEACHING SCHEME OF MCA 1st YEAR (2nd SEMESTER)

Code	Course Title	Cr.	L	T	P
MCA-201	Software Engineering & Project Management	4	3	1	0
MCA-202	ASP .Net	4	3	1	0
MCA-203	Python	4	3	1	0
MCA-204	Artificial Intelligence	4	3	1	0
MCA-231	Distributed Operating System	4	3	1	0
MCA-251	Lab Software Engineering and Project Management	2	0	0	4
MCA-252	Lab ASP. Net	2	0	0	4
MCA-253	Lab Python	2	0	0	4
	Total	26	15	5	6

PROFESSIONAL ELECTIVE-II

1. MCA-231 Distributed Operating System
2. MCA-232 Embedded System
3. MCA-233 Linux/ Unix

OPEN ELECTIVE

1. MCA-241 Cloud Computing
2. MCA-241 A Digital Electronics
3. MCA-241 B Business Communication
4. MCA-241 C Research Methodologies
5. MCA-241 D Cognitive Analytics and social skills for Professional Development
6. MCA-241 E Data Analytics and Decision Making

MCA-241 E

Data Analytics and Decision Making

L	T	P	Cr
3	1	0	4

COURSE OBJECTIVES:

The objectives of this course are to

1. Understand the fundamentals of data analytics and decision-making.
2. Learn data collection, cleaning, and processing techniques.
3. Apply statistical methods for data analysis.
4. Explore predictive analytics and machine learning concepts.
5. Develop decision-making models and frameworks.

Course Outcomes:

At the end of this course, students will demonstrate the ability to:

1. Understand advanced mathematical concepts and theories.
2. Solve complex mathematical problems using advanced techniques.
3. Apply mathematical methods to various real-world situations.
4. Develop analytical and critical thinking skills.
5. Master topics like calculus, linear algebra, and differential equations.

Unit 1: The unit introduces the basics of data analytics, covering data collection, types of data, and the importance of data analysis in decision-making processes. It explores key concepts such as data types, data visualization, and basic statistical tools used in analytics.

Unit 2: This unit focuses on data processing and cleaning techniques, including data wrangling, handling missing data, and transforming raw data into a usable format. It also covers techniques for ensuring data quality and integrity.

Unit 3: The unit explores statistical analysis methods and their applications in decision making. Topics include descriptive statistics, probability distributions, hypothesis testing, and inferential statistics, all aimed at supporting informed decisions.

Unit 4: This unit covers predictive analytics and the use of machine learning techniques. It introduces concepts like regression, classification, clustering, and model evaluation to predict future trends and make data-driven decisions.

Unit 5: The final unit examines decision-making models and frameworks, such as decision trees, optimization, and risk analysis. It looks at how these models can be applied to solve complex problems and improve decision-making in business and other fields.

TEXT BOOKS:-

1. Data Science for Business" by Foster Provost and Tom Fawcett
2. Data Analytics: Models and Algorithms for Intelligent Data Analysis" by Thomas A. Runkler
3. Business Analytics: Data Analysis & Decision Making" by S. Christian Albright and Wayne L. Winston
4. The Analytics Lifecycle Toolkit: A Practical Guide for an Effective Analytics Capability" by Gregory S. Nelson
5. Introduction to Data Science: A Python Approach to Concepts, Techniques, and Applications" by Rafael A. Irizarry

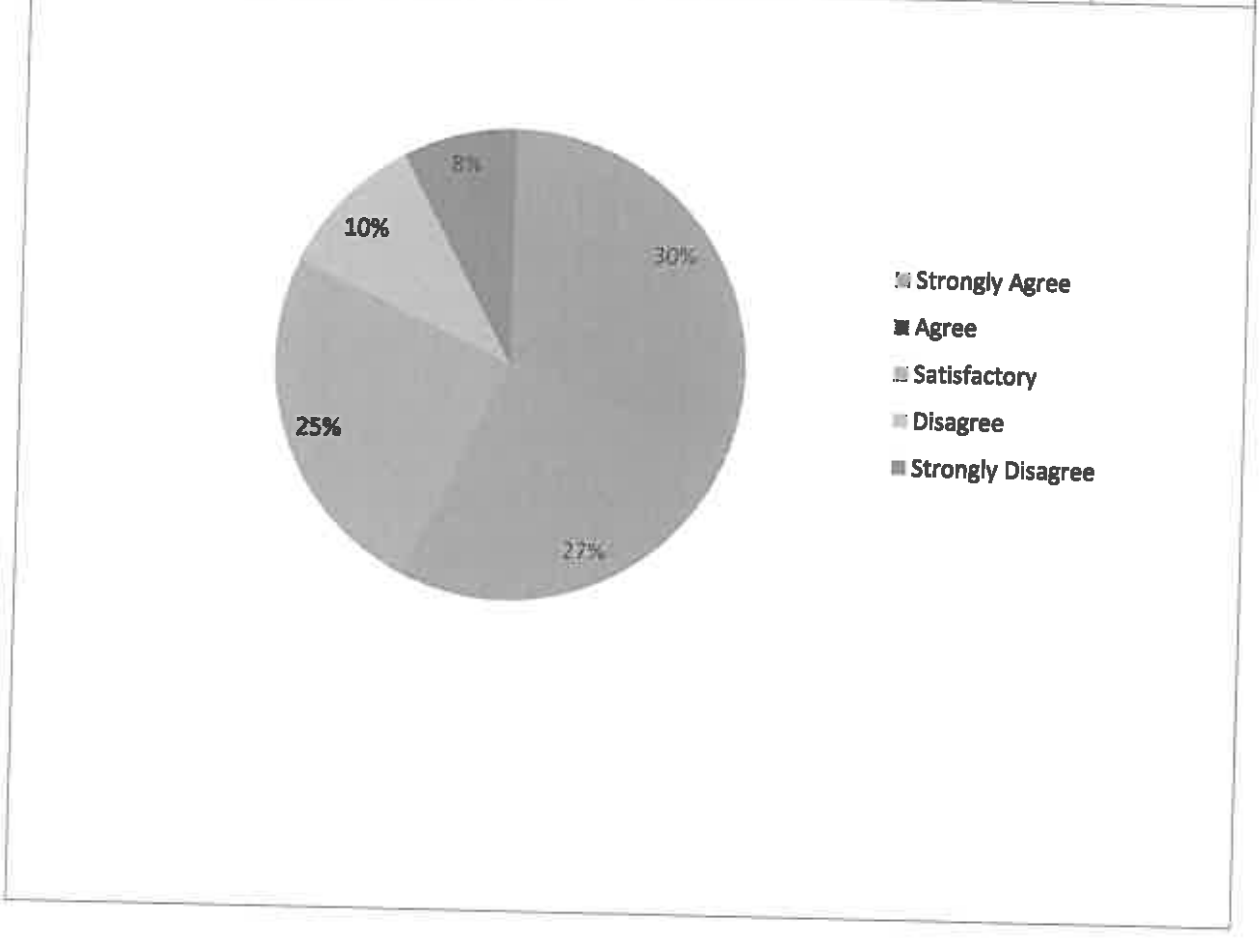
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EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
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E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

24th Meeting of BOS (Item No. 24.3 Annexure -3)

Analysis of Alumni' Feedback of School of Engineering and Technology through Table and Pie Chart

Q.1 The courses based on state of art trends and recent developments?

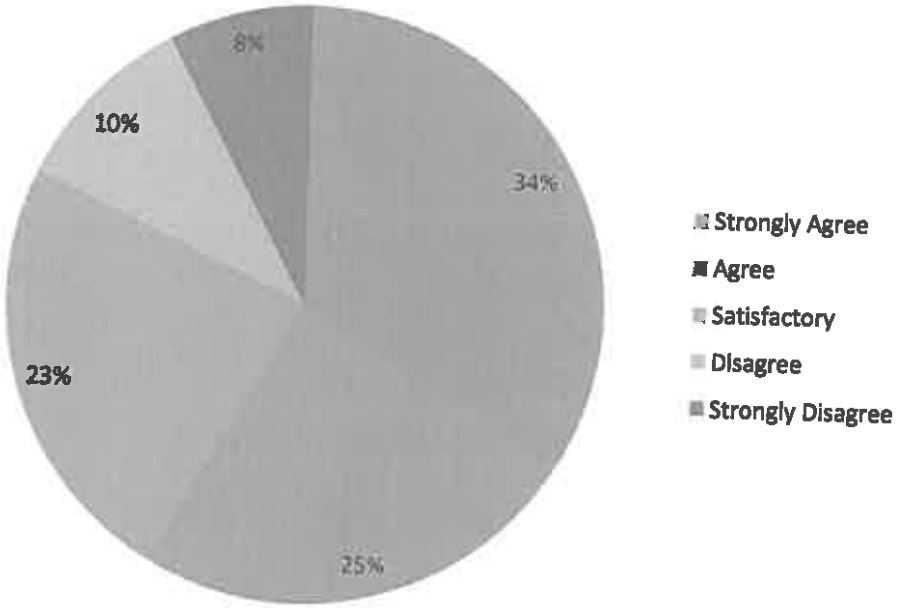
The courses based on state of art trends and recent developments	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	30.34	26.97	24.72	10.11	7.87



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U.: www.sug.ac.in

Q.2 The courses found to be helpful in developing skills and knowledge in respective domain?

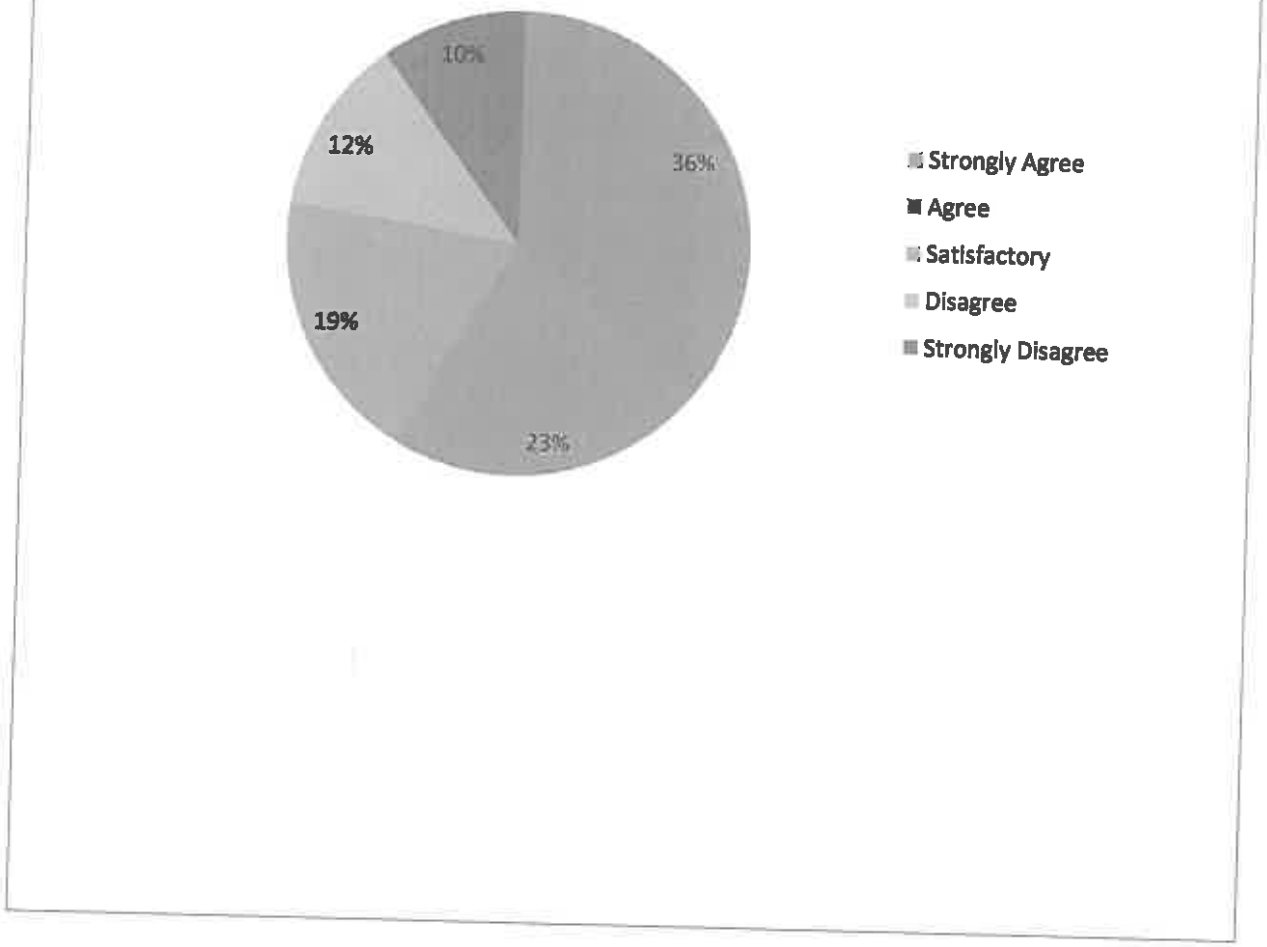
The courses found to be helpful in developing skills and knowledge in respective domain	Strongly Agree	Agree	satisfactory	Disagree	Strongly Disagree
Response (%)	33.71	24.72	23.60	10.11	7.87



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Q.3 The courses found to be productive in competing professionally at national/international level?

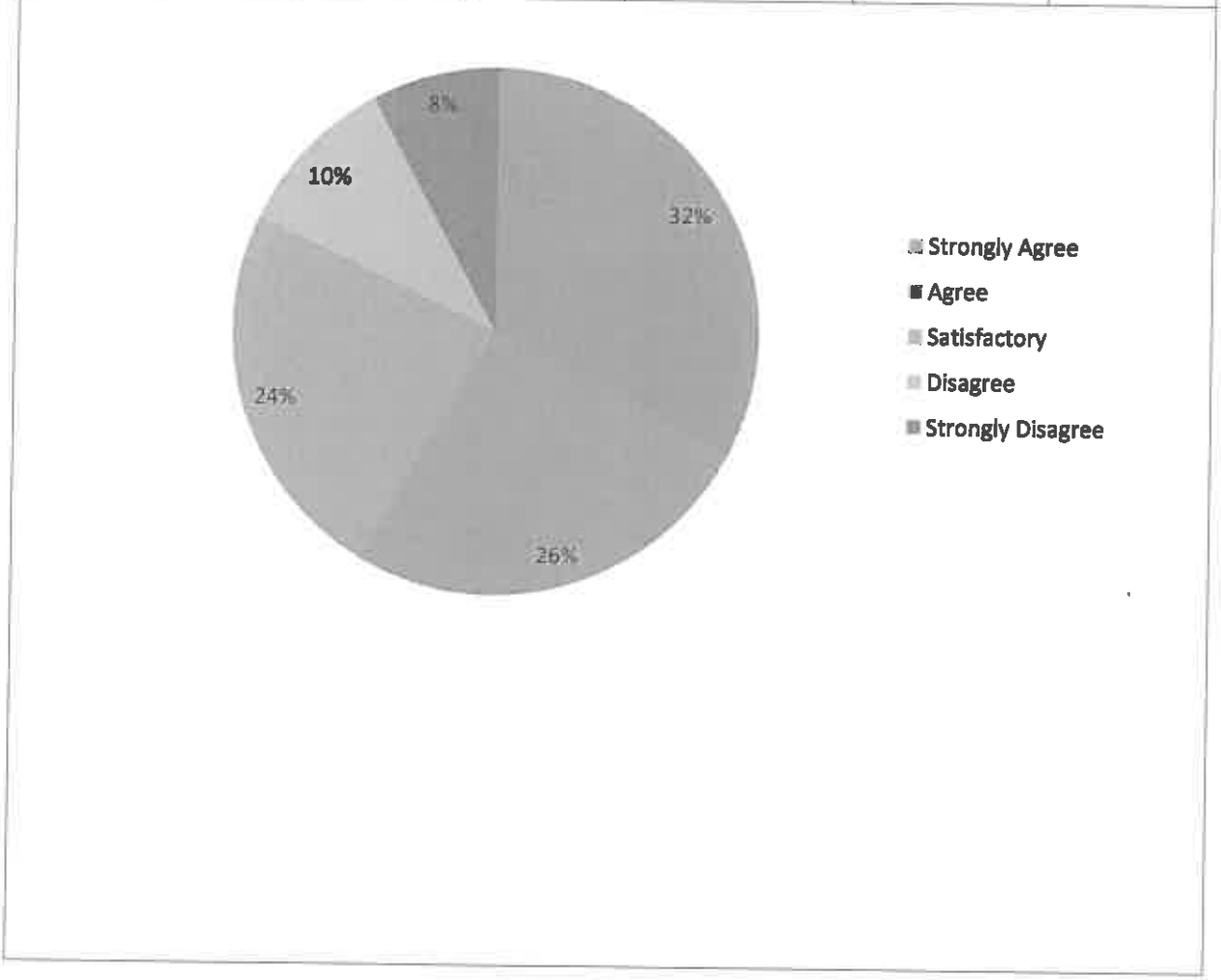
The courses found to be productive in competing professionally at national/international level	Strongly Agree	Agree	satisfactory	Disagree	Strongly Disagree
Response (%)	35.96	22.47	19.10	12.36	10.11



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Babu Vijendra Marg, Adarsh Institutional
Area Gangoh, Distt. Saharanpur (U.P.)
247341, India
Tel: +91 7830810052
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Q.4 The courses found to be appropriate in motivating students towards nation building by inculcating ethical and professional values?

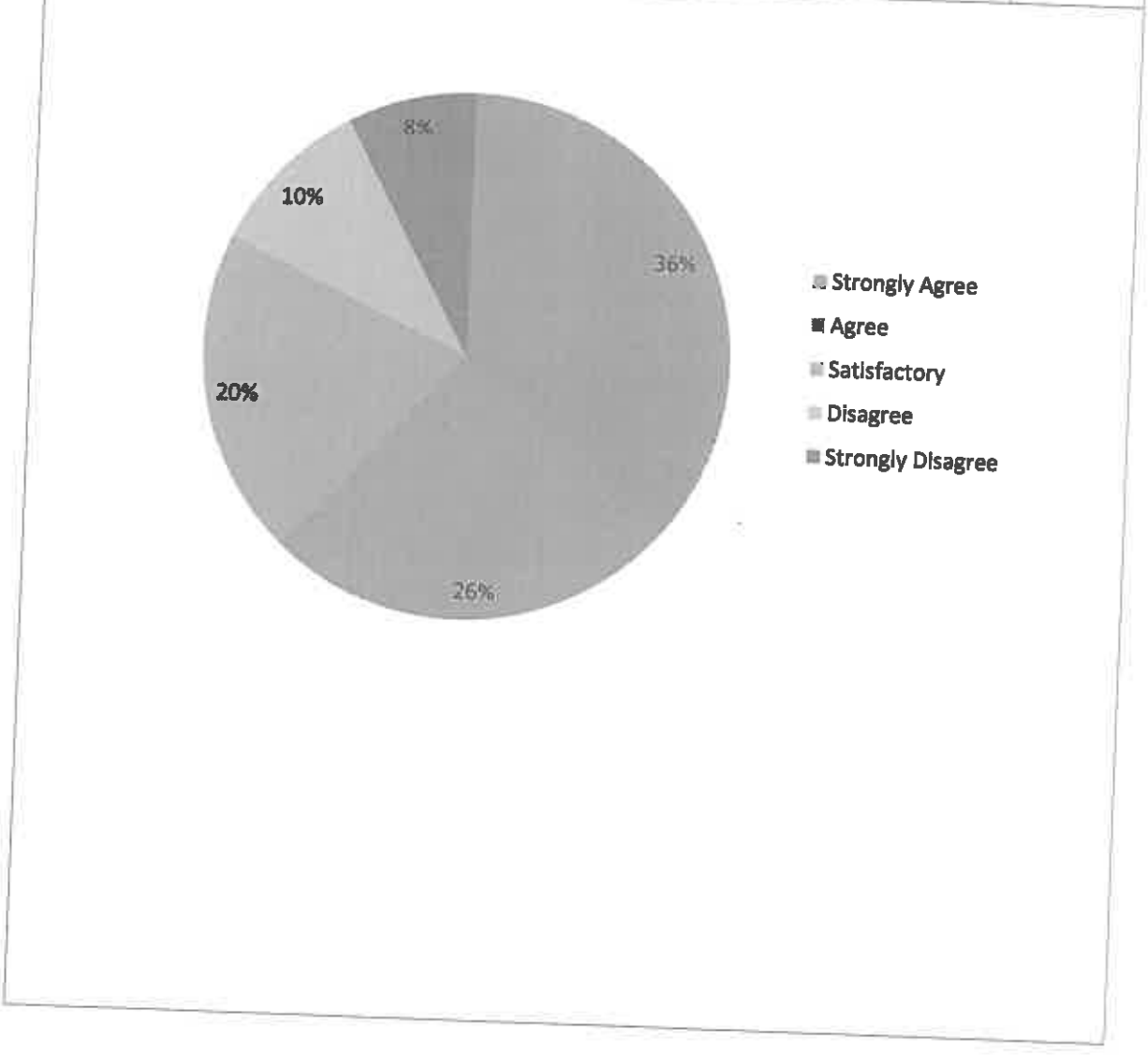
The courses found to be appropriate in motivating students towards nation building by inculcating ethical and professional values	Strongly Agree	Agree	satisfactory	Disagree	Strongly Disagree
Response (%)	32.58	25.84	23.60	10.11	7.87



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Q.5 The programme helped to understand the impact of domain knowledge in social and global context?

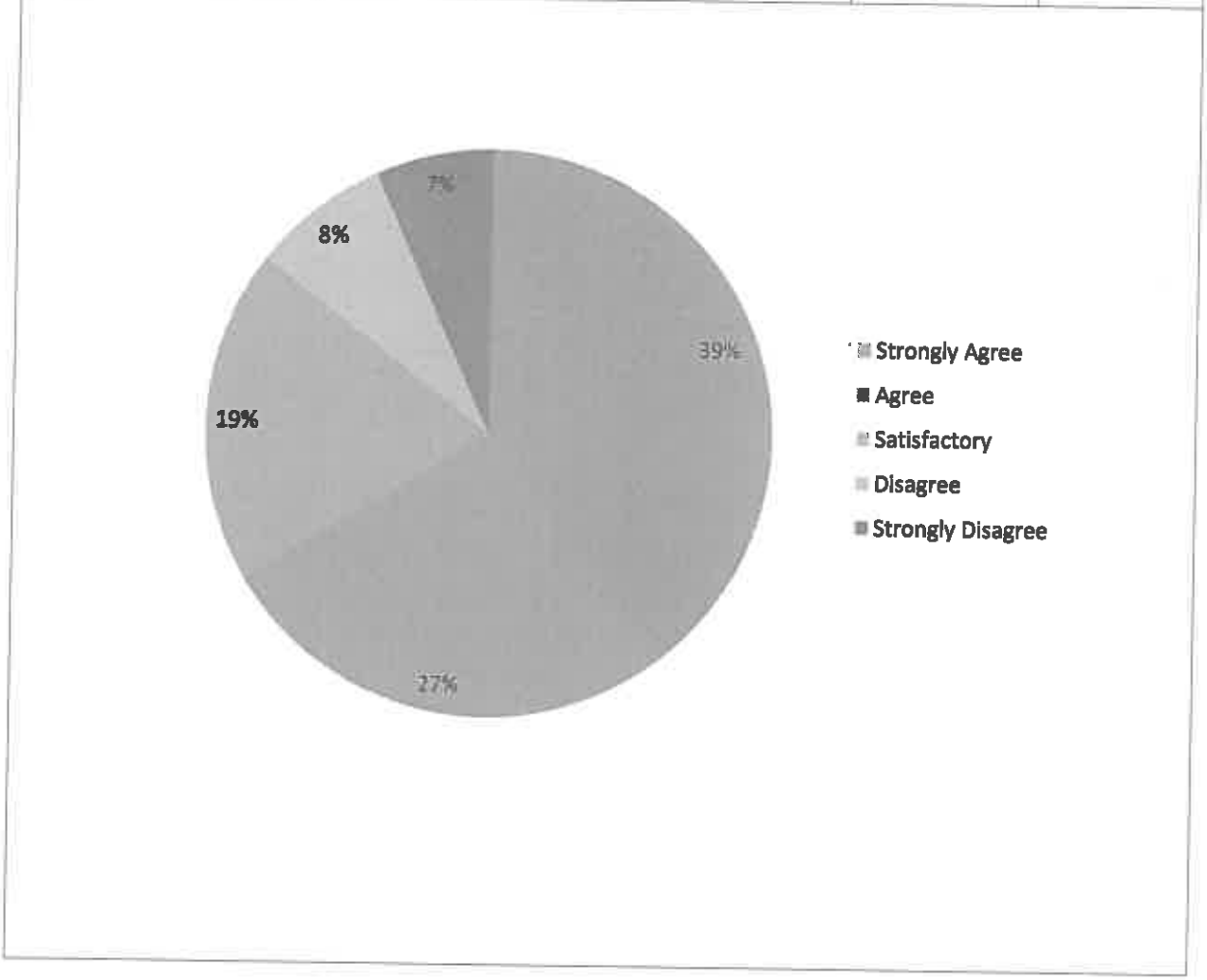
The programme helped to understand the impact of domain knowledge in social and global context	Strongly Agree	Agree	satisfactory	Disagree	.Strongly Disagree
Response (%)	35.96	25.84	20.22	10.11	7.87



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Q.6 Theprogramme provided awareness on recent advancements and innovations?

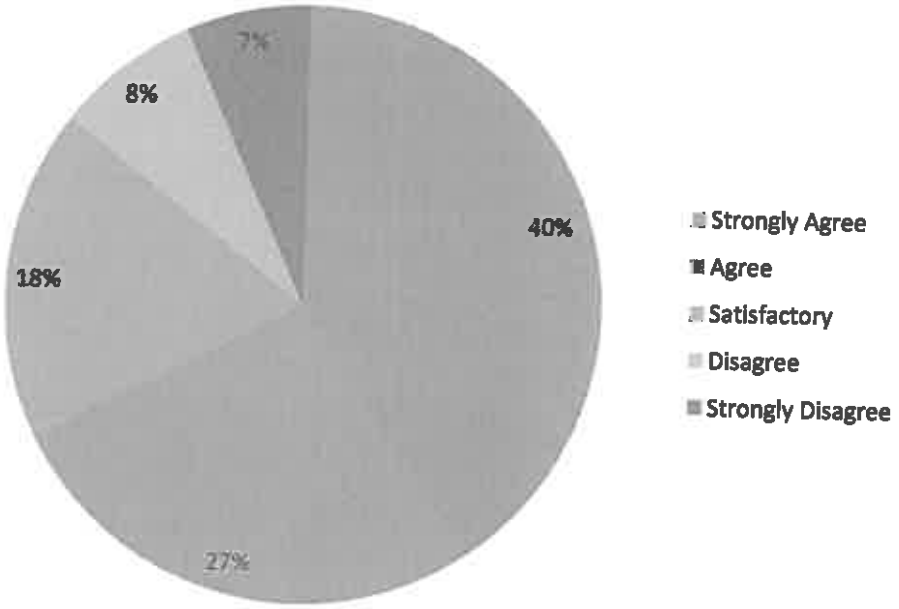
The programme provided awareness on recent advancements and innovations	Strongly Agree	Agree	satisfactory	Disagree	Strongly Disagree
Response (%)	39.33	26.97	19.10	7.87	6.74



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Q.7 Theprogramme improved critical thinking ability and problem-solving aptitude.

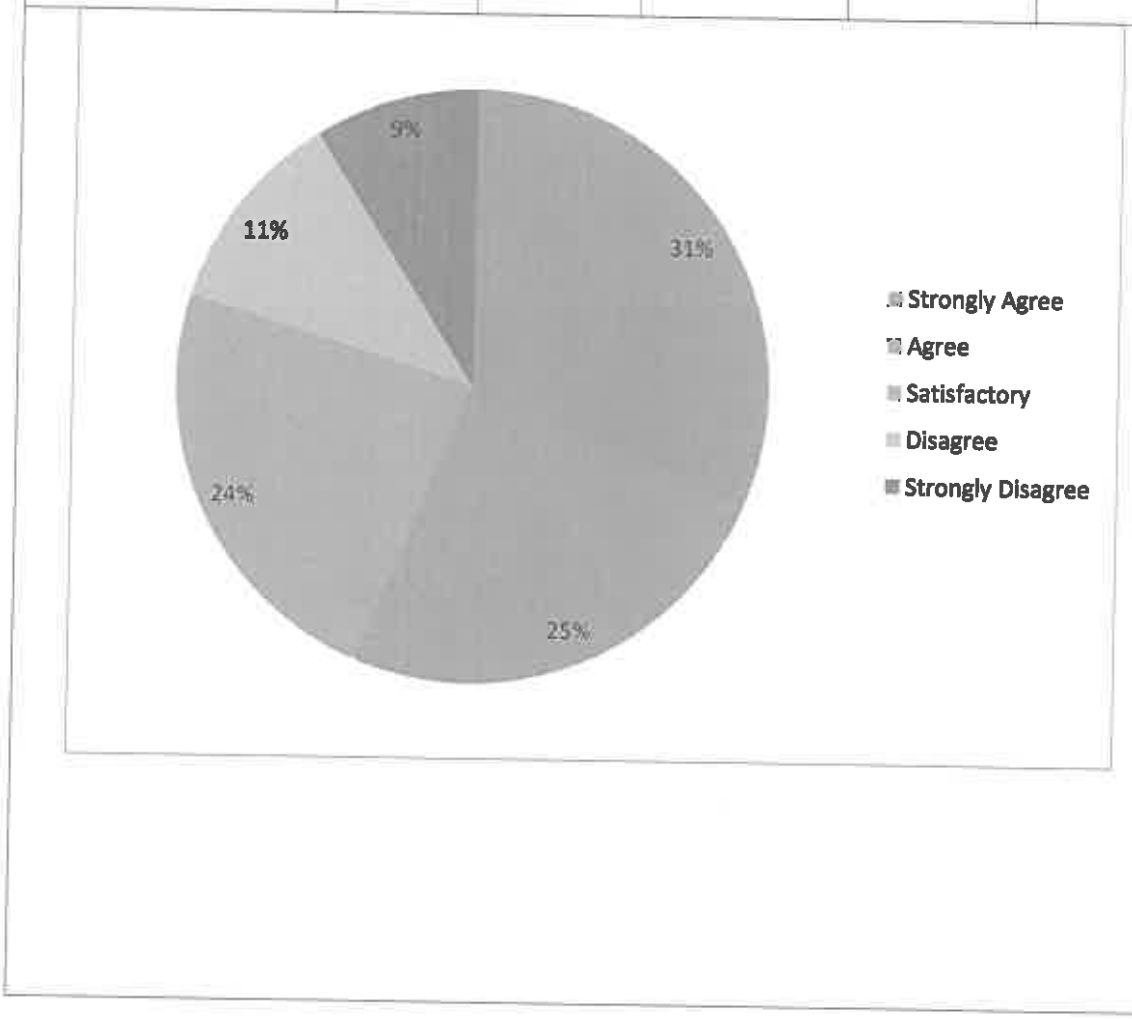
The programme improved critical thinking ability and problem-solving aptitude.	Strongly Agree	Agree	satisfactory	Disagree	Strongly Disagree
Response (%)	40.45	26.97	17.98	7.87	6.74



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Q.8 Theprogramme helped to take independent decisions and perform managerial &administerial functions diligently?

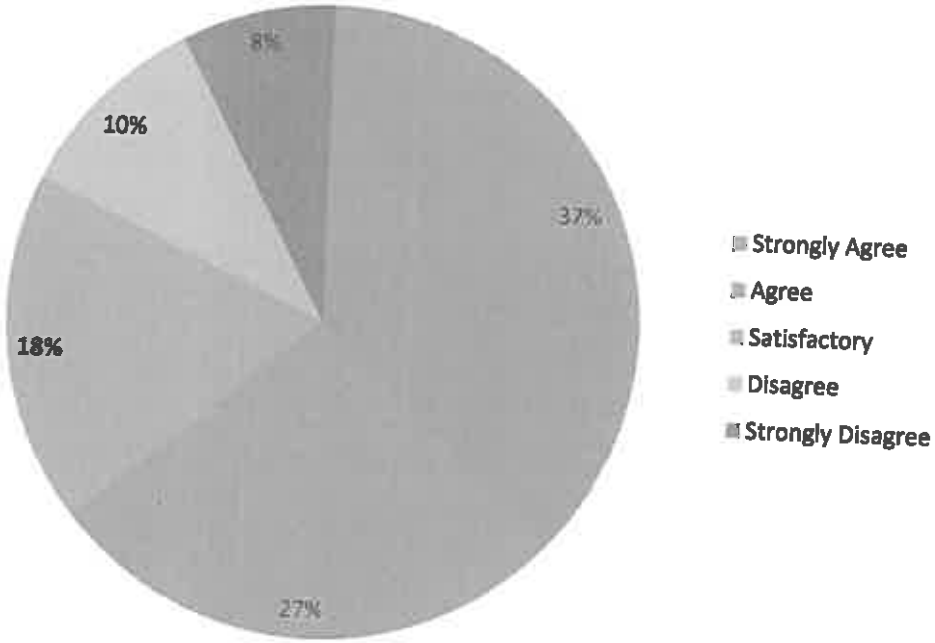
The programmehelped to take independent decisions and perform managerial &administerial functions diligently.	Strongly Agree	Agree	satisfactory	Disagree	Strongly Disagree
Response (%)	31.46	24.72	23.60	11.24	8.99



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Q.9 The curriculum was helpful in acquiring advance level knowledge to pursue research and higher studies?

The curriculum was helpful in acquiring advance level knowledge to pursue research and higher studies	Strongly Agree	Agree	satisfactory	Disagree	Strongly Disagree
Response (%)	37.08	26.97	17.98	10.11	7.87



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Babu Vijendra Marg, Adarsh Institutional
Area Gangoh, Distt. Saharanpur (U.P.)
247341, India
Tel: +91 7830810052
E-mail: regis.rargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

School of Engineering & Technology (89)							
Sr No	**Questions**	**Details**	**Strongly Agree**	**Agree**	**Satisfactory**	**Disagree**	**Strongly Disagree**
1	The courses based on state of art trends and recent developments?	No of Alumni	27	24	22	9	7
		Percentage	30.34	26.97	24.72	10.11	7.87
2	The courses found to be helpful in developing skills and knowledge in respective domain?	No of Alumni	30	22	21	9	7
		Percentage	33.71	24.72	23.60	10.11	7.87
3	The courses found to be productive in competing professionally at national/international level?	No of Alumni	32	20	17	11	9
		Percentage	35.96	22.47	19.10	12.36	10.11
4	The courses found to be appropriate in motivating students towards nation building by inculcating ethical and professional values?	No of Alumni	29	23	21	9	7
		Percentage	32.58	25.84	23.60	10.11	7.87
5	The programme helped to understand the impact of domain knowledge in social and global context?	No of Alumni	32	23	18	9	7
		Percentage	35.96	25.84	20.22	10.11	7.87
6	The programme provided awareness on recent advancements and innovations?	No of Alumni	35	24	17	7	6
		Percentage	39.33	26.97	19.10	7.87	6.74
7	The programme improved critical thinking ability and problem-solving aptitude.	No of Alumni	36	24	16	7	6
		Percentage	40.45	26.97	17.98	7.87	6.74
8	The programme helped to take independent decisions and perform managerial &administerial functions diligently?	No of Alumni	28	22	21	10	8
		Percentage	31.46	24.72	23.60	11.24	8.99
9	The curriculum was helpful in acquiring advance level knowledge to pursue research and higher studies?	No of Alumni	33	24	16	9	7
		Percentage	37.08	26.97	17.98	10.11	7.87

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Analysis of the Feedback

The alumni feedback reflects a generally positive view of the curriculum, with a few areas for improvement. High ratings (82.02%) were given for aspects such as developing domain-specific skills and knowledge, fostering ethical and professional values, promoting managerial competencies, and preparing students for both professional success and nation-building. These areas indicate that the curriculum is well-aligned with foundational career skills and ethical leadership. However, the feedback also highlights several areas where the curriculum may need enhancement. Lower ratings, particularly in the alignment with state-of-the-art trends (73.00%), global competitiveness (73.00%), critical thinking and problem-solving (73.00%), and research readiness (73.00%), suggest that the curriculum could benefit from stronger integration of cutting-edge developments, deeper engagement with global challenges, and a greater focus on advanced academic inquiry. The relatively low score (69.00%) for understanding the impact of domain knowledge in a social and global context further underscores the need for a broader, more interdisciplinary approach. Overall, while the curriculum is effective in building practical skills and professional values, there is room to improve its relevance to contemporary trends and its ability to foster higher-level critical thinking and research capabilities.

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247341, India
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E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

Action Taken Report

(School of Engineering & Technology)

Sr. No.	Suggestions	Action taken	Outcome
1	Improve alignment with state-of-the-art trends and technological advancements.	Integrated cutting-edge topics such as artificial intelligence, machine learning, blockchain technology, renewable energy systems, and Industry 4.0 into the curriculum. Introduced lab sessions focusing on emerging technologies and hands-on experience with the latest tools and software.	Students gained practical exposure to advanced technologies, enhancing their readiness for future industry needs; better alignment with current industry trends.
2	Strengthen global competitiveness and prepare students for international engineering challenges.	Established partnerships with international universities and engineering firms for student exchanges, internships, and joint research projects. Developed a curriculum that includes global engineering standards and practices.	Increased international exposure for students; more alumni securing roles in global engineering firms; better understanding of international engineering practices.
3	Enhance focus on critical thinking, problem-solving, and research readiness.	Introduced advanced courses in engineering problem-solving, creative design thinking, and research methodology. Promoted student participation in research projects, hackathons, and engineering competitions.	Improved student performance in engineering design challenges and competitions; enhanced problem-solving and critical thinking skills across the student body.
4	Broaden understanding of the social and global impact of engineering knowledge.	Added modules on the social, ethical, and environmental implications of engineering projects. Conducted seminars on sustainable engineering practices, engineering ethics, and the role of engineers in global development.	Students developed a deeper understanding of the broader impacts of their work on society and the environment; greater participation in sustainability and ethics initiatives.



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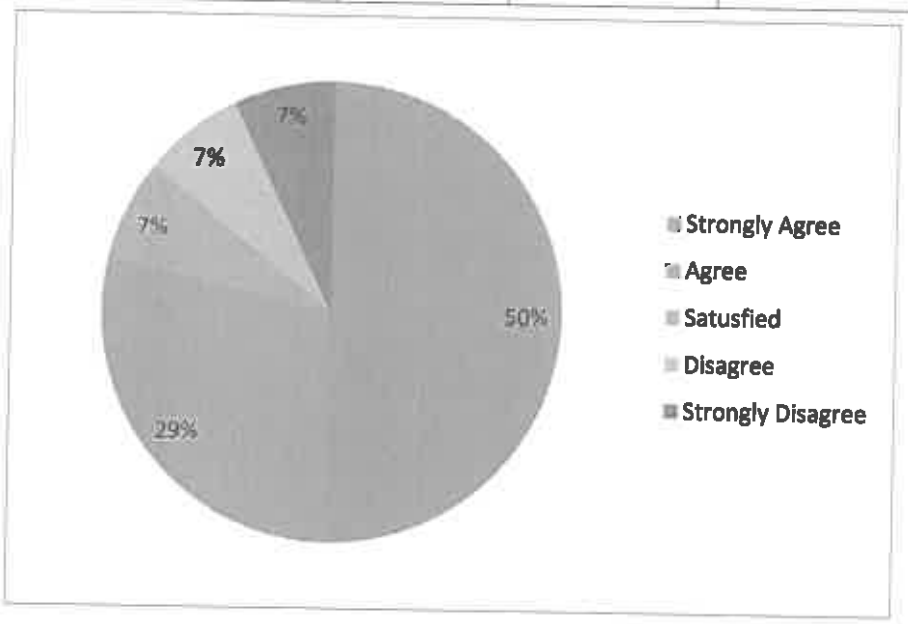
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Area Gangoh, Distt. Saharanpur (U.P.)
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Analysis of Employer's Feedback of School of Engineering and Technology through Table and Pie Chart

Q.1 curriculum assists the students to acquire necessary entry level skills in industrial sector.

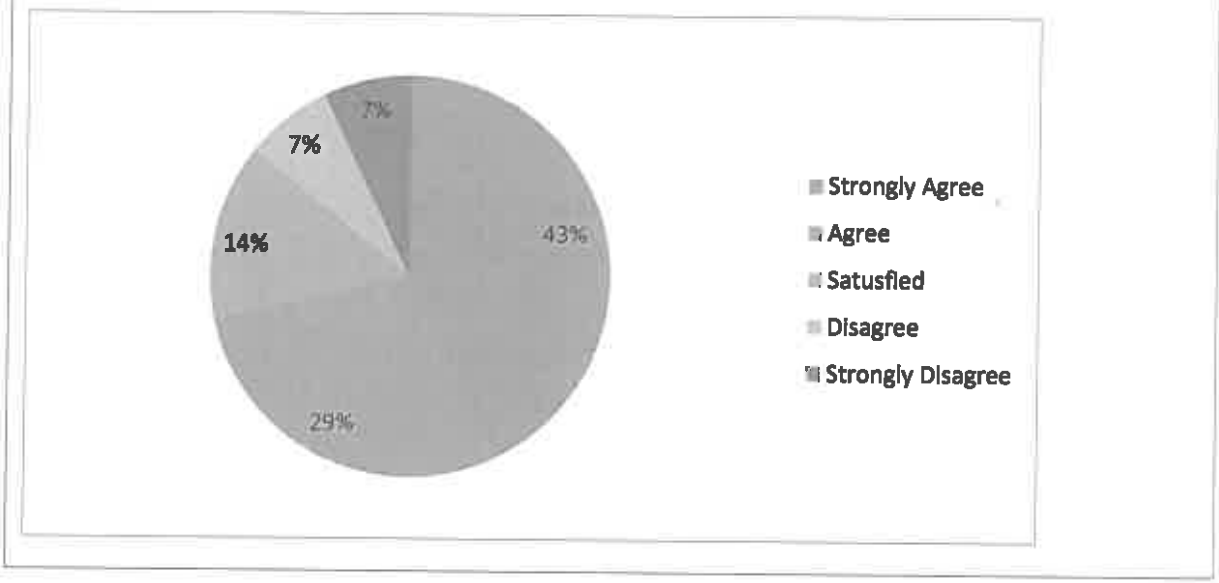
The curriculum assists the students to acquire necessary entry level skills in industrial sector.	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	50.0	28.6	7.1	7.1	7.1



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Q.2 The curriculum offers adequate scope for life-long learning and higher-level aptitude for new technology/tools.

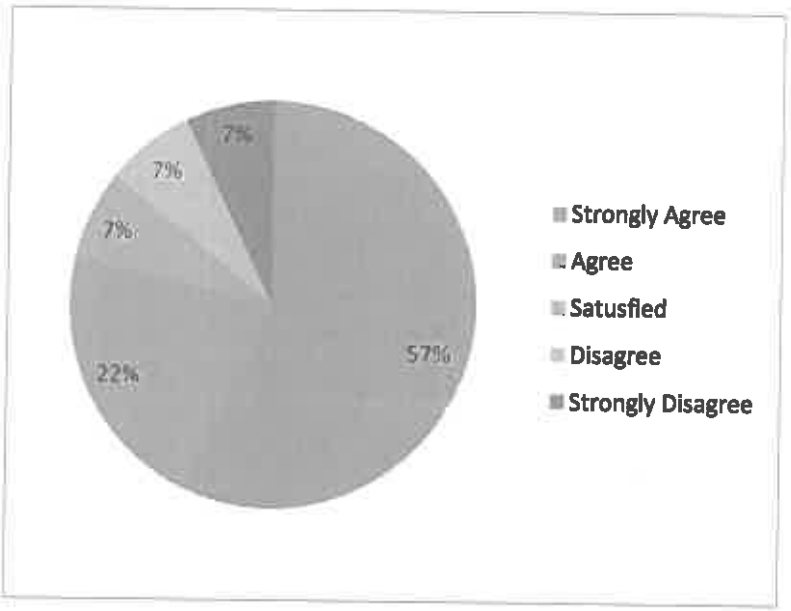
The curriculum offers adequate scope for life-long learning and higher-level aptitude for new technology/tools.	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	42.86	28.57	14.29	7.14	7.14



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Q.3 The curriculum has adequate scope for multidisciplinary knowledge and sufficient number of elective courses.

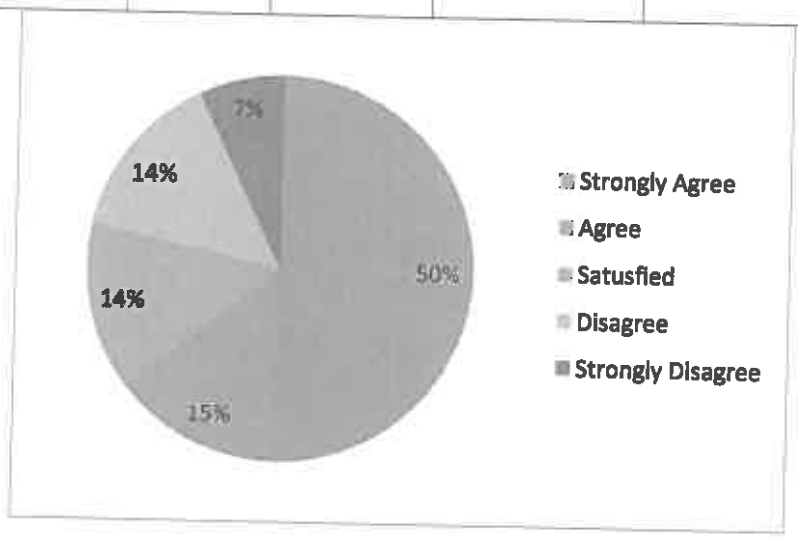
The curriculum has adequate scope for multidisciplinary knowledge and sufficient number of elective courses.	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	57.14	21.43	7.14	7.14	7.14



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Q.4 The curriculum has relevant content to assist students to work independently as well in a team with high level of adaptability.

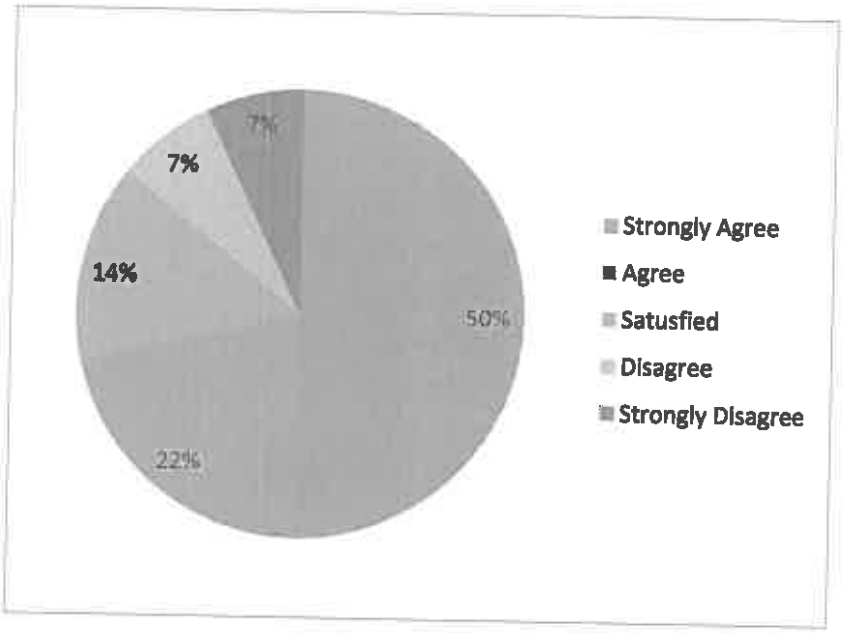
The curriculum has relevant content to assist students to work independently as well in a team with high level of adaptability	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	50.00	14.29	14.29	14.29	7.14



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Q.5 The curriculum provides enough scope for improving entrepreneurial skill as well as industry readiness.

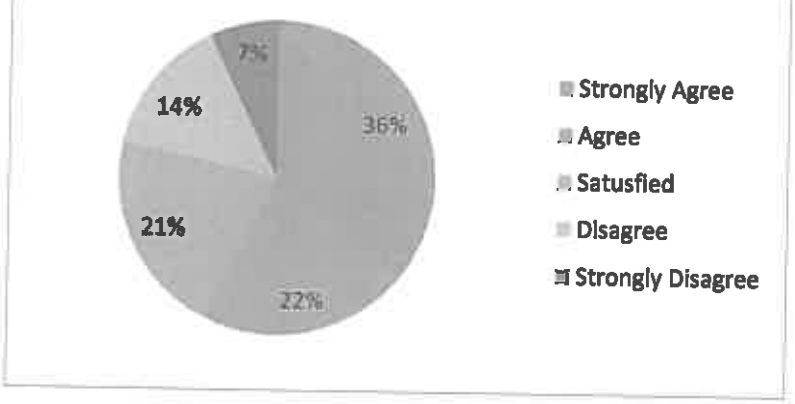
The curriculum provides enough scope for improving entrepreneurial skill as well as industry readiness.	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	50.00	21.43	14.29	7.14	7.14



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Q.6 The curriculum provides ample knowledge for increased employability and to promote students for higher education.

The curriculum provides ample knowledge for increased employability and to promote students for higher education.	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	35.71	21.43	21.43	14.29	7.14

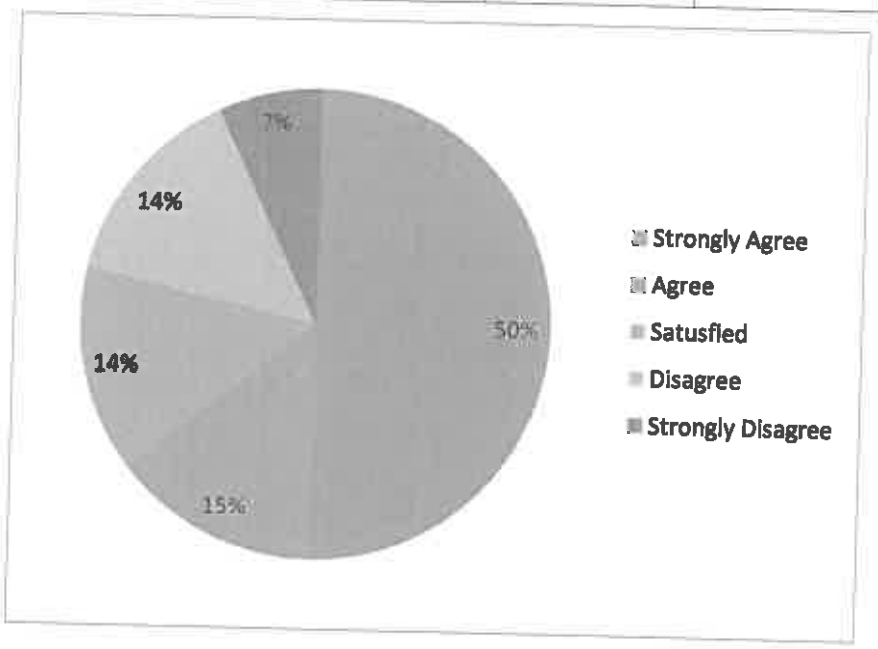


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Q.7 The curriculum has focus on personality development by presence of courses on human values and professional ethics.

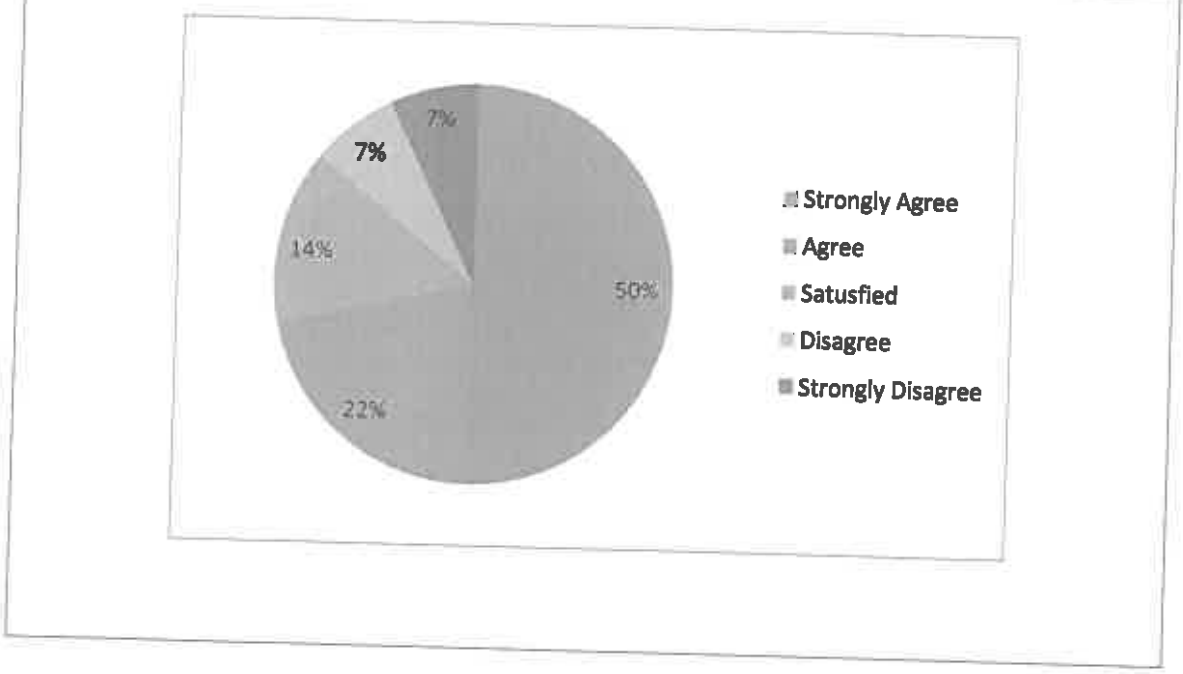
The curriculum has focus on personality development by presence of courses on human values and professional ethics	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	50.00	14.29	14.29	14.29	7.14



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Q.8 The curriculum is well organized and balanced for the programme with proper credit allocation.

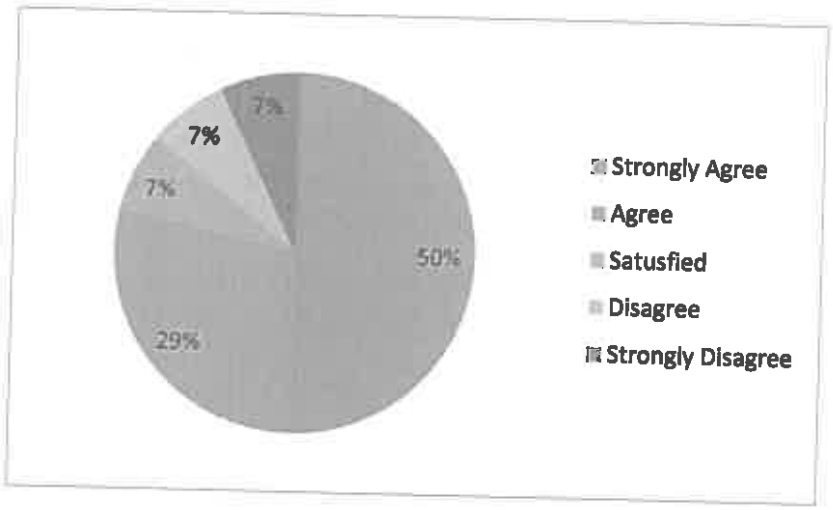
The curriculum is well organized and balanced for the programme with proper credit allocation.	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	50.0	21.4	14.3	7.1	7.1



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Q.9 The courses have adequate balance between theory and application for a student's holistic development.

The courses have adequate balance between theory and application for student's holistic development	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	50.0	28.6	7.1	7.1	7.1



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School of Engineering & Technology (14)						
Total no. of Employer: 14		Strongly Agree	Agree	Satisfied	Disagree	Strongly Disagree
The curriculum assists the students to acquire necessary entry level skills in industrial sector.	No. of Academicians	7	4	1	1	1
	Percentage	50.00	28.57	7.14	7.14	7.14
The curriculum offers adequate scope for life-long learning and higher-level aptitude for new technology/tools.	No. of Academicians	6	4	2	1	1
	Percentage	42.86	28.57	14.29	7.14	7.14
The curriculum has adequate scope for multidisciplinary knowledge and sufficient number of elective courses.	No. of Academicians	8	3	1	1	1
	Percentage	57.14	21.43	7.14	7.14	7.14
The curriculum has relevant content to assist students to work independently as well in a team with high level of adaptability	No. of Academicians	7	2	2	2	1
	Percentage	50.00	14.29	14.29	14.29	7.14
The curriculum provides enough scope for improving entrepreneurial skill as well as industry readiness.	No. of Academicians	7	3	2	1	1
	Percentage	50.00	21.43	14.29	7.14	7.14
The curriculum provides ample knowledge for increased employability	No. of Academicians	5	3	3	2	1
	Percentage	35.71	21.43	21.43	14.29	7.14

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Tel: +91 7830810052
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U.: www.sug.ac.in

and to promote students for higher education.						
The curriculum has focus on personality development by presence of courses on human values and professional ethics	No. of Academicians	7	2	2	2	1
	Percentage	50.00	14.29	14.29	14.29	7.14
The curriculum is well organized and balanced for the programme with proper credit allocation.	No. of Academicians	7	3	2	1	1
	Percentage	50.00	21.43	14.29	7.14	7.14
The courses have adequate balance between theory and application for student's holistic development	No. of Academicians	7	4	1	1	1
	Percentage	50.00	28.57	7.14	7.14	7.14

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Analysis of Feedback:

Based on the employers' feedback, the curriculum demonstrates a strong alignment with industry needs, particularly in preparing students with essential entry-level skills, evident from the consistent **80%** satisfaction in most areas. Employers acknowledge the curriculum's effectiveness in fostering multidisciplinary knowledge, promoting higher education, and enhancing employability. Additionally, the structure and organization of the curriculum, along with its emphasis on theoretical and practical balance, are well-received. However, slightly lower ratings of **70%** were given for the curriculum's capacity to support life-long learning, adoption of new technologies/tools, and entrepreneurship development, indicating areas for improvement. Overall, the feedback reflects a solid curriculum foundation with good industry relevance, while highlighting opportunities to strengthen aspects related to innovation and future readiness.

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Action Taken Report

(School of Engineering and Technology)

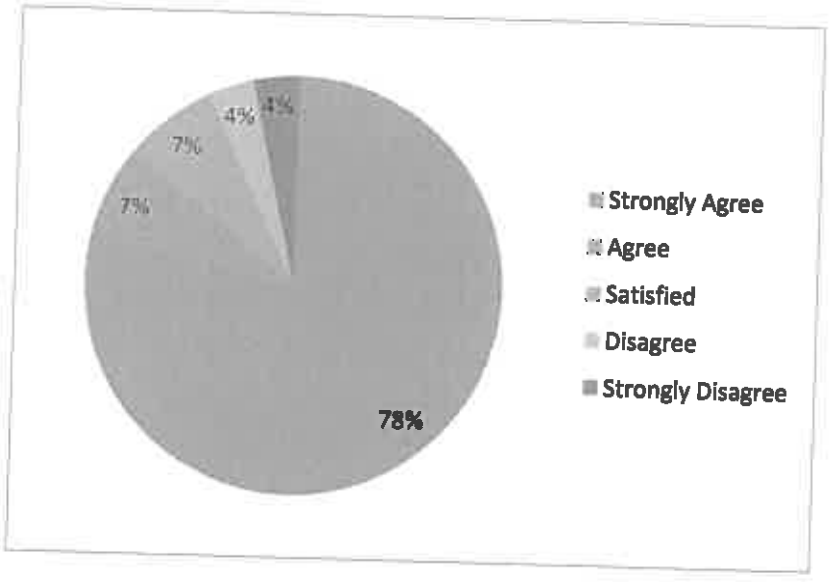
Sr. No.	Suggestions	Action Taken	Outcome
1.	Strengthen the integration of life-long learning by introducing continuous professional development modules.	Introduced specialized workshops and certifications on emerging technologies like AI, machine learning, and renewable energy.	Students and graduates now have access to ongoing learning opportunities, enhancing their skills and staying up-to-date with industry trends.
2.	Enhance the adoption of new technologies and tools by updating course content and providing hands-on training.	Updated curriculum to include more practical sessions using current technologies, such as IoT (Internet of Things), robotics, and advanced CAD software.	Students developed proficiency in the latest tools and technologies, making them better prepared for the rapidly evolving engineering and tech sectors.
3.	Improve entrepreneurial skill development through focused initiatives that bridge engineering with business.	Launched an entrepreneurial track offering courses on startup management, engineering product design, and market analysis.	Students gained insight into the entrepreneurial process, with several pursuing tech-based startups and innovation-driven projects.
4.	Increase collaboration with industries for real-world exposure and practical training in specialized fields.	Established partnerships with leading tech companies for internships, joint research, and industry-led projects.	Students gained hands-on experience and industry-relevant skills, increasing their employability and readiness for industry roles.

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Babu Vijendra Marg, Adarsh Institutional
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Analysis of Peer Academicians' Feedback of School of Engineering and Technology through Table and Pie Chart

Q.1 The syllabus of the courses are proper in relation to the competencies expected out of the programme.

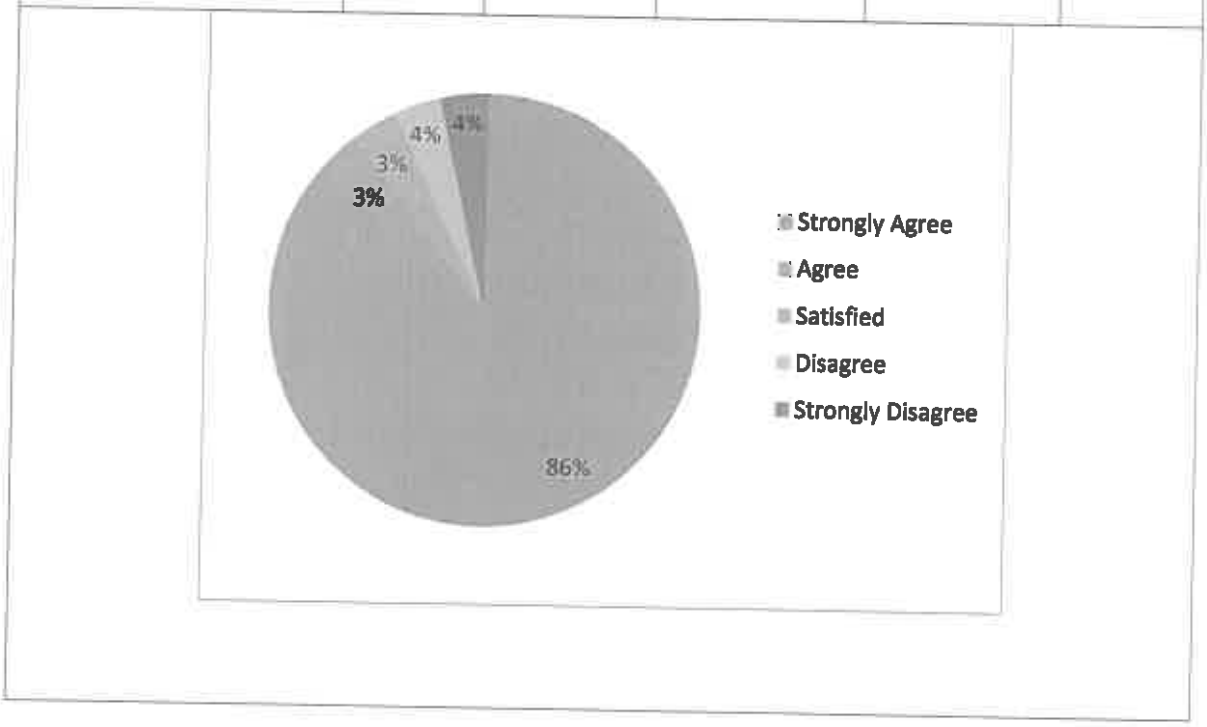
The syllabus of the courses are proper in relation to the competencies expected out of the programme.	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	78.57	7.14	7.14	3.57	3.57



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Q.2 The sequence and overall organization of the courses is proper in the curriculum.

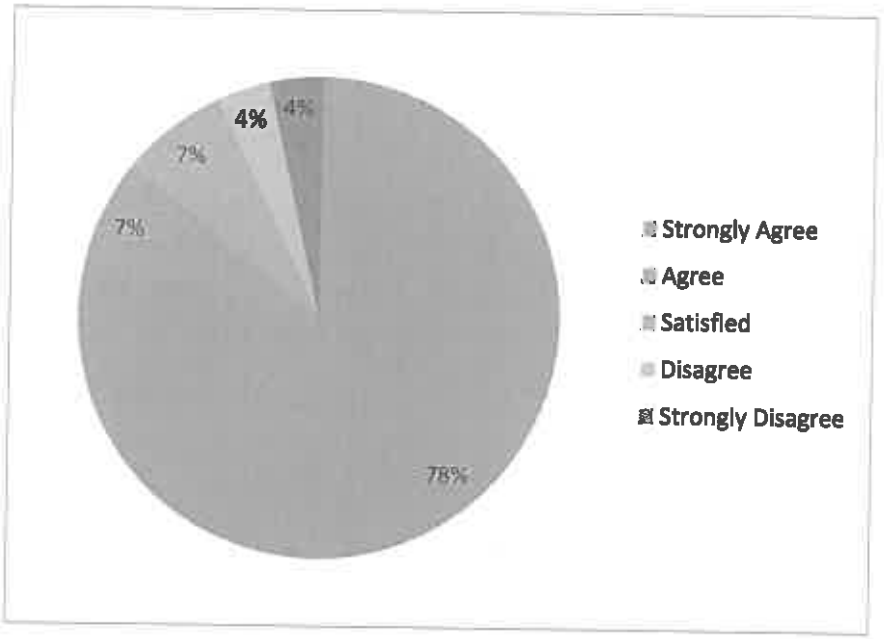
The sequence and overall organization of the courses is proper in the curriculum.	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	85.71	3.57	3.57	3.57	3.57



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Q.3 The curriculum has adequate scope for multidisciplinary knowledge and sufficient number of elective courses.

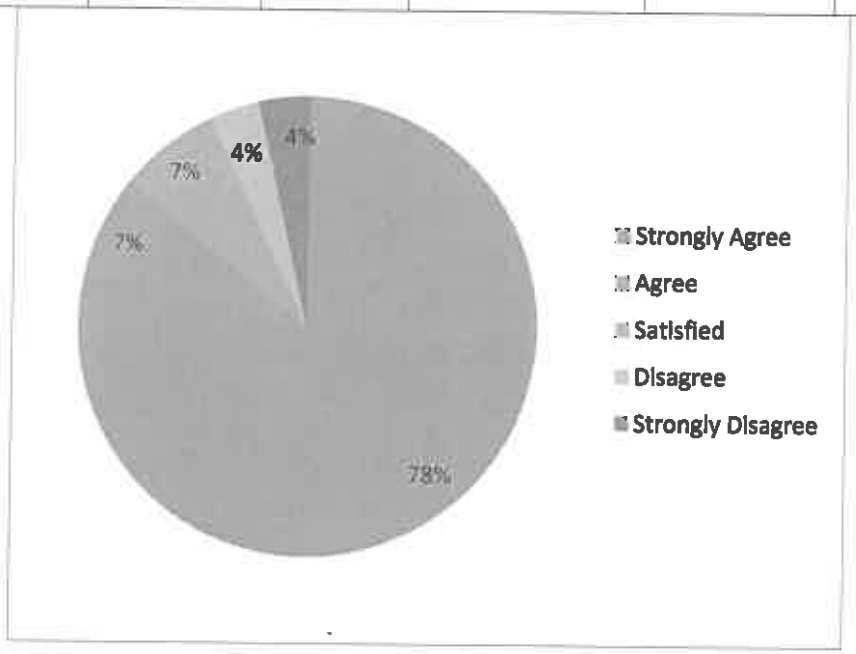
The curriculum has adequate scope for multidisciplinary knowledge and sufficient number of elective courses.	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	78.57	7.14	7.14	3.57	3.57



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Q.4 Extra care has been taken for extra learning or self-learning while designing the courses.

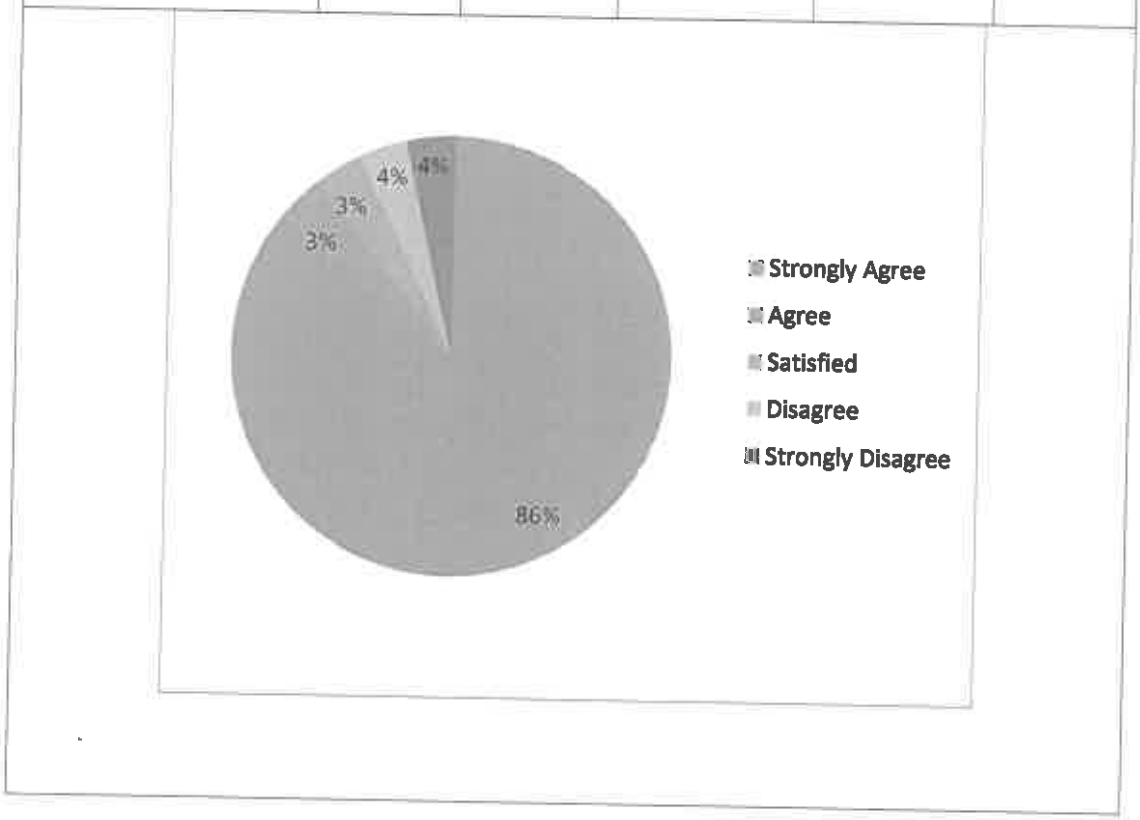
Extra care has been taken for extra learning or self-learning while designing the courses.	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	78.57	7.14	7.14	3.57	3.57



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Q.5 The curriculum provides enough scope for improving entrepreneurial skill as well as industry readiness.

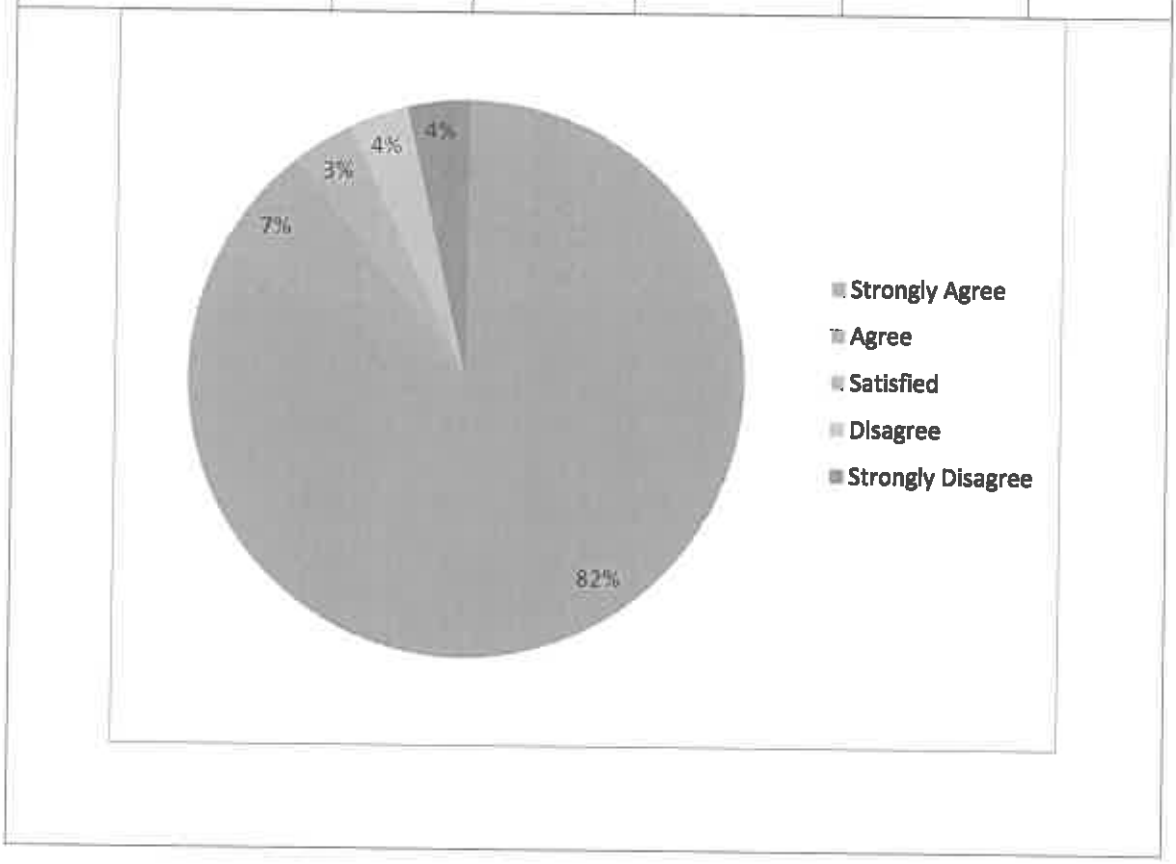
The curriculum provides enough scope for improving entrepreneurial skill as well as industry readiness.	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	85.71	3.57	3.57	3.57	3.57



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Q.6 The curriculum provides ample knowledge for increased employability and to promote students for higher education.

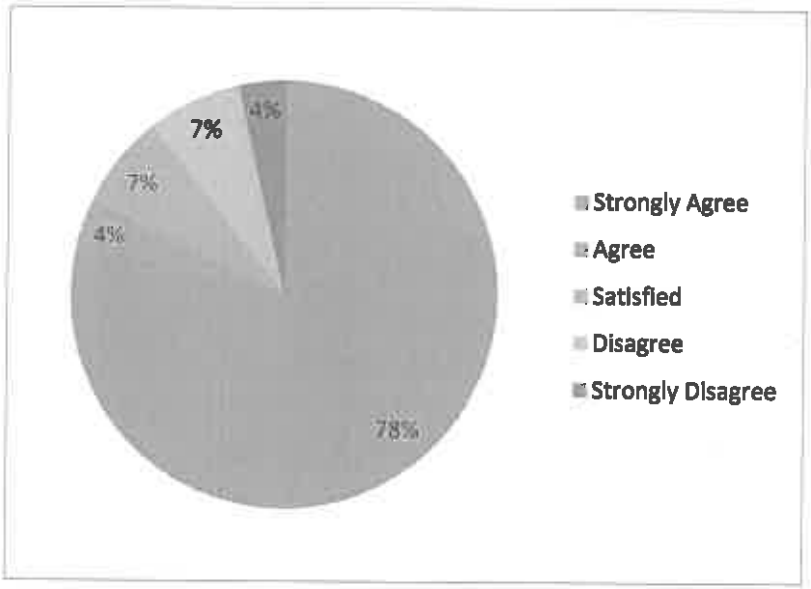
The curriculum provides ample knowledge for increased employability and to promote students for higher education.	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	82.14	7.14	3.57	3.57	3.57



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Q.7 The curriculum has focus on personality development by presence of courses on human values and professional ethics

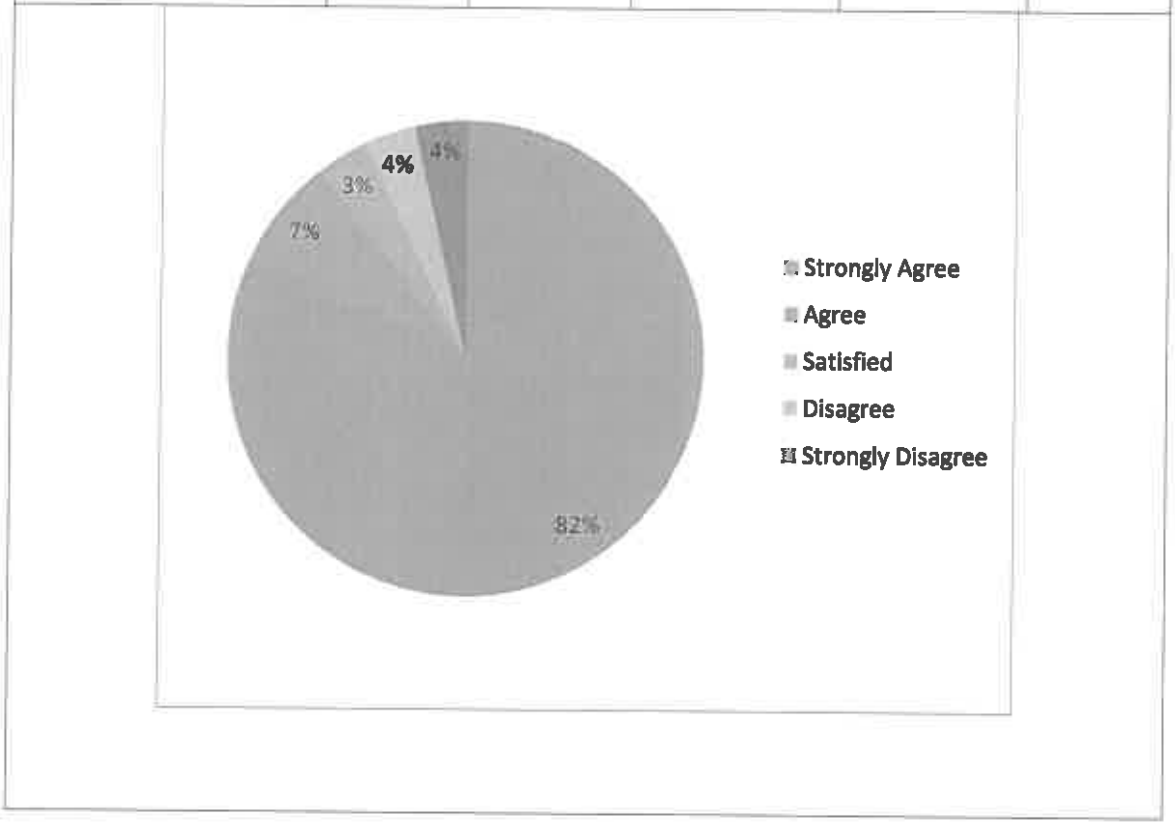
The curriculum has focus on personality development by presence of courses on human values and professional ethics	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	78.57	3.57	7.14	7.14	3.57



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Q.8 The curriculum is well organized and balanced for the programme with proper credit allocation.

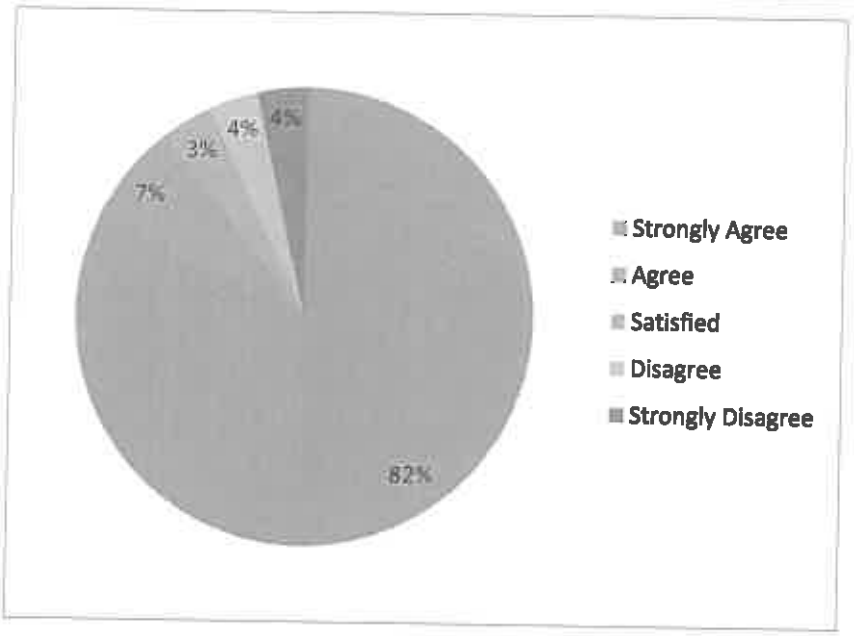
The curriculum is well organized and balanced for the programme with proper credit allocation.	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	82.14	7.14	3.57	3.57	3.57



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Q.9 The courses have adequate balance between theory and application for a student's holistic development.

The courses have adequate balance between theory and application for a student's holistic development.	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	82.14	7.14	3.57	3.57	3.57



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School of Engineering & Technology (28)						
Total no. of Peer Academicians: 28		Strongly Agree	Agree	Satisfied	Disagree	Strongly Disagree
The syllabus of the courses are proper in relation to the competencies expected out of the programme.	No. of Academicians	22.00	2.00	2.00	1.00	1.00
	Percentage	78.57	7.14	7.14	3.57	3.57
The sequence and overall organization of the courses is proper in the curriculum	No. of Academicians	24.00	1.00	1.00	1.00	1.00
	Percentage	85.71	3.57	3.57	3.57	3.57
The curriculum has adequate scope for multidisciplinary knowledge and sufficient number of elective courses	No. of Academicians	22.00	2.00	2.00	1.00	1.00
	Percentage	78.57	7.14	7.14	3.57	3.57
Extra care has been taken for extra learning or self-learning while designing the courses.	No. of Academicians	22.00	2.00	2.00	1.00	1.00
	Percentage	78.57	7.14	7.14	3.57	3.57
The curriculum provides enough scope for improving entrepreneurial skill as well as industry readiness.	No. of Academicians	24.00	1.00	1.00	1.00	1.00
	Percentage	85.71	3.57	3.57	3.57	3.57
The curriculum provides ample knowledge for increased employability	No. of Academicians	23.00	2.00	1.00	1.00	1.00
	Percentage	82.14	7.14	3.57	3.57	3.57

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and to promote students for higher education.						
The curriculum has focus on personality development by presence of courses on human values and professional ethics	No. of Academicians	22.00	1.00	2.00	2.00	1.00
	Percentage	78.57	3.57	7.14	7.14	3.57
The curriculum is well organized and balanced for the programme with proper credit allocation.	No. of Academicians	23.00	2.00	1.00	1.00	1.00
	Percentage	82.14	7.14	3.57	3.57	3.57
The courses have adequate balance between theory and application for a student's holistic development.	No. of Academicians	23.00	2.00	1.00	1.00	1.00
	Percentage	82.14	7.14	3.57	3.57	3.57

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Analysis of Feedback:

The peer feedback reveals a high level of satisfaction with the curriculum, with most parameters scoring consistently at 92.85%, indicating a well-structured and thoughtfully designed programme. The syllabus is considered appropriate to the expected competencies, and the curriculum's organization, multidisciplinary scope, and elective offerings are all positively received. Additionally, aspects such as provisions for self-learning, entrepreneurial readiness, employability, and higher education promotion are seen as effectively integrated. The slightly lower score of 89.28% for personality development through human values and professional ethics suggests a minor area for improvement, though still well-regarded. Overall, the curriculum demonstrates a strong balance between theoretical and practical components and reflects a robust alignment with academic and professional goals.

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Action Taken Report

(School of Engineering and Technology)

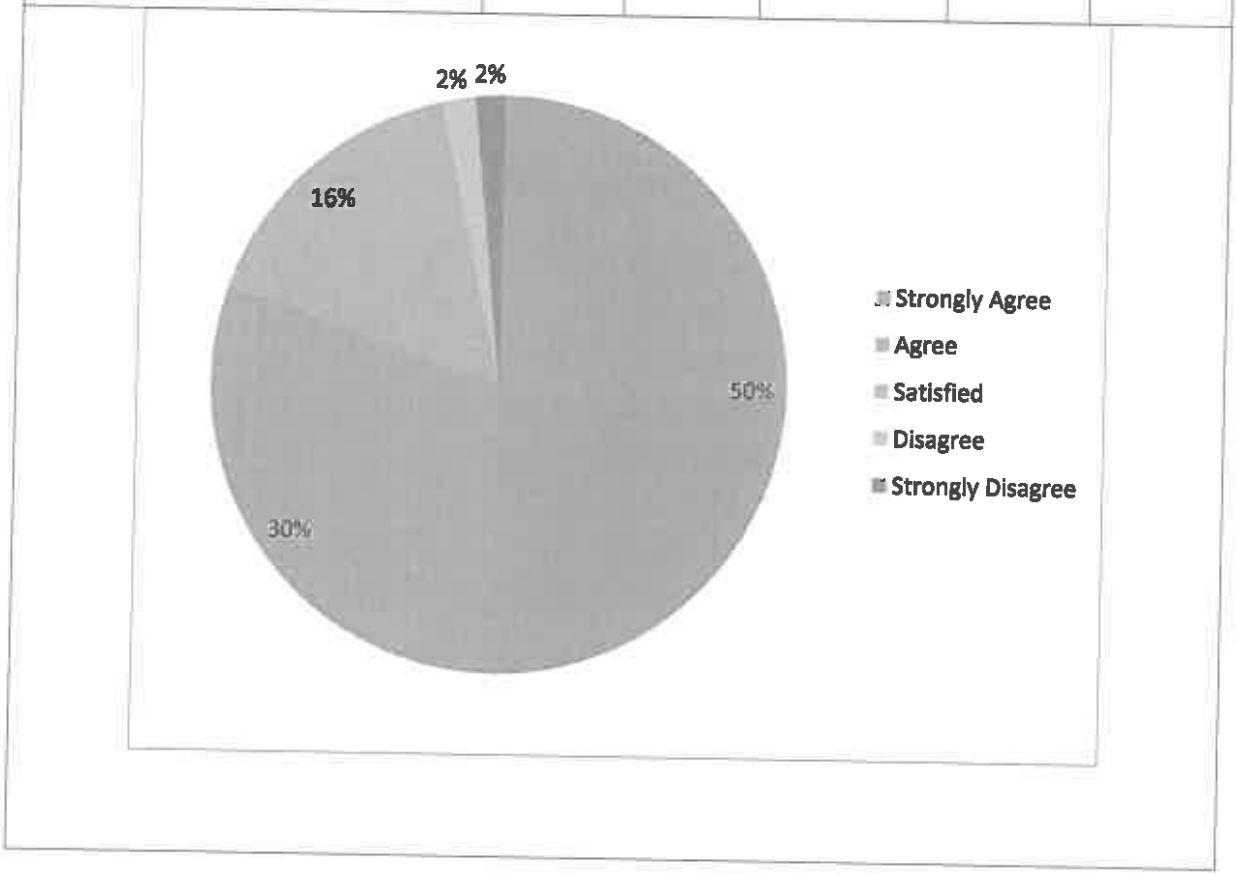
Sr.No.	Suggestions	Action Taken	Outcome
1	Enhance multidisciplinary knowledge and elective offerings.	Increased the variety of electives across fields like educational psychology, curriculum design, and educational technology to provide students with a broader academic perspective.	Students have more diverse learning opportunities, enriching their educational experience and broadening their understanding of the education sector.
2	Strengthen the focus on self-learning and independent study.	Introduced self-directed learning modules, including research projects and peer-led discussions, to encourage greater independence in students' learning processes.	Students have shown greater engagement in independent research and critical thinking, fostering a more self-motivated approach to learning.
3	Further integrate employability skills into the curriculum.	Partnered with educational institutions and industry experts to offer workshops, internships, and seminars on career development, teaching methods, and classroom management.	Students have gained practical insights into their future roles as educators and increased confidence in their ability to enter the workforce.
4	Improve personality development through courses on human values and professional ethics.	Developed new courses focusing on emotional intelligence, leadership in education, and ethical practices for educators.	Students reported improvements in their communication skills, ethical decision-making, and leadership abilities, preparing them for their professional careers.

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Analysis of Students' Feedback of School of Engineering and Technology through Table and Pie Chart

Q.1. Whether the curriculum has depth of the subjects and clears the concept?

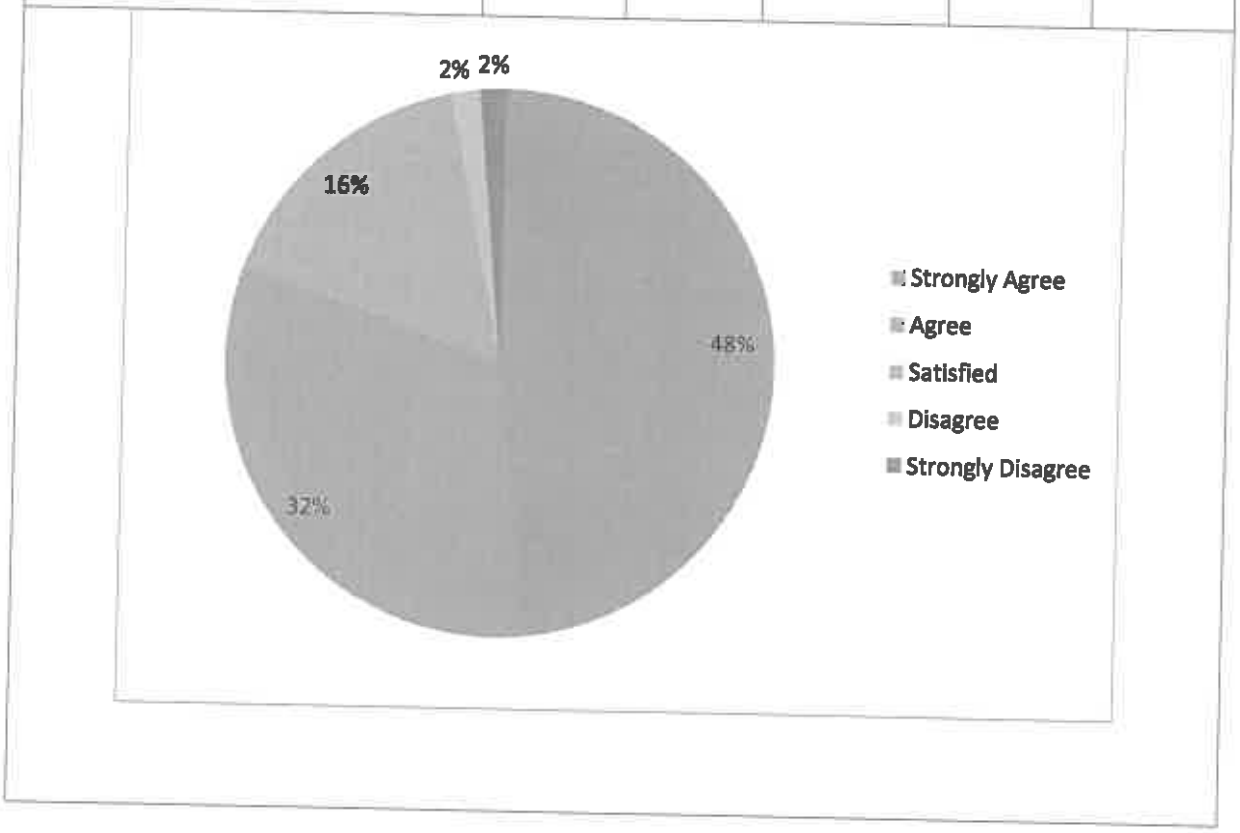
Curriculum has depth of the subjects and clears the concept	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	50	30.32258	16.12903	1.935484	1.612903



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Q.2. How do you rate the course outcomes and relevance to the course content?

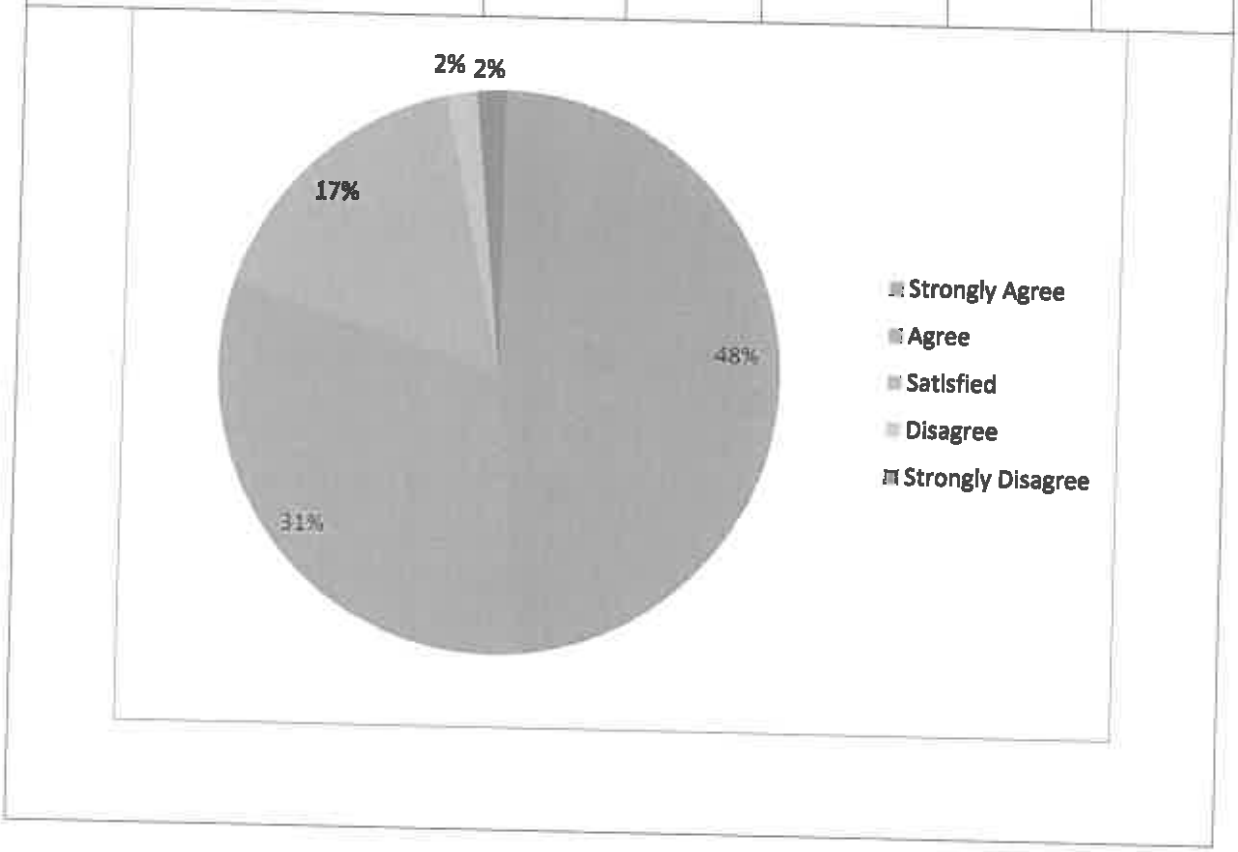
Rate the course outcomes and relevance to the course content	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	48.3871	32.09677	16.29032	1.774194	1.451613



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Q.3. How do you rate the sequence of units in the courses?

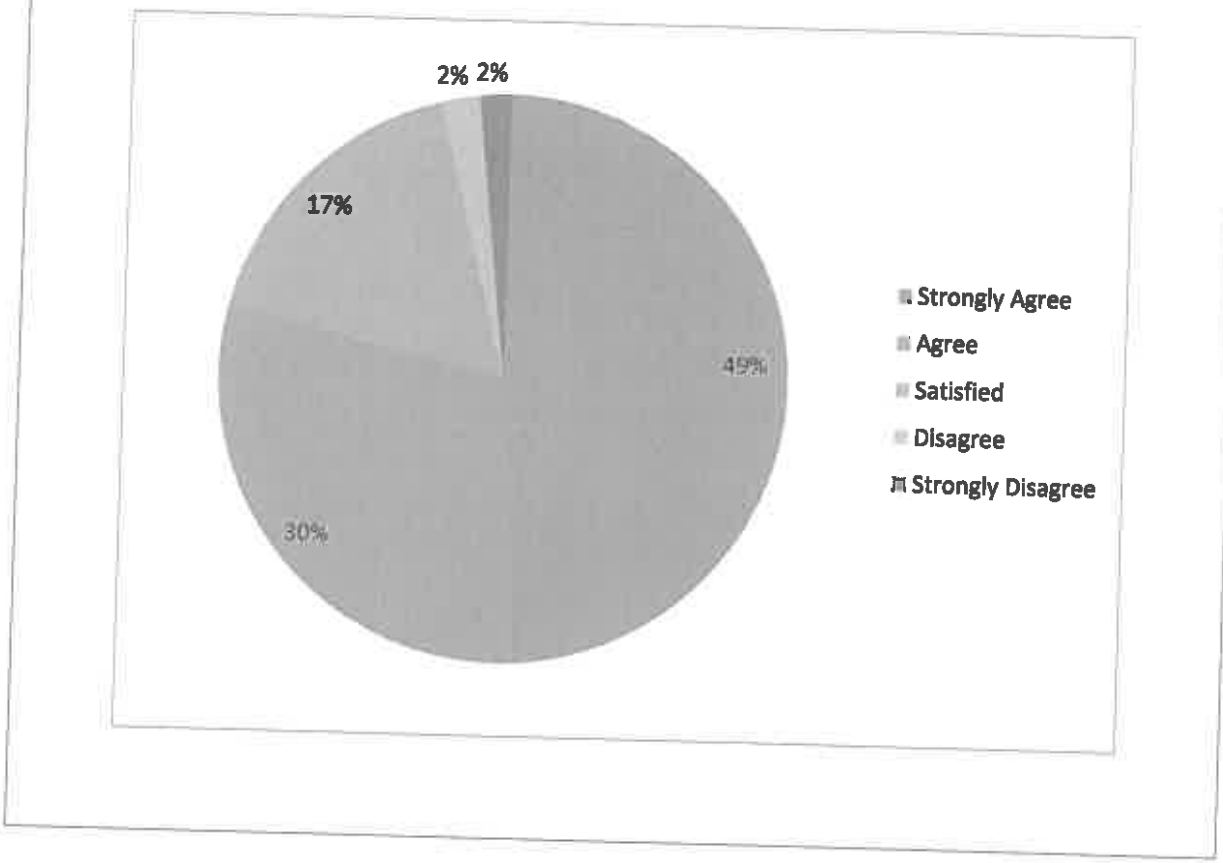
Rate the sequence of units in the courses	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	48.54839	31.45161	16.6129	1.774194	1.612903



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Q.4. How do you rate the credits allotted to individual courses?

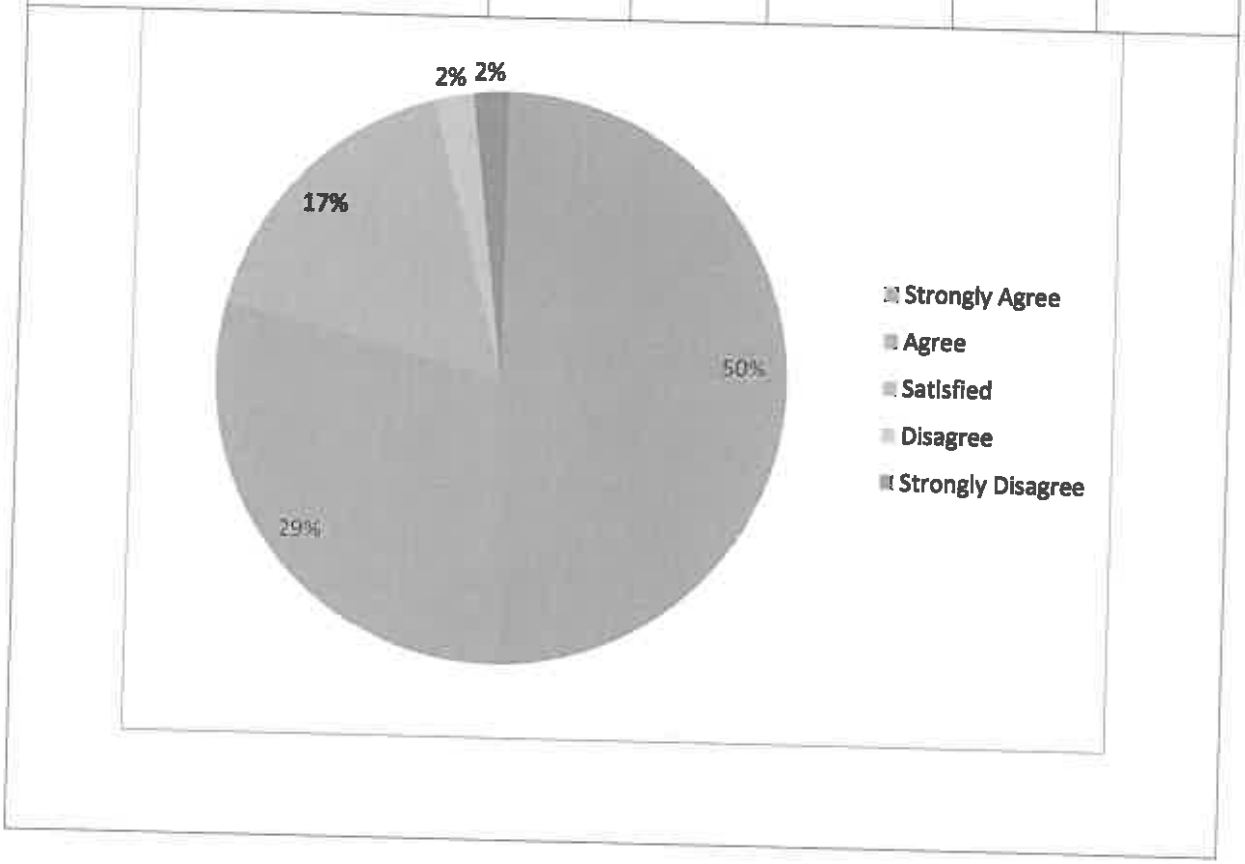
Rate the credits allotted to individual courses	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	49.03226	29.83871	17.09677	2.258065	1.774194



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Q.5. Does the curriculum focus on employability/career orientation?

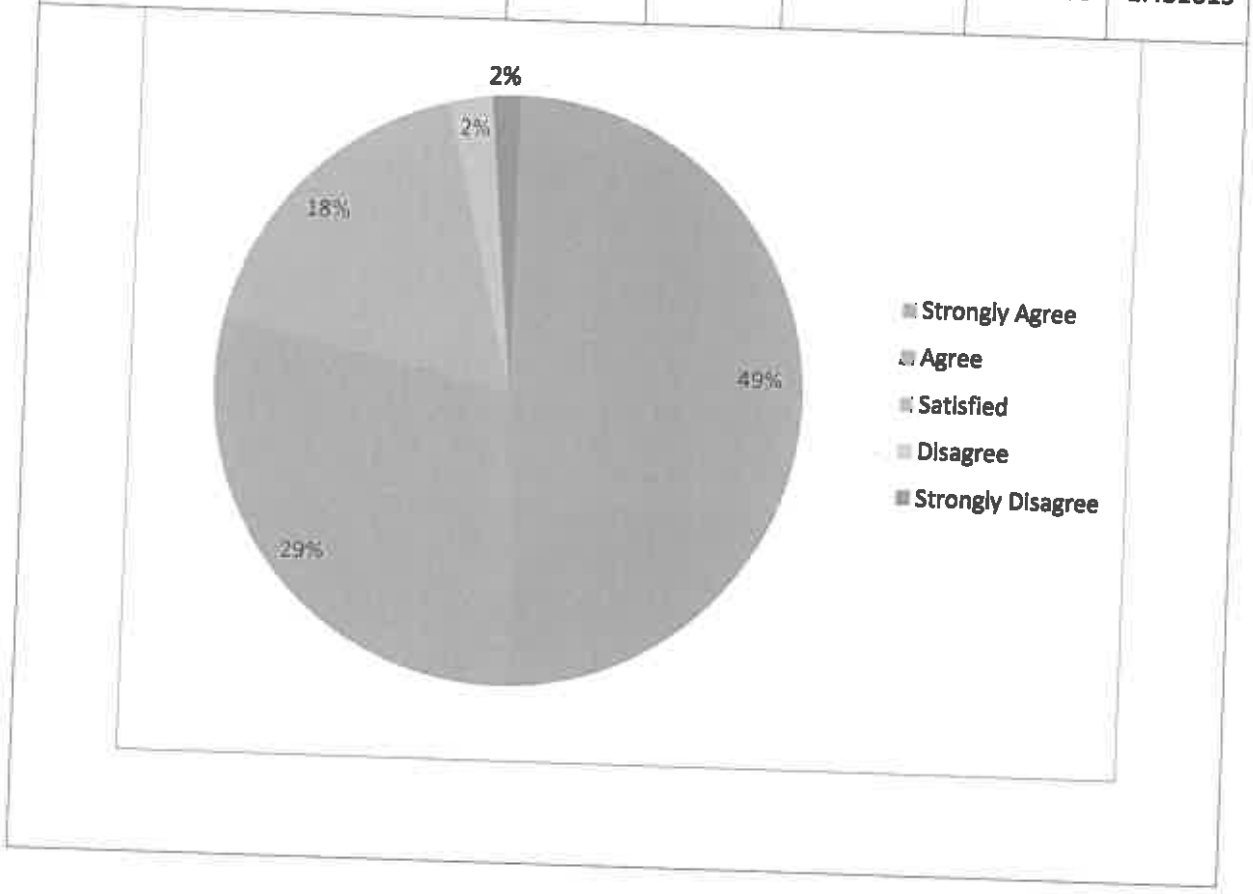
Curriculum focus on employability/career orientation	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	49.67742	29.35484	16.77419	2.258065	1.935484



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Q.6. Does the curriculum focus on skill development/entrepreneurship?

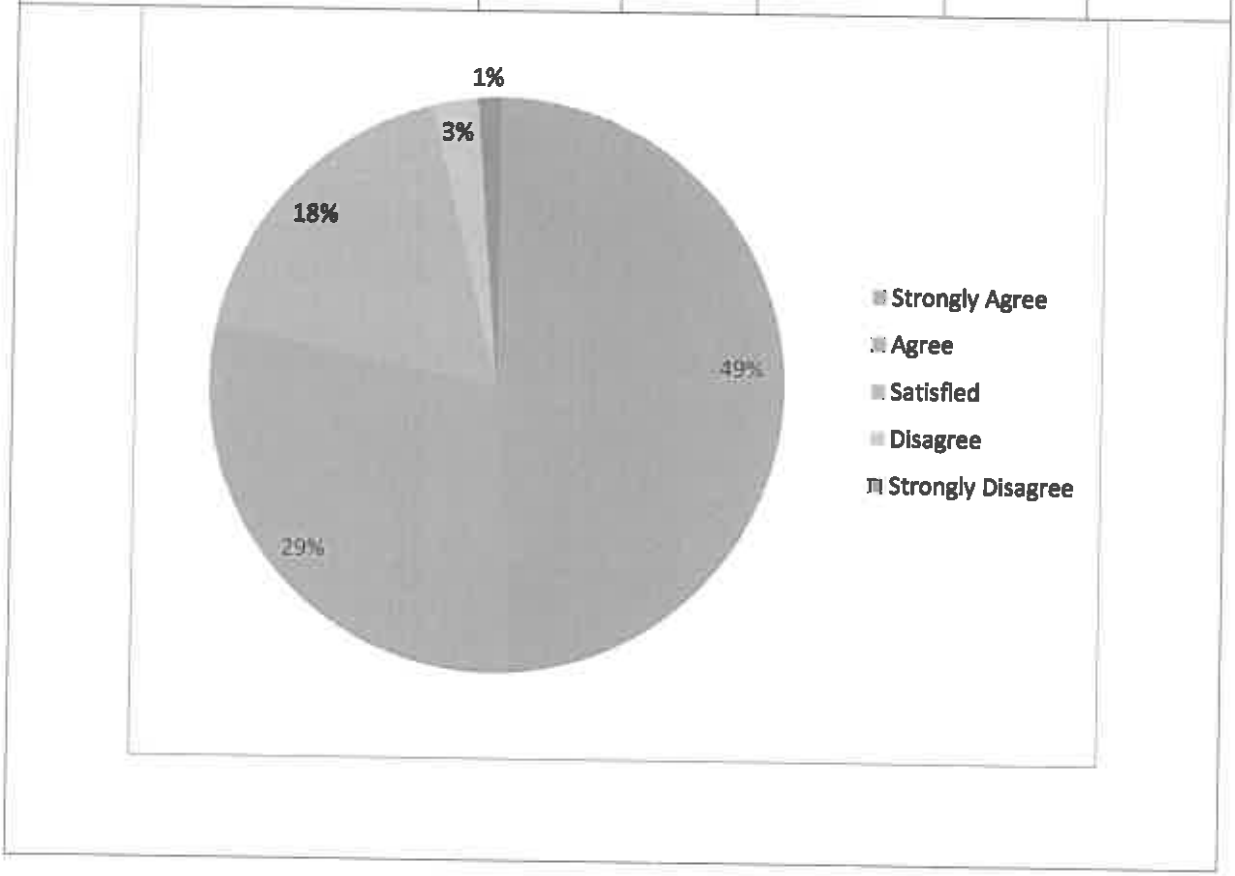
Curriculum focus on skill development/entrepreneurship	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	49.19355	29.35484	17.58065	2.419355	1.451613



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Q.7. Does the curriculum have satisfactory number of elective courses?

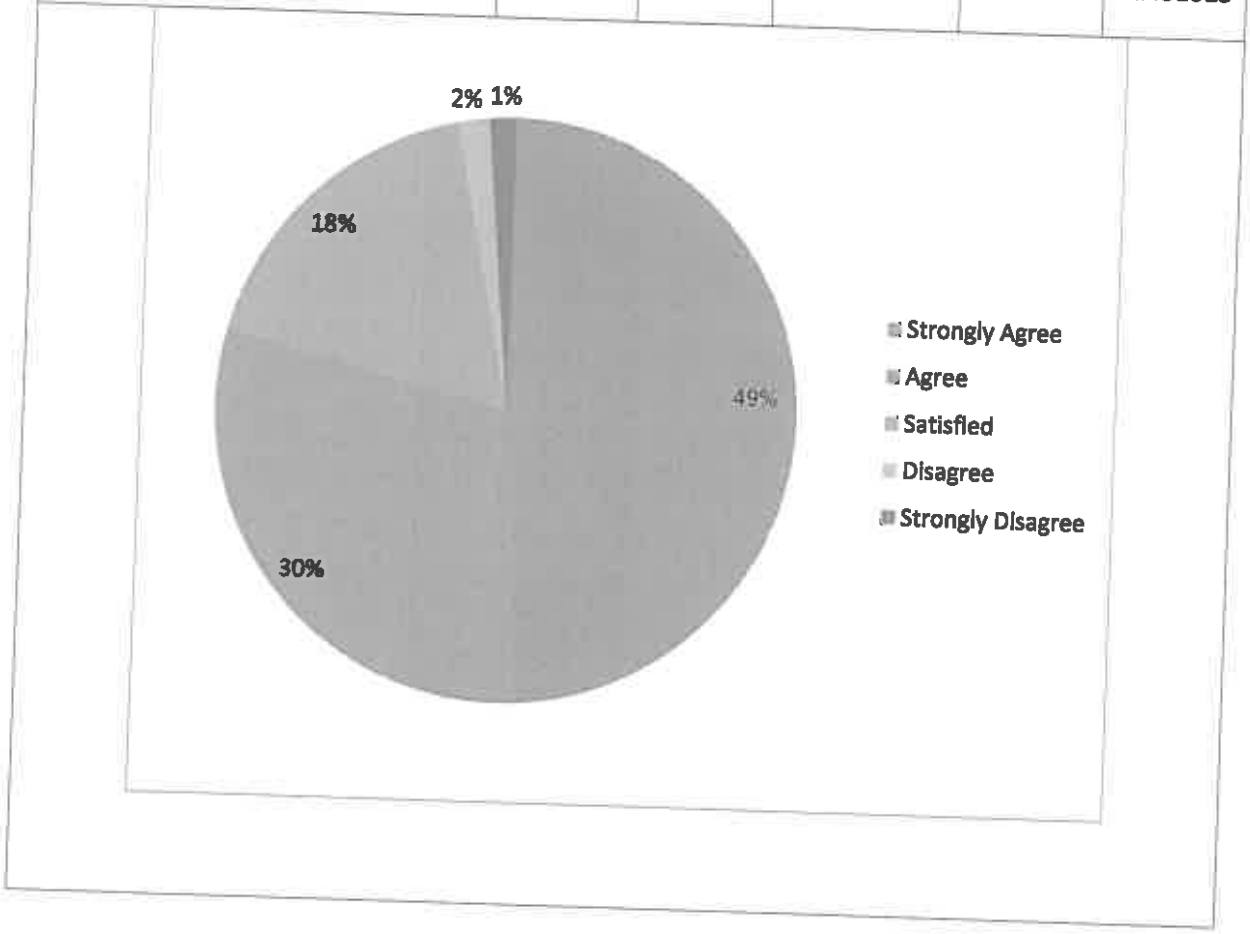
Curriculum have satisfactory number of elective courses	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	49.03226	29.19355	17.90323	2.580645	1.290323



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Q.8. Does the curriculum focus on life skill or help in value addition?

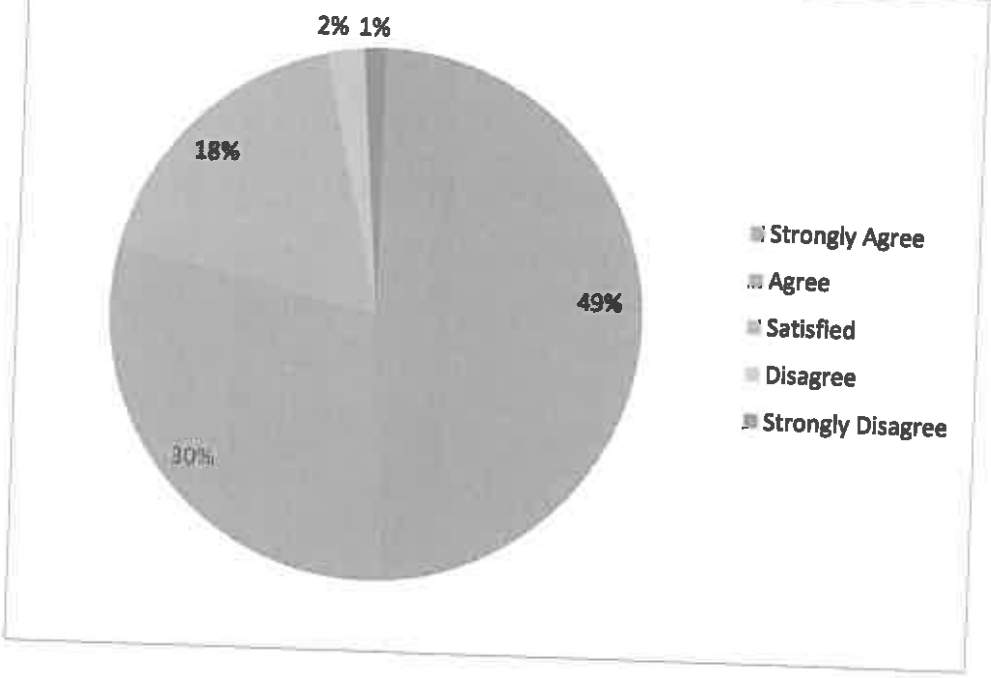
Curriculum focus on life skill or help in value addition	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	48.87097	30.16129	17.74194	1.774194	1.451613



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Q.9. Do the theory subjects are properly linked to the laboratories/provide real-life exposure?

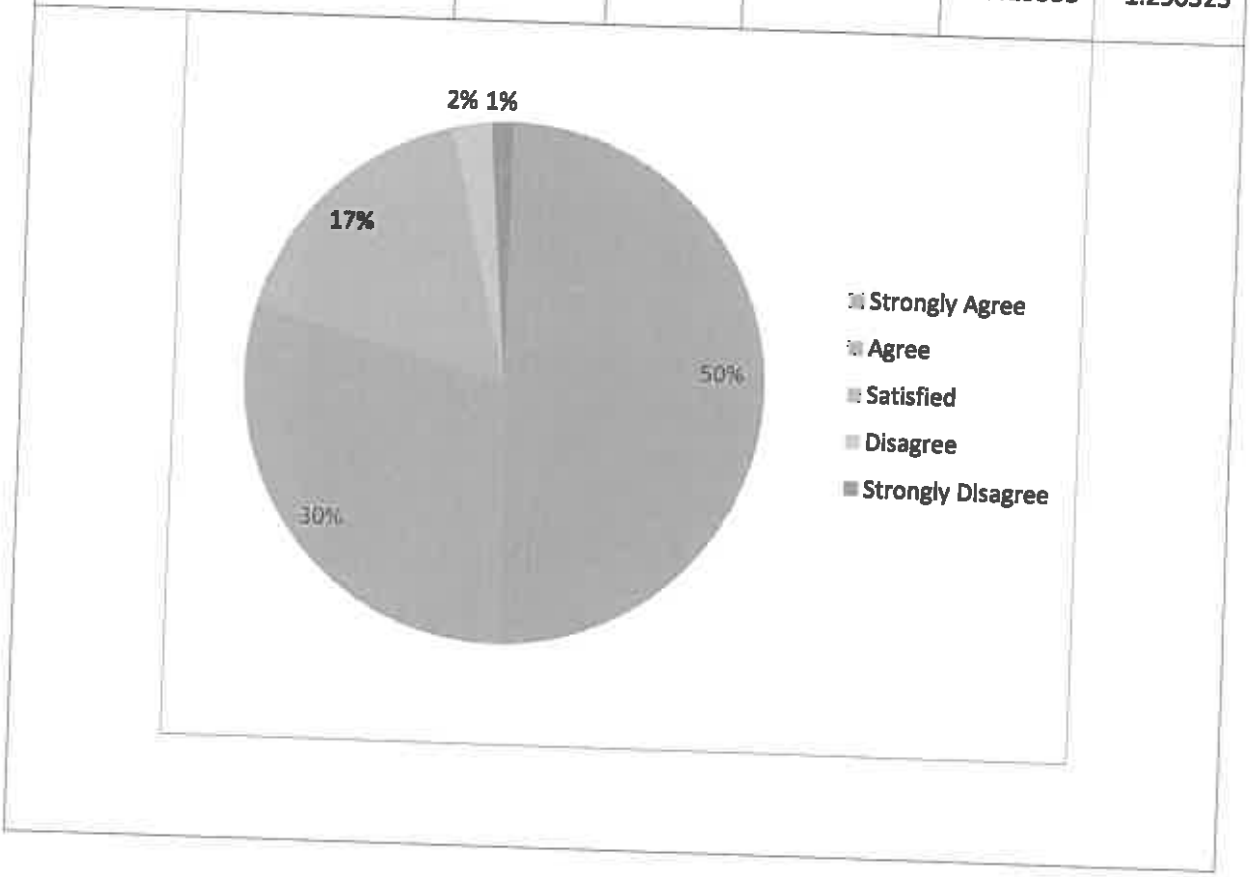
Theory subjects are properly linked to the laboratories/provide real-life exposure	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	49.03226	29.67742	17.74194	2.258065	1.290323



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Q.10. Does the curriculum provide multidisciplinary knowledge/information to a student?

Curriculum provide multidisciplinary knowledge/information to a student	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	49.51613	29.83871	16.93548	2.419355	1.290323



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School of Engineering & Technology (620)						
Question	Details	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Whether the curriculum has depth of the subjects and clears the concept?	No of Students	310	188	100	12	10
	Percentage	50	30.32258	16.12903	1.935484	1.612903
How do you rate the course outcomes and relevance to the course content?	No of Students	300	199	101	11	9
	Percentage	48.3871	32.09677	16.29032	1.774194	1.451613
How do you rate the sequence of units in the courses?	No of Students	301	195	103	11	10
	Percentage	48.54839	31.45161	16.6129	1.774194	1.612903
How do you rate the credits allotted to individual courses?	No of Students	304	185	106	14	11
	Percentage	49.03226	29.83871	17.09677	2.258065	1.774194
Does the curriculum focus on employability/career orientation?	No of Students	308	182	104	14	12
	Percentage	49.67742	29.35484	16.77419	2.258065	1.935484
Does the curriculum focus on skill development/entrepreneurship?	No of Students	305	182	109	15	9
	Percentage	49.19355	29.35484	17.58065	2.419355	1.451613
Does the curriculum have satisfactory number of elective courses?	No of Students	304	181	111	16	8
	Percentage	49.03226	29.19355	17.90323	2.580645	1.290323
Does the curriculum focus on life skill or help in value addition?	No of Students	303	187	110	11	9
	Percentage	48.87097	30.16129	17.74194	1.774194	1.451613
Do the theory subjects are properly linked to the laboratories/provide real-life exposure?	No of Students	304	184	110	14	8
	Percentage	49.03226	29.67742	17.74194	2.258065	1.290323
Does the curriculum provide multidisciplinary knowledge/information to a student?	No of Students	307	185	105	15	8
	Percentage	49.51613	29.83871	16.93548	2.419355	1.290323

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Analysis of Feedback:

Based on the feedback from 620 students of the School of Engineering & Technology, the curriculum is generally well-received, with a significant majority expressing positive responses across various parameters. Half of the students *strongly agree* that the curriculum has adequate depth and helps in concept clarification (50%), and 48.4% believe the course outcomes are relevant to the course content. The sequence of units in the courses is considered logical by 48.5% of the students, while 49% find the credit allocation appropriate. A considerable portion of students appreciates the curriculum's focus on employability and career orientation (49.7%) as well as on skill development and entrepreneurship (49.2%). Around 49% of the students agree that the curriculum provides a satisfactory number of electives and focuses on life skills and value addition (48.9%). The linkage between theory and lab work is acknowledged by 49%, and 49.5% of the students recognize the curriculum's effort in providing multidisciplinary knowledge. While the feedback indicates overall satisfaction, with most students rating the aspects as either "strongly agree" or "agree," there is still scope to enhance practical integration, soft skill development, and innovation-oriented learning, to ensure an even more impactful academic experience.

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Action Taken Report

(School of Engineering and Technology)

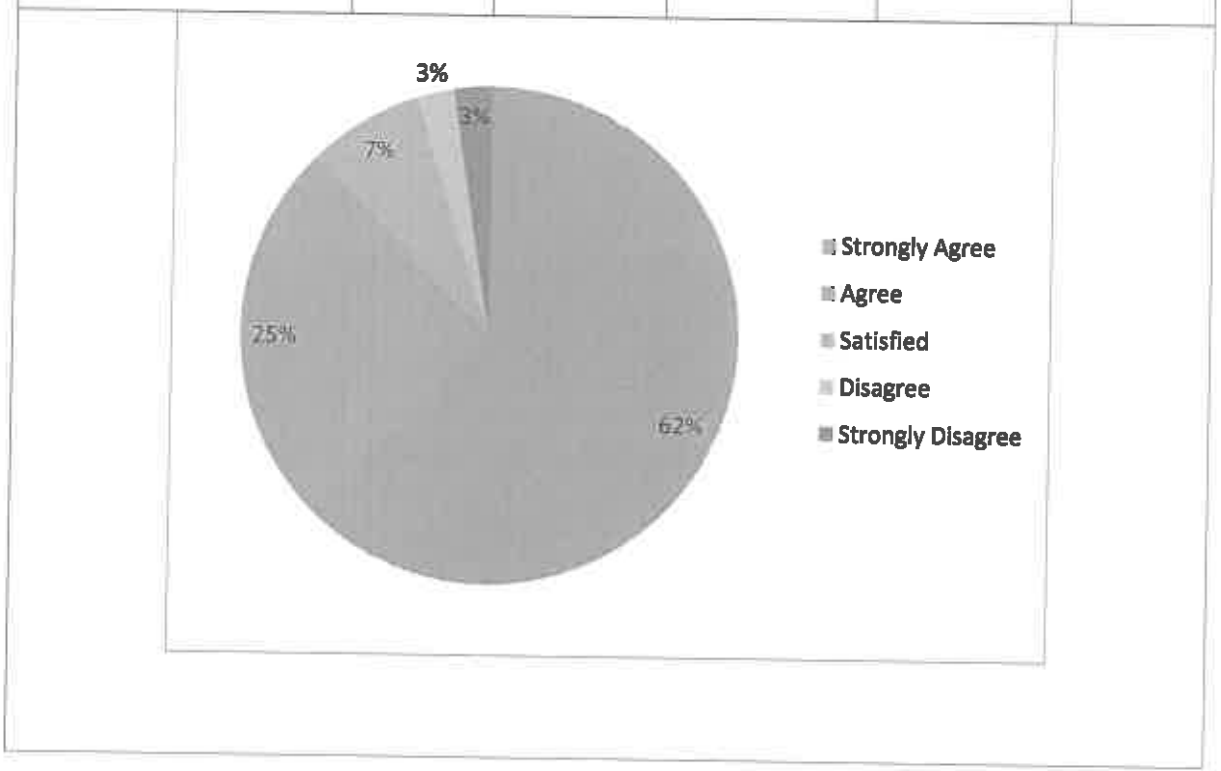
Sr. No.	Suggestions	Action Taken	Outcome
1	Strengthen conceptual depth with clearer subject foundations	Curriculum revised to include more foundational modules and concept-based tutorials	Improved clarity in technical subjects and stronger academic performance
2	Increase alignment between course outcomes and content delivery	Regular curriculum audits and faculty workshops to align teaching methods with defined outcomes	More consistent learning outcomes and better student comprehension
3	Enhance focus on employability and industry-readiness	Career development programs, mock interviews, and increased internship tie-ups with industry	Improved placement rates and student confidence in job interviews
4	Expand practical exposure through labs and real-world projects	Introduction of industry-linked capstone projects and lab enhancements in core subjects	Better real-life application of theoretical knowledge and increased student engagement

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Analysis of Teacher's Feedback of School of Engineering and Technology through Table and Pie Chart

Q.1 The curriculum is well organized and balanced for the programme with proper credit allocation.

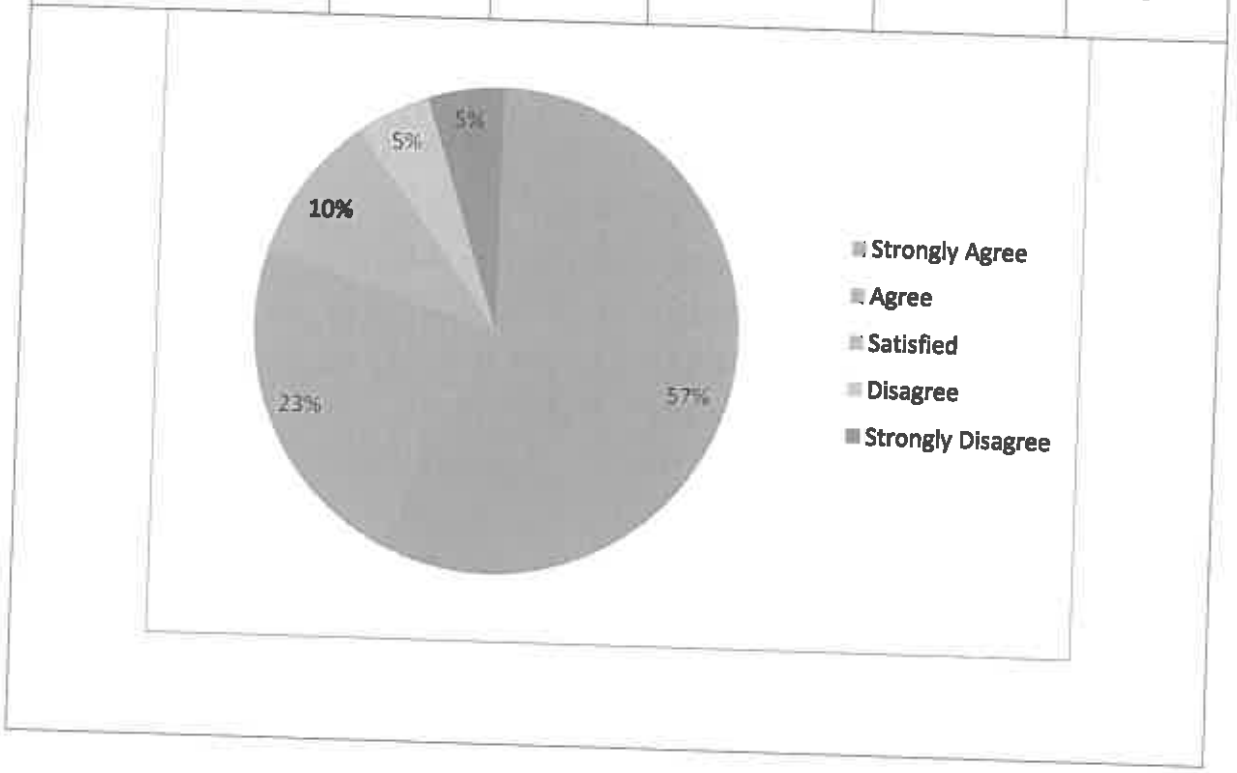
The curriculum is well organized and balanced for the programme with proper credit allocation	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	62.5	25	7.5	2.5	2.5



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Q.2 The courses have adequate balance between theory and application for student's holistic development.

The courses have adequate balance between theory and application for student's holistic development.	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	57.5	22.5	10	5	5

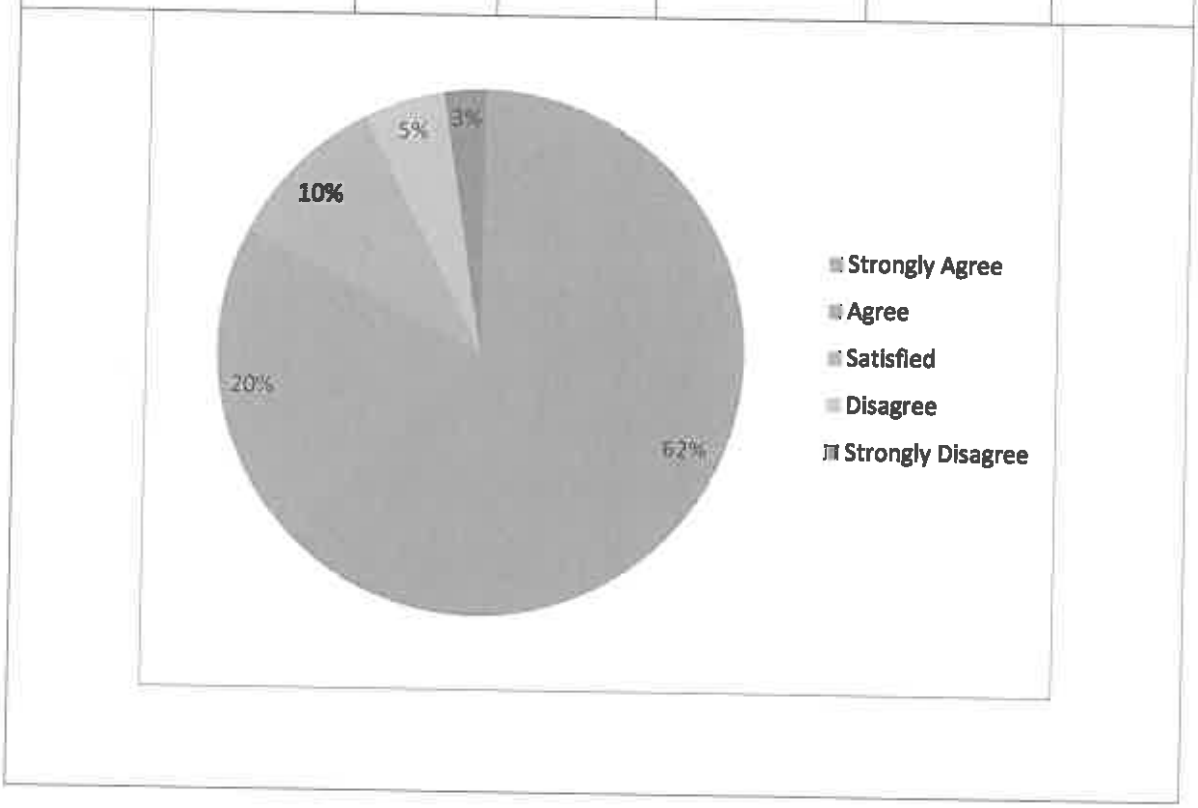


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Q.3 The curriculum has adequate scope for multidisciplinary knowledge and sufficient number of elective courses.

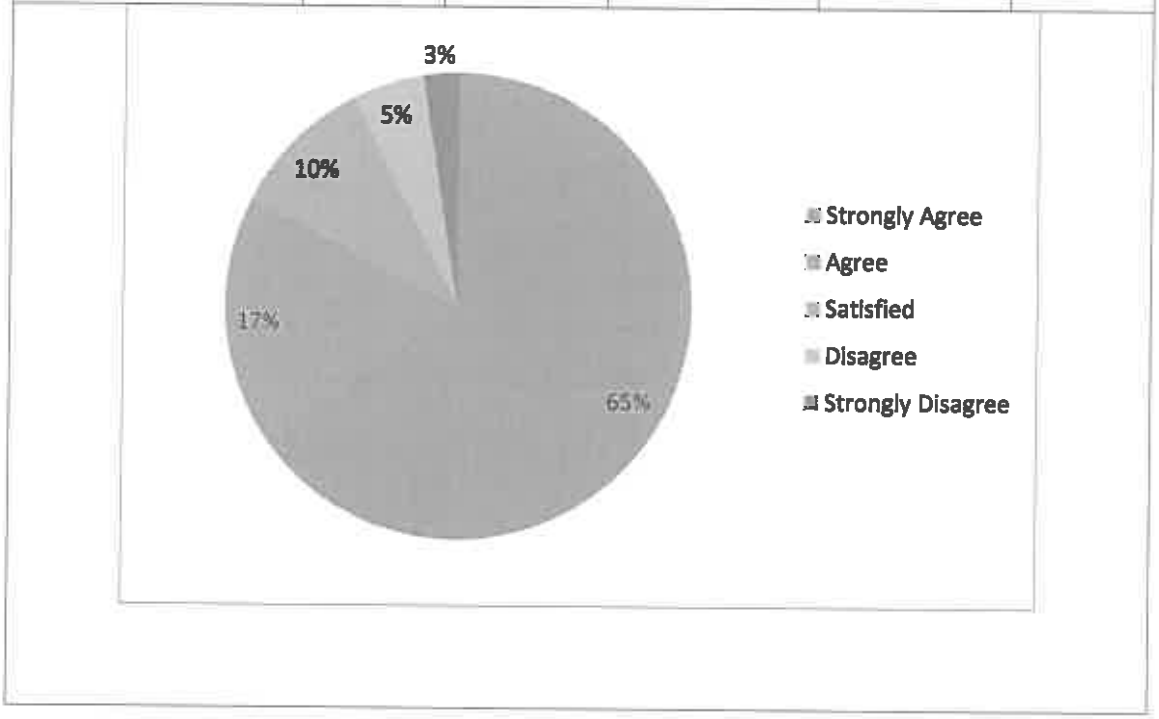
The curriculum has adequate scope for multidisciplinary knowledge and sufficient number of elective courses.	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	62.5	20	10	5	2.5



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Q.4 The curriculum has focus on personality development by presence of courses on human values and professional ethics

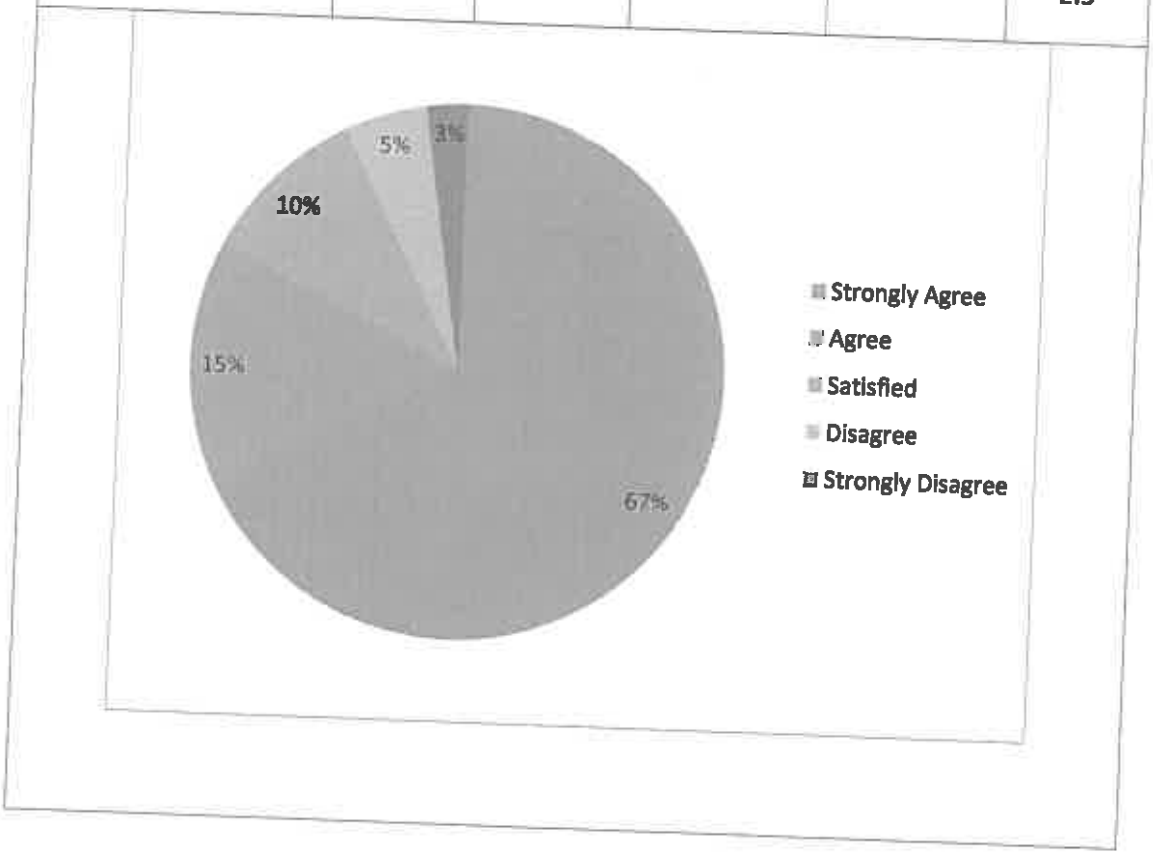
The curriculum has focus on personality development by presence of courses on human values and professional ethics.	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	65	17.5	10	5	2.5



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U.: www.sug.ac.in

Q.5 The curriculum provides enough scope for improving entrepreneurial skill as well as industry readiness.

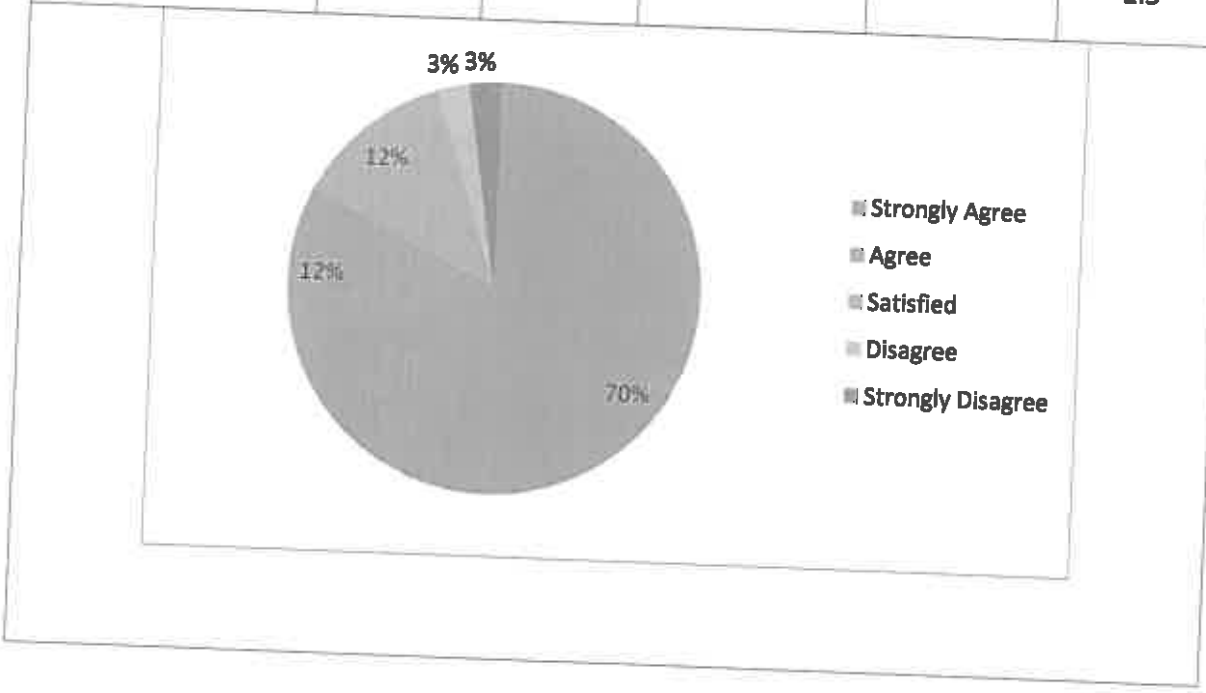
The curriculum provides enough scope for improving entrepreneurial skill as well as industry readiness.	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	67.5	15	10	5	2.5



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Babu Vijendra Marg, Adarsh Institutional
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247341, India
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U.: www.sug.ac.in

Q.6 The curriculum provides ample knowledge for increased employability and to promote students for higher education.

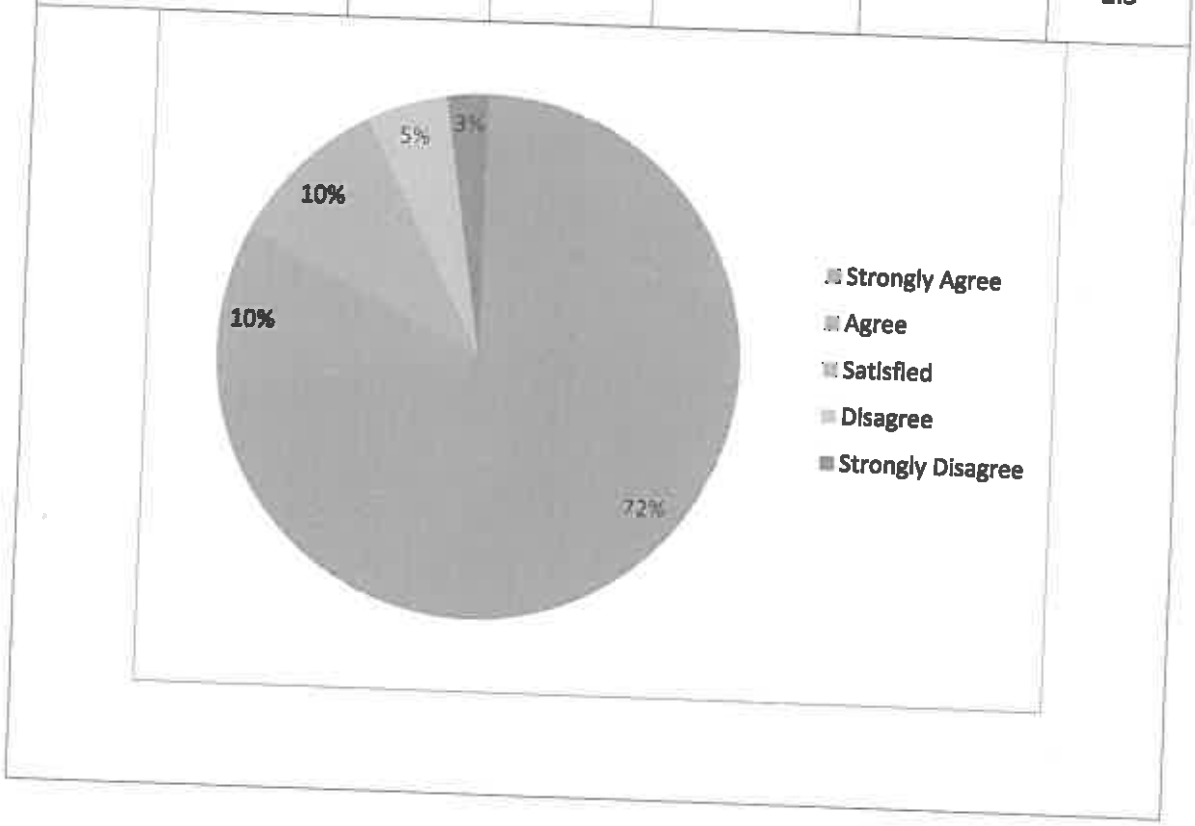
The curriculum provides ample knowledge for increased employability and to promote students for higher education.	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	70	12.5	12.5	2.5	2.5



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Babu Vijendra Marg, Adarsh Institutional
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247341, India
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Q.7 The curriculum helps in enhancing problem solving capability related to local/global societal issues.

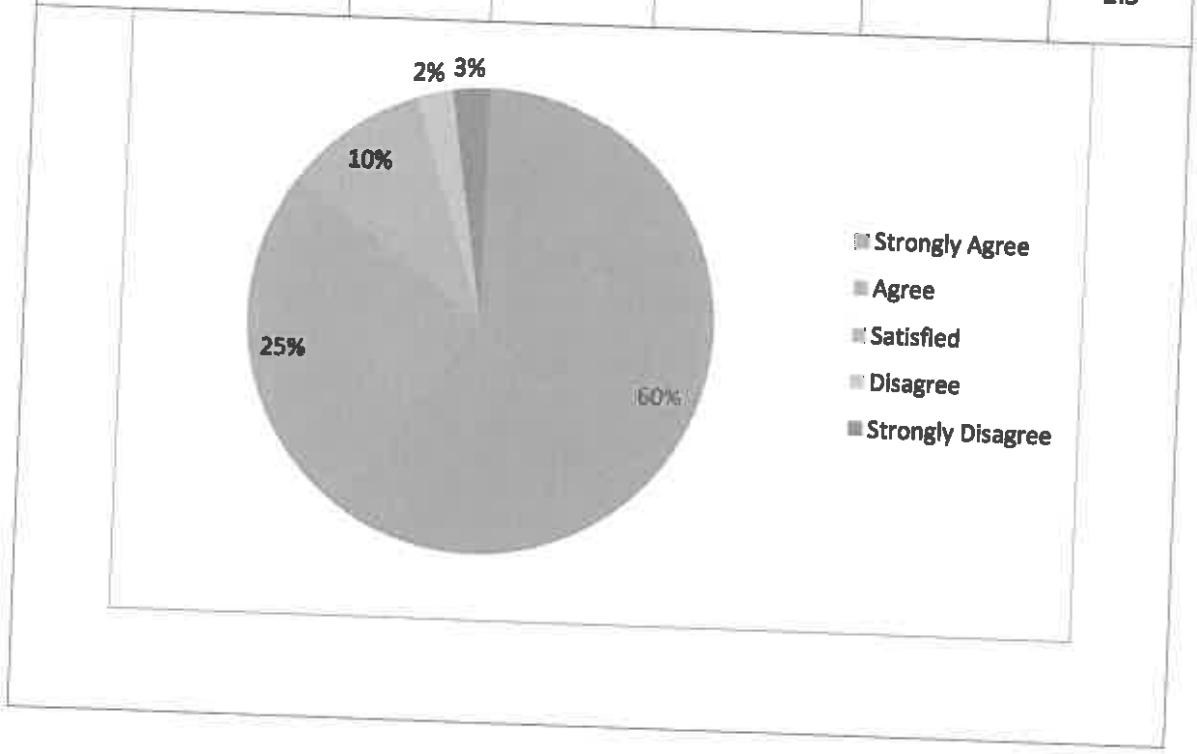
The curriculum helps in enhancing problem solving capability related to local/global societal issues.	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	72.5	10	10	5	2.5



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U: www.sug.ac.in

Q.8 Adequate freedom is given to offer opinion on design & development of curriculum.

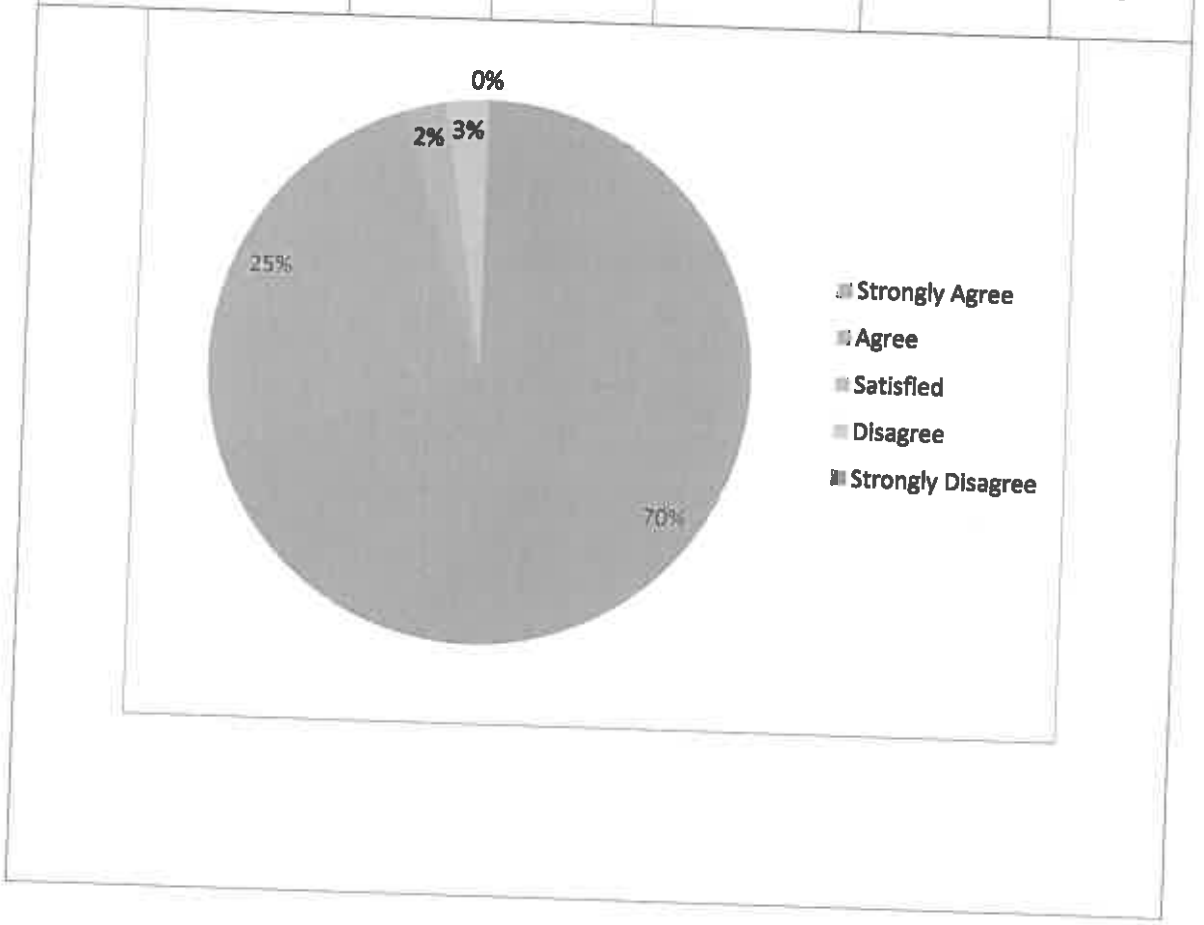
Adequate freedom is given to offer opinion on design & development of curriculum.	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	60	25	10	2.5	2.5



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Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
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E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

Q.9 The existing system for curriculum revision is found to be effective.

The existing system for curriculum revision is found to be effective.	Strongly Agree	Agree	Satisfactory	Disagree	Strongly Disagree
Response (%)	70	25	2.5	2.5	0



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School of Engineering and Technology(40)						
Total no. of Teachers : 40		**Strongly Agree**	**Agree**	**Satisfied**	**Disagree**	**Strongly Disagree**
The curriculum is well organized and balanced for the programme with proper credit allocation.	No. of Teachers	25	10	3	1	1
	Percentage	62.5	25	7.5	2.5	2.5
The courses have adequate balance between theory and application for student's holistic development.	No. of Teachers	23	9	4	2	2
	Percentage	57.5	22.5	10	5	5
The curriculum has adequate scope for multidisciplinary knowledge and sufficient number of elective courses.	No. of Teachers	25	8	4	2	1
	Percentage	62.5	20	10	5	2.5
The curriculum has focus on personality development by presence of courses on human values and professional ethics	No. of Teachers	26	7	4	2	1
	Percentage	65	17.5	10	5	2.5
The curriculum provides enough scope for	No. of Teachers	27	6	4	2	1

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Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

improving entrepreneurial skill as well as industry readiness.	Percentage	67.5	15	10	5	2.5
The curriculum provides ample knowledge for increased employability and to promote students for higher education.	No. of Teachers	28	5	5	1	1
	Percentage	70	12.5	12.5	2.5	2.5
The curriculum helps in enhancing problem solving capability related to local/global societal issues	No. of Teachers	29	4	4	2	1
	Percentage	72.5	10	10	5	2.5
Adequate freedom is given to offer opinion on design & development of curriculum.	No. of Teachers	24	10	4	1	1
	Percentage	60	25	10	2.5	2.5
The existing system for curriculum revision is found to be effective.	No. of Teachers	28	10	1	1	0
	Percentage	70	25	2.5	2.5	0

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Babu Vijendra Marg, Adarsh Institutional
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247341, India
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E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

Analysis of Feedback:

The feedback from the 40 teachers at the School of Engineering and Technology reveals a predominantly positive view of the curriculum, with some areas for further enhancement. A significant portion of faculty members (62.5%) strongly agree that the curriculum is well-organized and balanced with proper credit allocation, while 25% agree and 7.5% are satisfied, indicating a high level of satisfaction but also some potential for improvement. Regarding the balance between theory and application, 57.5% of teachers strongly agree, 22.5% agree, and 10% are satisfied, reflecting a solid consensus that the curriculum supports holistic student development, though there is room for refinement in practical learning.

In terms of multidisciplinary knowledge and elective courses, 62.5% of teachers strongly agree that the curriculum provides adequate opportunities, with 20% agreeing and 10% satisfied, signaling broad approval but a potential need for even more interdisciplinary options. The curriculum's focus on personality development, particularly through courses on human values and professional ethics, is highly regarded by 65% of faculty, with 17.5% agreeing and 10% satisfied, suggesting that this aspect of the curriculum is strong but could be further enhanced.

The inclusion of entrepreneurial skills and industry readiness is well-received, with 67.5% of teachers strongly agreeing, 15% agreeing, and 10% satisfied. This indicates that the curriculum is generally effective in fostering these competencies, although more attention may be needed to further develop these areas. Regarding employability and promoting higher education, 70% of teachers strongly agree, 12.5% agree, and 12.5% are satisfied, reflecting strong confidence in the curriculum's effectiveness in this regard.

In terms of problem-solving abilities related to societal issues, 72.5% of teachers strongly agree, 10% agree, and 10% are satisfied, signaling that the curriculum is highly effective in this area. Regarding faculty involvement in curriculum design, 60% of teachers strongly agree that they have adequate freedom to provide input, with 25% agreeing and 10% satisfied. Lastly, the system for curriculum revision is seen as effective by 70% of faculty, with 25% agreeing and only 2.5% dissatisfied, indicating a high level of satisfaction with the revision process. Overall, the feedback is largely positive, though areas such as further expansion of electives and strengthening industry readiness could be areas for further development.

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Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

Action Taken Report

(School of Engineering and Technology)

Sr. No.	Suggestions	Action taken	Outcome
1	Expand the range of interdisciplinary electives and options	Introduced new elective courses in emerging fields such as Artificial Intelligence, Robotics, and Sustainability Engineering. Expanded collaborations with other departments to offer cross-disciplinary electives.	Enhanced flexibility and student exposure to a broader range of interdisciplinary topics, allowing students to tailor their learning according to evolving industry needs.
2	Further enhance industry readiness and entrepreneurial skills development	Established partnerships with local industries for internships, projects, and guest lectures. Launched workshops on entrepreneurial skills and innovation.	Improved industry engagement and real-world experience for students, boosting their readiness for both employment and entrepreneurial endeavors.
3	Strengthen focus on practical learning and application of theory	Increased the number of laboratory sessions, practical workshops, and industry collaboration projects. Enhanced the use of real-world case studies in coursework.	More opportunities for hands-on experience and practical application of theoretical knowledge, ensuring students are better equipped for industry challenges.
4	Foster greater faculty involvement in the curriculum design and review process	Instituted regular faculty workshops for feedback on curriculum updates, and created a platform for faculty to propose new course offerings and content revisions.	Greater faculty involvement in shaping the curriculum, ensuring it remains relevant, responsive, and reflective of industry

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Babu Vijendra Marg, Adarsh Institutional
Area Gangoh, Distt. Saharanpur (U.P.)
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			needs and academic advancements.

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E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

24th Meeting of BOS (Item No. 24.4 Annexure -4)

SHOBHIT UNIVERSITY GANGOH
SCHOOL OF ENGINEERING AND TECHNOLOGY
List of Examiners (2024-2025)

Sr. No.	Course code with Title	Name, Designation, Institution and Correspondence address of the Paper Setter/Examiner	Contact number with E. Mail ID
1	OOPS Using C++ (BCA-201)	External Examiner 1. Dr. Abahay Bhatia	dr.abhay@ritrookee.ac.in, 9837386973
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com, 97604492192
		3. Dr. Mamta	mamta.bansal345@gmail.com 9997025606
		Internal Examiner 1. Dr. Tarun Kumar Sharma	Tarun.sharma@shobhituniversity.ac.in, 9456086759
		2. Mr. Vinod Kumar	Vinod.kumar@shobhituniversity.ac.in, 9758749227
2	Database Management Systems(BCA-202)	External Examiner 1. Dr. Abahay Bhatia	dr.abhay@ritrookee.ac.in, 9837386973
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com, 97604492192
		3. Dr. Mamta	mamta.bansal345@gmail.com 9997025606
		Internal Examiner 1. Mr. Kuldeep Chauhan	Kuldeep.chauhan@shobhituniversity.ac.in, 9756997090

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

		2. Mr. Nitin Kumar	nitin.kumar@shobhituniversity.ac.in, 9758170029
3	Web & E-Commerce Technologies(BCA-203)	External Examiner 1. Dr. Abahay Bhatia	dr.abhay@ritrookee.ac.in, 9837386973
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com, 97604492192
		3. Dr. Mamta	mamta.bansal345@gmail.com,9997025606
		Internal Examiner 1. Mr. Nitin Kumar	nitin.kumar@shobhituniversity.ac.in, 9758170029
		2. Ms. Sumika Jain	Sumika.jai@shobhituniversity.ac.in, 9456666326
4	Discrete Structures(BCA-204)	External Examiner 1. Dr. Abahay Bhatia	dr.abhay@ritrookee.ac.in, 9837386973
		2. Dr. Mamta	mamta.bansal345@gmail.com,9997025606
		3. Dr. Ankit Sharma	gurukul.ankit@gmail.com, 97604492192
		Internal Examiner 1. Mr. Vinod Kumar	
		2. Mr. Kuldeep Chauhan	Kuldeep.chauhan@shobhituniversity.ac.in, 9756997090
5	Environmental Studies(BCA-205)	External Examiner 1. Dr. Abahay Bhatia	dr.abhay@ritrookee.ac.in, 9837386973
		2. Dr. Mamta	mamta.bansal345@gmail.com,9997025606
		3. Dr. Ankit Sharma	gurukul.ankit@gmail.com, 97604492192
		Internal Examiner 1. Mr. Vinod Kumar	Vinod.kumar@shobhituniversity.ac.in, 9758749227

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional
Area Gangoh, Distt. Saharanpur (U.P.)
247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

		2. Ms. Sumika Jain	Sumika.jai@shobhituniversity.ac.in, 9456666326
6	OOPS Using C++ Lab(BCA-251)	External Examiner 1. Dr. Abahay Bhatia	dr.abhay@ritrookee.ac.in, 9837386973
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com, 97604492192
		3.Dr Mamta	mamta.bansal345@gmail.com,9997025606
		Internal Examiner 1. Mr. Vinod Kumar	Vinod.kumar@shobhituniversity.ac.in, 9758749227
		2. Ms. Sumika Jain	Sumika.jai@shobhituniversity.ac.in, 9456666326
7	Database Management Systems Lab(BCA-252)	External Examiner 1. Dr. Ankit Sharma	gurukul.ankit@gmail.com, 97604492192
		2. Dr. Abahay Bhatia	dr.abhay@ritrookee.ac.in, 9837386973
		3.dr Mamta	mamta.bansal345@gmail.com,9997025606
		Internal Examiner 1. Mr. Vinod Kumar	Vinod.kumar@shobhituniversity.ac.in, 9758749227
		2. Ms. Sumika Jain	Sumika.jai@shobhituniversity.ac.in, 9456666326
8	Seminar Based on Learning(BCA-253)	External Examiner 1. Dr. Abahay Bhatia	dr.abhay@ritrookee.ac.in, 9837386973
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com, 97604492192
		3. Dr. Mamta	mamta.bansal345@gmail.com,9997025606
		Internal Examiner	

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

		4. Dr. Tarun Kumar Sharma	Tarun.sharma@shobhituniversity.ac.in, 9456086759
		5. Mr. Vinod Kumar	Vinod.kumar@shobhituniversity.ac.in, 9758749227
9	Data Structures(BCA-401)	External Examiner 1. Dr. Ankit Sharma	gurukul.ankit@gmail.com, 97604492192
		2. Dr. Mamta	
		3. Dr. Abahay Bhatia	dr.abhay@ritrookee.ac.in, 9837386973
		Internal Examiner 1. Dr. Tarun Kumar Sharma	Tarun.sharma@shobhituniversity.ac.in, 9456086759
		2. Mr. Vinod Kumar	Vinod.kumar@shobhituniversity.ac.in, 9758749227
10	Java Programming(BCA-402)	External Examiner 1. Dr. Ankit Sharma	gurukul.ankit@gmail.com, 97604492192
		2. Dr. Abahay Bhatia	dr.abhay@ritrookee.ac.in, 9837386973
		3. Dr. Mamta	mamta.bansal345@gmail.com,9997025606
		Internal Examiner 1. Mr. Kuldeep Chauhan	Kuldeep.chauhan@shobhituniversity.ac.in, 9756997090
		2. Mr. Nitin Kumar	nitin.kumar@shobhituniversity.ac.in, 9758170029
11	Computer System Architecture(BCA-403)	External Examiner 1. Dr. Abahay Bhatia	dr.abhay@ritrookee.ac.in, 9837386973
		2. Dr. Mamta	mamta.bansal345@gmail.com,9997025606

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

		3. Dr. Ankit Sharma	gurukul.ankit@gmail.com, 97604492192
		Internal Examiner 1. Dr. Tarun Kumar Sharma	Tarun.sharma@shobhituniversity.ac.in, 9456086759
		2. Mr. Vinod Kumar	Vinod.kumar@shobhituniversity.ac.in, 9758749227
12	Knowledge Management(BCA-404)	External Examiner 1. Dr. Abahay Bhatia	dr.abhay@ritrookee.ac.in, 9837386973
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com, 97604492192
		3. Dr. Mamta	mamta.bansal345@gmail.com 9997025606
		Internal Examiner 1. 1.Mr. Kuldeep Chauhan	Kuldeep.chauhan@shobhituniversity.ac.in, 9756997090
		2. 2.Mr. Nitin Kumar	nitin.kumar@shobhituniversity.ac.in, 9758170029
13	Data Structures Lab(BCA-451)	External Examiner 1. 1. Dr. Mamta	mamta.bansal345@gmail.com 9997025606
		2. 2. Dr. Ankit Sharma	gurukul.ankit@gmail.com, 97604492192
		3. 3. Dr. Abahay Bhatia	dr.abhay@ritrookee.ac.in, 9837386973
		Internal Examiner 1. Dr. Varun Bansal	Varun.bansal@shobhituniversity.ac.in, 9411295559
		2. Mr. Vinod Kumar	Vinod.kumar@shobhituniversity.ac.in, 9758749227
14		External Examiner	

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

	Java Programming Lab(BCA-452)	1. Dr. Mamta	mamta.bansal345@gmail.com,9997025606
		2. Dr. Abahay Bhatia	dr.abhay@ritrookee.ac.in, 9837386973
		3. Dr. Ankit Sharma	gurukul.ankit@gmail.com, 97604492192
		Internal Examiner 1. Dr. Varun Bansal	Varun.bansal@shobhituniversity.ac.in, 9411295559
		2. Mr. Vinod Kumar	Vinod.kumar@shobhituniversity.ac.in, 9758749227
15	Computer System Architecture Lab(BCA-453)	External Examiner 1. Dr. Mamta	mamta.bansal345@gmail.com,9997025606
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com, 97604492192
		3. Dr. Abahay Bhatia	dr.abhay@ritrookee.ac.in, 9837386973
		Internal Examiner 1. Mr. Kuldeep Chauhan	Kuldeep.chauhan@shobhituniversity.ac.in, 9756997090
		2. Mr. Nitin Kumar	nitin.kumar@shobhituniversity.ac.in, 9758170029
16	Seminar Based on Learning(BCA-454)	External Examiner 1. Dr. Mamta	mamta.bansal345@gmail.com,9997025606
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com, 97604492192
		3. Dr. Abahay Bhatia	dr.abhay@ritrookee.ac.in, 9837386973
		Internal Examiner 3. Mr. Kuldeep Chauhan	Kuldeep.chauhan@shobhituniversity.ac.in, 9756997090
		4. Mr. Nitin Kumar	nitin.kumar@shobhituniversity.ac.in, 9758170029

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

17	Data Communication and Computer Networks(BCA-601)	External Examiner 1. Dr. Abahay Bhatia	dr.abhay@ritrookee.ac.in, 9837386973
		2. Dr. Mamta	mamta.bansal345@gmail.com,9997025606
		3. Dr. Ankit Sharma	gurukul.ankit@gmail.com, 97604492192
		Internal Examiner 6. Mr. Kuldeep Chauhan	Kuldeep.chauhan@shobhituniversity.ac.in, 9756997090
		7. Mr. Nitin Kumar	nitin.kumar@shobhituniversity.ac.in, 9758170029
18	Artificial Intelligence(BCA-602)	External Examiner 1. Dr. Ankit Sharma	gurukul.ankit@gmail.com, 97604492192
		2. Dr. Mamta	mamta.bansal345@gmail.com,9997025606
		3. Dr. Abahay Bhatia	dr.abhay@ritrookee.ac.in, 9837386973
		Internal Examiner 5. Mr. Kuldeep Chauhan	Kuldeep.chauhan@shobhituniversity.ac.in, 9756997090
		6. Mr. Nitin Kumar	nitin.kumar@shobhituniversity.ac.in, 9758170029
19	Cyber Security & Cyber Laws(BCA-603)	External Examiner 1. Dr. Abahay Bhatia	dr.abhay@ritrookee.ac.in, 9837386973
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com, 97604492192
		3. Dr. Mamta	mamta.bansal345@gmail.com,9997025606
		Internal Examiner 8. Mr. Kuldeep Chauhan	Kuldeep.chauhan@shobhituniversity.ac.in, 9756997090

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Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

		9. Mr. Nitin Kumar	nitin.kumar@shobhituniversity.ac.in, 9758170029
20	Software Project management(BCA-604)	External Examiner 1. Dr. Mamta	mamta.bansal345@gmail.com,9997025606
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com, 97604492192
		3. Dr. Abahay Bhatia	dr.abhay@ritrookee.ac.in, 9837386973
		Internal Examiner Ms. Sumika Jain	Sumika.jai@shobhituniversity.ac.in, 9456666326
		Mr. Vinod Kumar	Vinod.kumar@shobhituniversity.ac.in, 9758749227
21	Computer Networks Lab(BCA-651)	External Examiner 1. Dr. Mamta	mamta.bansal345@gmail.com,9997025606
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com, 97604492192
		3. Dr. Abahay Bhatia	dr.abhay@ritrookee.ac.in, 9837386973
		Internal Examiner 1. Mr. Kuldeep Chauhan	Kuldeep.chauhan@shobhituniversity.ac.in, 9756997090
		2. Mr. Nitin Kumar	nitin.kumar@shobhituniversity.ac.in, 9758170029
22	Seminar and Group Discussion(BCA-656)	External Examiner 1. Dr. Ankit Sharma	gurukul.ankit@gmail.com, 97604492192
		2. Dr. Mamta	mamta.bansal345@gmail.com,9997025606
		3. Dr. Abahay Bhatia	dr.abhay@ritrookee.ac.in, 9837386973
		Internal Examiner 1. Ms. Sumika Jain	

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

			Sumika.jai@shobhituniversity.ac.in, 9456666326
		2. Mr. Vinod Kumar	Vinod.kumar@shobhituniversity.ac.in, 9758749227
23	Research Project-II (BCA-658)	External Examiner Dr. Abahay Bhatia	dr.abhay@ritrookee.ac.in, 9837386973
		Dr. Ankit Sharma	gurukul.ankit@gmail.com, 97604492192
		Dr. Mamta	mamta.bansal345@gmail.com 9997025606
		Internal Examiner 1. Ms. Sumika Jain	Sumika.jai@shobhituniversity.ac.in, 9456666326
		2. Mr. Vinod Kumar	Vinod.kumar@shobhituniversity.ac.in, 9758749227

MCA List of Examiners (2024-2025)

Sr. No.	Course code with Title	Name, Designation, Institution and Correspondence address of the Paper Setter/Examiner	Contact number with E. Mail ID
1	Software Engineering & Project Management (MCA-201)	External Examiner 1. Dr. Abhay Bhatia	Dr.abhay@ritroorkee.ac.in 9837386973
		2. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		3. Dr. Mamta Bansal	Mamta.bansal345@gmail.com 9997025606
		Internal Examiner 1. Mr. Jitendra K. Saini	Jitendra.saini@shobhituniversity.ac.in 7669110295

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

		2. Mr. Shahnawaaj	Mohd.shahnawaz@shobhituniversity.ac.in 9536940100
2.	ASP .Net(MCA-202)	External Examiner 1. Dr. Ankit Sharma	Gurukul.ankit@gmail.com 9760492192
		2. Dr. Arun Giri	Arungiri123@yahoo.com 981880953
		3. Dr. Nidhi Tyagi	Nidhi.tyagi9785@gmail.com 9927007273
		Internal Examiner 1. Dr. Varun Bansal	Varun.bansal@shobhituniversity.ac.in 9675478559
		2. Mr. Shubham Kumar	Shubham.k@shobhituniversity.ac.in 7895408519
3.	Python(MCA-203)	External Examiner 1. Dr. Ankit Sharma	Gurukul.ankit@gmail.com 9760492192
		2. Dr. Arun Giri	Arungiri123@yahoo.com 981880953
		3. Dr. Nidhi Tyagi	Nidhi.tyagi9785@gmail.com 9927007273
		Internal Examiner 1. Dr. Tarun Kumar Sharma	Tarun.sharma@shobhituniversity.ac.in 9456086759
		2. Mr. Vinod Kumar	Vinod.kumar@shobhituniversity.ac.in 9758749227
4.	Artificial Intelligence(MCA-204)	External Examiner 1. Dr. Nidhi Tyagi	Nidhi.tyagi9785@gmail.com 9927007273
		2. Dr. Mamta Bansal	Mamta.bansal345@gmail.com 9997025606
		3. Dr. Abhay Bhatia	Dr.abhay@ritroorkee.ac.in 9837386973
		Internal Examiner 1. Mr. Jitendra K. Saini	Jitendra.saini@shobhituniversity.ac.in 7669110295

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

		2. Dr. Tarun Kumar Sharma	Tarun.sharma@shobhituniversity.ac.in 9456086759
5.	Distributed Operating System (MCA-231)	External Examiner 1. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		2. Dr. Ankit Sharma	Gurukul.ankit@gmail.com 9760492192
		3. Dr. Arun Giri	Arungiri123@yahoo.com 981880953
		Internal Examiner 1. Dr. Varun Bansal	Varun.bansal@shobhituniversity.ac.in 9675478559
		2. Mr. Jitendra K. Saini	Jitendra.saini@shobhituniversity.ac.in 7669110295
6.	Lab Software Engineering and Project Management (MCA-251)	External Examiner 1. Dr. Ankit Sharma	Gurukul.ankit@gmail.com 9760492192
		2. Dr. Arun Giri	Arungiri123@yahoo.com 981880953
		3. Dr. Nidhi Tyagi	Nidhi.tyagi9785@gmail.com 9927007273
		Internal Examiner 1. Dr. Varun Bansal	Varun.bansal@shobhituniversity.ac.in 9675478559
		2. Ms. Sumika Jain	Sumika.jain@shobhituniversity.ac.in 9456666326
7.	Lab ASP. Net (MCA-252)	External Examiner 1. Dr. Nidhi Tyagi	Nidhi.tyagi9785@gmail.com 9927007273
		2. Dr. Mamta Bansal	Mamta.bansal345@gmail.com 9997025606
		3. Dr. Abhay Bhati	Dr.abhay@ritroorkee.ac.in 9837386973
		Internal Examiner 1. Mr. Jitendra K. Saini	Jitendra.saini@shobhituniversity.ac.in 7669110295

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

		2. Mr. Shahnawaj	Mohd.shahnawaz@shobhituniversity.ac.in 9536940100
8.	Lab Python (MCA-253)	External Examiner 1. Dr. Mamta Bansal	Mamta.bansal345@gmail.com 9997025606
		2. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		3. Dr. Abhay Bhatia	Dr.abhay@ritroorkee.ac.in 9837386973
		Internal Examiner 1. Dr. Varun Bansal	Varun.bansal@shobhituniversity.ac.in 9675478559
		2. Ms. Sumika Jain	Sumika.jain@shobhituniversity.ac.in 9456666326
9.	MAJOR PROJECT PRESENTATION & VIVA(MCA-462)	External Examiner 1. Dr. Arun Giri	Arungiri123@yahoo.com 981880953
		2. Dr. Nidhi Tyagi	Nidhi.tyagi9785@gmail.com 9927007273
		3. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		Internal Examiner 1. Mr. Vinod Kumar	Vinod.kumar@shobhituniversity.ac.in 9758749227
		2. Mr. Anuj Kumar	Anju.k@shobhituniversity.ac.in 7249989555

M.Tech List of Examiners (2024-2025)

Sr. No.	Course code with Title	Name, Designation, Institution and Correspondence address of the Paper Setter/Examiner	Contact number with E. Mail ID
1.	Resource Management of Computer Systems	External Examiner 1. Dr. Arun Giri	arungiri123@yahoo.com 9818809053
		2. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

	CE- 502		9927007273
		3. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		Internal Examiner 1. Ms. Sumika Jain	sumika.jain@shobhituniversity.ac.in 9456666326
		2. Mr. Raveendra Kr. Bharati	raveendra.bharati@shobhituniversity.ac.in 9953328744
2.	Soft Computing CE-504	External Examiner 1. Dr. Abhay Bhatia	dr.abhav@ritroorkee.ac.in 9837386973
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192
		3. Dr. Mamta Bansal	mamta.bansal345@gmail.com 9997025606
		Internal Examiner 1. Mr. Raveendra Kr. Bharati	anil.nishad@shobhituniversity.ac.in 8171418088
		2. Mr. Kuldeep Chauhan	kuldeep.chauhan@shobhituniversity.ac.in 9756997090
3.	High Performance Computer Architecture CE- 506	External Examiner 1. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		2. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		3. Dr. Abhay Bhatia	dr.abhav@ritroorkee.ac.in 9837386973

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

		Internal Examiner 1. Mr. Varun Bansal	varun.bansal@shobhituniversity.ac.in 9675478559
		2. Mr. Nitin Kumar	nitin.kumar@shobhituniversity.ac.in 9758170029
4.	Mobile & Wireless Communication CE-522	External Examiner 1. Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192
		2. Dr. Mamta Bansal	mamta.bansal345@gmail.com 9997025606
		3. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		Internal Examiner 1. Mr. Raveendra Kr. Bharati	anil.nishad@shobhituniversity.ac.in 8171418088
		2. Mr. Kuldeep Chauhan	kuldeep.chauhan@shobhituniversity.ac.in 9756997090
5.	Operating systems Lab CE-552	External Examiner 1. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192
		3. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		Internal Examiner 1. Mr. Vinod Kumar	vinod.kumar@shobhituniversity.ac.in 9758749227
		2. Ms. Sumika Jain	sumika.jain@shobhituniversity.ac.in

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

			9456666326
6.	Seminar-II CE-582	External Examiner 1. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192
		3. Dr. Mamta Bansal	mamta.bansal345@gmail.com 9997025606
		Internal Examiner 1. Mr. Madhav P. Namdev	Madhav.namdev@shobhituniversity.ac.in 94572731592
		2. Mr. Raveendra Kr. Bharati	raveendra.bharati@shobhituniversity.ac.in 9953328744
7.	Dissertation CE- 692	External Examiner 1. Dr. Arun Giri	arungiri123@yahoo.com 9818809053
		2. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		3. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		Internal Examiner 1. Mr. Varun Bansal	varun.bansal@shobhituniversity.ac.in 9675478559
		2. Mr. Nitin Kumar	nitin.kumar@shobhituniversity.ac.in 9758170029

B.tech List of Examiners (2024-2025)

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

Sr. No.	Course code with Title	Name, Designation, Institution and Correspondence address of the Paper Setter/Examiner	Contact number with E. Mail ID
1.	MATHEMATICS-II (CMAN 102)	External Examiner 4. Dr. Arun Giri	arungiri123@yahoo.com 9818809053
		5. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		6. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		Internal Examiner 1. Dr. Vishvas Chand	vishvas.chand@shobhituniversity.ac.in 9286093196
		2. Mr. Abdulla Khan	abdulla.khan@shobhituniversity.ac.in 7454976780
2.	ENGINEERING PHYSICS (CPHN 102)	External Examiner 4. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		5. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		6. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		Internal Examiner 1. Mohd Ahamad	mohd.ahamad@shobhituniversity.ac.in 9548159750
		2. Mr. Hamid Ali	hamid.ali@shobhituniversity.ac.in

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

			9759302770
3.	COMPUTER FUNDAMENTALS AND PROGRAMMING USING-C (CCSN 102)	External Examiner 4. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		5. Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192
		6. Dr. Mamta Bansal	mamta.bansal345@gmail.com 9997025606
		Internal Examiner 1. Mr. Varun Bansal	varun.bansal@shobhituniversity.ac.in 9675478559
		2. Mr. Kuldeep Chauhan	kuldeep.chauhan@shobhituniversity.ac.in 9756997090
4.	BASICS OF ELECTRICAL ENGINEERING (CEEN 102)	External Examiner 1. Dr. Arun Giri	arungiri123@yahoo.com 9818809053
		2. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		3. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		Internal Examiner 1. Dr. Jasvir Singh Rana	jasvirsingh.rana@shobhituniversity.ac.in 9759233859
		2. Mr. Shoyab Hussain	shoyab.hussain@shobhituniversity.ac.in 9837446390

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

5.	TECHNICAL COMMUNICATION (CPCN 102)	External Examiner 1. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		2. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		3. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		Internal Examiner 1. Mr. Dhruv Joshi	dhruv.joshi@shobhituniversity.ac.in 7302702677
		2. Ms. Abhilasha R. Goel	abhilasha.goyal@shobhituniversity.ac.in 8392821112
6.	ENGINEERING PHYSICS LAB (CPHN 152)	External Examiner 1. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192
		3. Dr. Mamta Bansal	mamta.bansal345@gmail.com 9997025606
		Internal Examiner 1. Mohd Ahamad	mohd.ahamad@shobhituniversity.ac.in 9548159750
		2. Mr. Hamid Ali	hamid.ali@shobhituniversity.ac.in 9759302770
7.		External Examiner	nidhi.tyagi9785@gmail.com

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

	COMPUTER PROGRAMMING USING C LAB (CCSN 152)	1. Dr. Nidhi Tyagi	9927007273
		2. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		3. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		Internal Examiner 1. Mr. Varun Bansal	varun.bansal@shobhituniversity.ac.in 9675478559
		2. Mr. Kuldeep Chauhan	kuldeep.chauhan@shobhituniversity.ac.in 9756997090
8.	BASIC ELECTRICAL ENGINEERING LAB (CEEN 152)	External Examiner 1. Dr. Arun Giri	arungiri123@yahoo.com 9818809053
		2. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		3. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		Internal Examiner 1. Dr. Jasvir Singh Rana	jasvirsingh.rana@shobhituniversity.ac.in 9759233859
		2. Mr. Shoyab Hussain	shoyab.hussain@shobhituniversity.ac.in 9837446390
9.	OBJECT ORIENTED PROGRAMMING	External Examiner	dr.abhay@ritroorkee.ac.in 9837386973

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

	USING C++ (CCSN 202)	1. Dr. Abhay Bhatia	
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192
		3. Dr. Mamta Bansal	mamta.bansal345@gmail.com 9997025606
		Internal Examiner 1. Dr. Tarun Kumar Sharma	tarun.sharma@shobhituniversity.ac.in 9456086759
		2. Mr. Vinod Kumar	vinod.kumar@shobhituniversity.ac.in 9758749227
10.	DESIGN AND ANALYSIS OF ALGORITHMS (CCSN 204)	External Examiner 1. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		2. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		3. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		Internal Examiner 1. Mr. Varun Bansal	varun.bansal@shobhituniversity.ac.in 9675478559
		2. Mr. Nitin Kumar	nitin.kumar@shobhituniversity.ac.in 9758170029
11.		External Examiner	dr.abhay@ritroorkee.ac.in

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

	INTERNET AND WEB TECHNOLOGY (CCSN 206)	1. Dr. Abhay Bhatia	9837386973
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192
		3. Dr. Mamta Bansal	mamta.bansal345@gmail.com 9997025606
		Internal Examiner 1. Mr. Varun Bansal	varun.bansal@shobhituniversity.ac.in 9675478559
		2. Mr. Kuldeep Chauhan	kuldeep.chauhan@shobhituniversity.ac.in 9756997090
12.	COMPUTER NETWORKS (CCSN 208)	External Examiner 1. Dr. Arun Giri	arungiri123@yahoo.com 9818809053
		2. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		3. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		Internal Examiner 1. Mr. Varun Bansal	varun.bansal@shobhituniversity.ac.in 9675478559
		2. Mr. Kuldeep Chauhan	kuldeep.chauhan@shobhituniversity.ac.in 9756997090
13.	FORMAL LANGUAGES &	External Examiner	nidhi.tyagi9785@gmail.com 9927007273

Shobhit University
EDUCATION EMPOWERS.
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

	AUTOMATION THEORY (CCSN 210)	1. Dr. Nidhi Tyagi	
		2. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		3. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		Internal Examiner 1. Mr. Nitin Kumar	nitin.kumar@shobhituniversity.ac.in 9758170029
		2. Ms. Sumika Jain	sumika.jain@shobhituniversity.ac.in 9456666326
14.	TECHNICAL ENGLISH (CBSN 202)	External Examiner 1. Dr. Arun Giri	arungiri123@yahoo.com 9818809053
		2. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		3. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		Internal Examiner 1. Dr. Jasvir Singh Rana	jasvirsingh.rana@shobhituniversity.ac.in 9759233859
		2. Mr. Shoyab Hussain	shoyab.hussain@shobhituniversity.ac.in 9837446390
15.	OBJECT ORIENTED	External Examiner	dr.abhay@ritroorkee.ac.in 9837386973

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

	PROGRAMMING USING C++ LAB (CCSN 252)	1. Dr. Abhay Bhatia	
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192
		3. Dr. Mamta Bansal	mamta.bansal345@gmail.com 9997025606
		Internal Examiner 1. Dr. Tarun Kumar Sharma	tarun.sharma@shobhituniversity.ac.in 9456086759
		2. Mr. Vinod Kumar	vinod.kumar@shobhituniversity.ac.in 9758749227
16.	DESIGN AND ANALYSIS OF ALGORITHMS LAB (CCSN 254)	External Examiner 1. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		2. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		3. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		Internal Examiner 1. Mr. Varun Bansal	varun.bansal@shobhituniversity.ac.in 9675478559
		2. Mr. Nitin Kumar	nitin.kumar@shobhituniversity.ac.in 9758170029
17.		External Examiner	dr.abhay@ritroorkee.ac.in

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

	INTERNET AND WEB TECHNOLOGY LAB (CCSN 256)	1. Dr. Abhay Bhatia	9837386973
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192
		3. Dr. Mamta Bansal	mamta.bansal345@gmail.com 9997025606
		Internal Examiner 1. Mr. Varun Bansal	varun.bansal@shobhituniversity.ac.in 9675478559
		2. Mr. Kuldeep Chauhan	kuldeep.chauhan@shobhituniversity.ac.in 9756997090
18.	COMPUTER GRAPHICS (CCSN 302)	External Examiner 1. Dr. Arun Giri	arungiri123@yahoo.com 9818809053
		2. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		3. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		Internal Examiner 1. Dr. Tarun Kumar Sharma	tarun.sharma@shobhituniversity.ac.in 9456086759
		2. Ms. Sumika Jain	sumika.jain@shobhituniversity.ac.in 9456666326
19.		External Examiner	dr.abhay@ritroorkee.ac.in 9837386973

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

	DATA WAREHOUSING & DATA MINING (CCSN 304)	1. Dr. Abhay Bhatia	
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192
		3. Dr. Mamta Bansal	mamta.bansal345@gmail.com 9997025606
		Internal Examiner 1. Mr. Varun Bansal	varun.bansal@shobhituniversity.ac.in 9675478559
		2. Ms. Sumika Jain	sumika.jain@shobhituniversity.ac.in 9456666326
20.	MOBILE COMPUTING (CCSN 306)	External Examiner 1. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		2. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		3. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		Internal Examiner 1. Ms. Sumika Jain	sumika.jain@shobhituniversity.ac.in 9456666326
		2. Mr. Nitin Kumar	nitin.kumar@shobhituniversity.ac.in 9758170029
21.		External Examiner	dr.abhay@ritroorkee.ac.in

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

	KNOWLEDGE MANAGEMENT & EXPERT SYSTEM (CCSN 308)	1. Dr. Abhay Bhatia	9837386973
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192
		3. Dr. Mamta Bansal	mamta.bansal345@gmail.com 9997025606
		Internal Examiner 1. Dr. Mahipal Singh	registrargangh@shobhituniversity.ac.in 9759174581
		2. Dr. Shri Kant Gupta	shrikant.gupta@shobhituniversity.ac.in 8279909590
22.	SOFTWARE PROJECT MANAGEMENT (CUCS 342)	External Examiner 1. Dr. Arun Giri	arungiri123@yahoo.com 9818809053
		2. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		3. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		Internal Examiner 1. Mr. Kuldeep Chauhan	kuldeep.chauhan@shobhituniversity.ac.in 9756997090
		2. Ms. Sumika Jain	sumika.jain@shobhituniversity.ac.in 9456666326
23.		External Examiner	dr.abhay@ritroorkee.ac.in

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

	ENVIRONMENTAL STUDIES (CBSN 302)	1. Dr. Abhay Bhatia	9837386973
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192
		3. Dr. Mamta Bansal	mamta.bansal345@gmail.com 9997025606
		Internal Examiner 1. Dr. Jasvir Singh Rana	jasvirsingh.rana@shobhituniversity.ac.in 9759233859
		2. Mr. Shoyab Hussain	shoyab.hussain@shobhituniversity.ac.in 9837446390
24.	COMPUTER GRAPHICS LAB (CCSN 352)	External Examiner 1. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		2. Dr. Ankit Sharma	gurukul.ankit@gmail.com 9760492192
		3. Dr. Mamta Bansal	mamta.bansal345@gmail.com 9997025606
		Internal Examiner 1. Dr. Tarun Kumar Sharma	tarun.sharma@shobhituniversity.ac.in 9456086759
		2. Ms. Sumika Jain	sumika.jain@shobhituniversity.ac.in 9456666326
25.		External Examiner	nidhi.tyagi9785@gmail.com

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional Area Gangoh, Distt. Saharanpur (U.P.) 247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

	DATA WAREHOUSING & DATA MINING LAB (CCSN 354)	1. Dr. Nidhi Tyagi	9927007273
		2. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		3. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		Internal Examiner 1. Mr. Varun Bansal	varun.bansal@shobhituniversity.ac.in 9675478559
		2. Ms. Sumika Jain	sumika.jain@shobhituniversity.ac.in 9456666326
26.	MINI PROJECT (CCSN 356)	External Examiner 1. Dr. Arun Giri	arungiri123@yahoo.com 9818809053
		2. Dr. Nidhi Tyagi	nidhi.tyagi9785@gmail.com 9927007273
		3. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		Internal Examiner 1. Dr. Tarun Kumar Sharma	tarun.sharma@shobhituniversity.ac.in 9456086759
		2. Mr. Varun Bansal	varun.bansal@shobhituniversity.ac.in 9675478559
27.	INTERNSHIP AND Report Presentation	External Examiner	nidhi.tyagi9785@gmail.com 9927007273

Shobhit University
EDUCATION EMPOWERS
Babu Vijendra Marg, Adarsh Institutional
Area Gangoh, Distt. Saharanpur (U.P.)
247341, India
Tel: +91 7830810052
E-mail: registrargangoh@shobhituniversity.ac.in
U.: www.sug.ac.in

	(CCSN 462)	1. Dr. Nidhi Tyagi	
		2. Dr. Maheep Singh	kingmaheep@gmail.com 9411293327
		3. Dr. Abhay Bhatia	dr.abhay@ritroorkee.ac.in 9837386973
		Internal Examiner 1. Dr. Mahipal Singh	registrargangh@shobhituniversity.ac.in 9759174581
		2. Dr. Tarun Kumar Sharma	tarun.sharma@shobhituniversity.ac.in 9456086759