

School of Engineering and Technology

Bachelor of Application (Computer Science & Engineering)

Program Outcomes, Program Specific Outcomes & Course Outcomes (POs, PSOs & COs)

Program Outcomes

Program Outcome		Statement
PO 1	Basic Knowledge in Computing	Will demonstrate basic knowledge in computing discipline.
PO 2	Design and Conduct Experiments	Will demonstrate the ability to design and conduct experiments, interpret and analyze data, and report results.
PO 3	Software Design and Development	Will demonstrate the ability to design and develop software that meets the Software industry demands.
PO 4	Problem Analysis and Formulation	Capacity to analyze a problem, and identify and formulate the computing requirements appropriate to its solution.
PO 5	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.
PO 6	Professional and Ethical Responsibilities	Will demonstrate an understanding of their professional and ethical responsibilities.
PO 7	Effective Communication	Will be able to communicate effectively in both verbal and written forms.
PO 8	Global and Societal Contexts in Engineering	Will have the confidence to apply engineering solutions in global and societal contexts.





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PO 9	Self-Education and Lifelong Learning	Should be capable of self-education and clearly understand the value of lifelong learning.
PO 10	Continuing Professional Development	Awareness of the need for and an ability to engage in continuing professional development.
PO 11	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.
PO 12	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.

Program Specific Outcomes (PSOs)

Program Specific Outcome	Statement
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.





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Course Outcomes (COs)

1st Semester

Course: Fundamentals of Computer and Programming in C

Course Outcomes	Statement
CO 1	Understand basic computer systems and software types.
CO 2	Learn the fundamentals of C programming and data types.
CO 3	Master control structures, arrays, and string handling in C.
CO 4	Develop user-defined functions and understand recursion and pointers.
CO 5	Implement structures, unions, and file management in C.

Course: Problem Solving Using Computer

Course Outcomes	Statement
CO 1	Understand computer fundamentals and basic program planning.
CO 2	Apply problem-solving techniques like flowcharting and algorithm design.
CO 3	Get hands-on experience with Python programming basics.
CO 4	Work with Python structures, functions, and file handling.
CO 5	Explore advanced Python topics like OOP, regular expressions, and GUI programming.





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Course: Professional Communication

Course Outcomes	Statement
CO 1	Develop effective verbal and written communication skills.
CO 2	Improve technical writing and documentation for professional contexts.
CO 3	Understand non-verbal communication and body language.
CO 4	Gain skills for job applications, resumes, group discussions, and interviews.
CO 5	Learn organizational communication and communication network strategies.

Course: English

Course Outcomes	Statement
CO 1	Improve grammar, vocabulary, and style in English.
CO 2	Develop skills in reading comprehension and interpreting visual information.
CO 3	Strengthen business writing, including job applications and reports.
CO 4	Enhance speaking skills for business etiquette, debates, and presentations.
CO 5	Improve listening skills through business-related exercises.





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Course: Technical Communication

Course Outcomes	Statement
CO 1	Understand the principles and formats of technical writing for clear and effective communication.
CO 2	Develop skills to create user manuals, reports, proposals, and technical documentation.
CO 3	Use visuals like charts, diagrams, and tables to enhance the clarity of technical content.
CO 4	Apply audience analysis to tailor technical information for specific readers or stakeholders.
CO 5	Practice editing and proofreading to ensure accuracy, consistency, and professionalism in technical documents.

Course: Human Values, De-addiction, and Traffic Rules

Course Outcomes	Statement
CO 1	Understand the need and process for value education.
CO 2	Learn harmony in self and relationships with family and society.
CO 3	Grasp the interconnectedness of nature and existence.
CO 4	Apply holistic understanding to professional ethics.
CO 5	Explore human values, ethical conduct, and humanistic education.





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Course: Mathematics

Course Outcomes	Statement
CO 1	Understand determinants, matrices, and their properties.
CO 2	Learn limits, continuity, and their applications.
CO 3	Master differentiation, including chain rule, Rolle's theorem, and maxima/minima.
CO 4	Apply integration techniques such as substitution, parts, and reduction formulas.
CO 5	Study vector algebra, including scalar and vector products, and their applications.

Course: Basic Mathematics

Course Outcomes	Statement
CO 1	Grasp symbolic logic, set theory, and relations.
CO 2	Learn differentiation and applications like tangents, normals, and maxima/minima.
CO 3	Understand integral calculus, including multiple integrals and transformations.
CO 4	Study 2D analytical geometry, including lines, circles, and conic sections.
CO 5	Apply functions and relations in areas like coding theory and equivalence.





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Course: Mathematics-1

Course Outcomes	Statement
CO 1	Understand basic concepts in sets, relations, and functions.
CO 2	Study limits, continuity, and discontinuities.
CO 3	Learn differential calculus, including Leibnitz's theorem and partial differentiation.
CO 4	Master integration techniques, including reduction formulae and applications.
CO 5	Understand vector calculus, differential equations, and coordinate geometry.

Course: Advanced Applied Mathematics

Course Outcomes	Statement
CO 1	Study multivariable calculus, gradients, divergence, and theorems like Green's and Stokes'.
CO 2	Learn methods of solving ordinary and partial differential equations.
CO 3	Understand linear algebra, including vector spaces, eigenvalues, and diagonalization.
CO 4	Apply numerical methods, error analysis, and computational mathematics.
CO 5	Study probability, statistics, and stochastic processes, including regression and Markov chains.





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Course: Fundamental of Computer and C Programming Lab

Course Outcomes	Statement
CO 1	Understand the basics of computer hardware, software, and operating systems.
CO 2	Develop problem-solving skills using C programming language constructs.
CO 3	Write, compile, and debug simple C programs using control structures and functions.
CO 4	Implement arrays, strings, and pointers for efficient data handling in C.
CO 5	Apply file handling concepts to create, read, and write data to files using C.

Course: Software Lab using Python

Course Outcomes	Statement
CO 1	Understand Python syntax, data types, and control structures for basic programming tasks.
CO 2	Develop programs using functions, modules, and exception handling for modular coding.
CO 3	Implement data structures like lists, tuples, dictionaries, and sets for effective data management.
CO 4	Use file handling and regular expressions for processing and manipulating text data.
CO 5	Apply object-oriented programming concepts to design and build real-world Python applications.





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Course: English Communication Lab

Course Outcomes	Statement
CO 1	Develop listening skills through audio-visual materials and language lab activities.
CO 2	Enhance speaking abilities with focus on pronunciation, intonation, and fluency.
CO 3	Practice effective verbal communication through presentations, role plays, and group discussions.
CO 4	Build confidence in public speaking and interpersonal communication.
CO 5	Improve language proficiency using interactive exercises in grammar and vocabulary.

Course: English Lab

Course Outcomes	Statement
CO 1	Improve pronunciation, accent, and intonation through speech practice.
CO 2	Develop listening comprehension using audio materials and lab tools.
CO 3	Enhance speaking skills through conversations, role plays, and presentations.
CO 4	Strengthen grammar, vocabulary, and sentence structure for effective communication.
CO 5	Build confidence in using English for academic and professional interactions.





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Course: Technical Communication Lab

Course Outcomes	Statement
CO 1	Develop proficiency in writing technical documents such as reports, manuals, and proposals.
CO 2	Practice effective oral communication through presentations and technical discussions.
CO 3	Use visual aids like charts and diagrams to support technical content clearly.
CO 4	Enhance editing and proofreading skills for accuracy and clarity in documentation.
CO 5	Apply technical writing principles to tailor content for specific audiences and purposes.

Course: Human Values, Deaddiction and Traffic Rules (Lab)

Course Outcomes	Statement
CO 1	Understand the importance of human values and ethics in personal and professional life.
CO 2	Learn about the causes, effects, and prevention of substance abuse and addiction.
CO 3	Develop awareness about responsible behavior and mental well-being.
CO 4	Gain knowledge of traffic rules, signals, and the importance of road safety.
CO 5	Promote responsible citizenship through discussions and activities on social and legal responsibilities.





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Course: Seminar Based on Learning

Course Outcomes	Statement
CO 1	Enhance research skills by exploring topics relevant to academic and professional fields.
CO 2	Develop effective presentation and public speaking abilities.
CO 3	Foster critical thinking through analysis and interpretation of information.
CO 4	Improve confidence and communication through structured seminar delivery.
CO 5	Encourage peer learning and feedback through group interactions and discussions.





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Course Outcomes (COs)
2nd Semester

Course: Object Oriented Programming System Using C++

Course Outcomes	Statement
CO 1	Understand OOP concepts and differences between procedural and object-oriented programming.
CO 2	Work with control structures, arrays, pointers, structures, and functions in C++.
CO 3	Learn about classes, objects, constructors, destructors, and operator overloading.
CO 4	Implement inheritance, polymorphism, and virtual functions in C++.
CO 5	Perform file handling operations and manage I/O in C++.

Course: Database Management Systems

Course Outcomes	Statement
CO 1	Grasp fundamental DBMS concepts, architecture, and data modeling.
CO 2	Understand relational databases, relational algebra, and relational calculus.
CO 3	Master normalization (1NF to 5NF) and de-normalization techniques.
CO 4	Learn indexing, transaction management, and concurrency control.
CO 5	Develop proficiency in SQL, PL/SQL, and database implementation techniques.





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Course: Web and E-Commerce Technologies

Course Outcomes	Statement
CO 1	Understand the basics of e-commerce, its applications, and business models.
CO 2	Learn how to build and promote websites and understand web design principles.
CO 3	Study internet security, encryption, decryption, and privacy measures.
CO 4	Understand Electronic Data Exchange (EDI) and electronic payment systems.
CO 5	Explore planning for e-commerce, internet marketing, and e-governance.

Course: Discrete Structures

Course Outcomes	Statement
CO 1	Learn propositional logic, truth tables, and proof techniques.
CO 2	Understand set theory, relations, functions, and partially ordered sets.
CO 3	Explore graph theory, including types of graphs, paths, and circuits.
CO 4	Study trees, binary trees, traversal, and spanning trees.
CO 5	Learn lattice theory, including bounded lattices and duals.





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Course: Set Theory

Course Outcomes	Statement
CO 1	A set is a collection of distinct elements.
CO 2	Set operations include union (\cup), intersection (\cap), and complement ($'$).
CO 3	Venn diagrams visually represent set relationships.
CO 4	Set laws include commutative, associative, and distributive properties.
CO 5	The power set contains all subsets, and the Cartesian product forms ordered pairs.

Course: Graph Theory

Course Outcomes	Statement
CO 1	A graph consists of vertices (nodes) and edges (connections between nodes).
CO 2	Types of graphs include undirected, directed, weighted, and unweighted graphs.
CO 3	Degree of a vertex is the number of edges incident to it.
CO 4	Path in a graph is a sequence of vertices connected by edges.
CO 5	A tree is a connected acyclic graph, and a cycle is a closed path in a graph.





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Course: Discrete Probability

Course Outcomes	Statement
CO 1	Understand basic probability concepts, events, and probability rules.
CO 2	Learn mathematical expectation, variance, and properties of random variables.
CO 3	Study discrete distributions such as Poisson and hypergeometric distributions.
CO 4	Explore negative binomial and geometric distributions.
CO 5	Apply probability theory and distributions to solve related problems.

Course: Environmental Studies

Course Outcomes	Statement
CO 1	Understand the causes and impacts of environmental pollution, including air, water, and land pollution.
CO 2	Learn the structure, function, and dynamics of ecosystems, as well as energy flow in natural systems.
CO 3	Gain knowledge about the sustainable use of natural resources and the relationship between human and environmental resources.
CO 4	Analyze the environmental effects of agricultural and industrial systems and their interactions with natural ecosystems.
CO 5	Explore various energy technologies and their environmental impact, with a focus on sustainable energy sources.





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Course: Environmental Science

Course Outcomes	Statement
CO 1	Understand the multidisciplinary nature and importance of environmental studies, and the need for public awareness.
CO 2	Study the exploitation and conservation issues surrounding forest and water resources, including their overuse.
CO 3	Learn the structure and function of various ecosystems and their energy flow, along with ecological succession.
CO 4	Explore the concept of biodiversity and its conservation through in-situ and ex-situ methods, focusing on endangered species.
CO 5	Investigate environmental pollution, its causes, and effects, including case studies on air, water, and soil pollution.

Course: Natural Resource Management

Course Outcomes	Statement
CO 1	Understand the types of natural resources, their renewable and non-renewable nature, and human impact on these resources.
CO 2	Learn about land degradation, desertification, soil erosion, and the reclamation and management of wastelands.
CO 3	Study various energy resources and their environmental impacts, focusing on sustainable energy options like solar, wind, and biomass.
CO 4	Examine forest resources, the impact of deforestation, and the management practices for sustainable forestry.
CO 5	Understand the intersection of economics, development, and natural resource conservation, including ecotourism and sustainable fisheries management.





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Course: Pollution Control

Course Outcomes	Statement
CO 1	Understand the types, causes, and effects of pollution, including air, water, soil, and noise pollution.
CO 2	Learn methods of controlling air pollution, including filtration, electrostatic precipitators, and catalytic converters.
CO 3	Gain knowledge on water and wastewater treatment processes, including coagulation, filtration, and disinfection techniques.
CO 4	Study solid waste management practices, such as waste reduction, recycling, and disposal methods, as well as noise pollution control.
CO 5	Explore environmental policies, sustainable development, and the role of renewable energy in pollution control.

Course: Environmental Policy and Governance

Course Outcomes	Statement
CO 1	Understand the frameworks and principles guiding environmental policy and governance.
CO 2	Analyze the role of institutions, stakeholders, and international agreements in environmental decision-making.
CO 3	Examine the impact of public policies on environmental sustainability and resource management.
CO 4	Develop knowledge of policy tools used for environmental regulation and enforcement.
CO 5	Evaluate the effectiveness of governance mechanisms in addressing global and local environmental issues.





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Course: OOPS Using C++ Lab

Course Outcomes	Statement
CO 1	Understand the fundamental concepts of object-oriented programming using C++.
CO 2	Implement classes, objects, inheritance, polymorphism, and encapsulation in C++ programs.
CO 3	Develop modular and reusable code using constructors, destructors, and operator overloading.
CO 4	Apply file handling techniques for data storage and retrieval in C++.
CO 5	Debug, test, and document object-oriented applications for real-world problem solving.

Course: Database Management Systems Lab

Course Outcomes	Statement
CO 1	Understand the fundamentals of relational databases and SQL for data management.
CO 2	Develop skills in designing and implementing database schemas and normalization.
CO 3	Execute SQL queries for data manipulation, retrieval, and transaction management.
CO 4	Implement database security features like user authentication and access control.
CO 5	Use database management systems (DBMS) tools to optimize database performance and troubleshoot issues.





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Course Outcomes	Statement
CO 1	Develop research skills by selecting, analyzing, and presenting a relevant topic.
CO 2	Enhance public speaking abilities through structured seminar presentations.
CO 3	Improve critical thinking by evaluating and synthesizing information from various sources.
CO 4	Encourage peer-to-peer learning through discussions, feedback, and knowledge sharing.
CO 5	Foster confidence in communicating complex ideas in an engaging and understandable manner.





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Course Outcomes (COs)

3rd Semester

Course: Operating Systems

Course Outcomes	Statement
CO 1	Understand the fundamentals of operating systems and their functions.
CO 2	Learn process management and CPU scheduling algorithms.
CO 3	Analyze deadlock prevention, avoidance, and recovery methods.
CO 4	Grasp memory management techniques like paging and fragmentation.
CO 5	Learn file and device management, along with disk scheduling.

Course: HTML, DHTML, and CSS Programming

Course Outcomes	Statement
CO 1	Master HTML tags, text formatting, and creating web page structures.
CO 2	Understand the use of tables, frames, and hyperlinks in web pages.
CO 3	Learn CSS to style text, backgrounds, borders, and layout.
CO 4	Gain knowledge of JavaScript for enhancing webpage behavior.
CO 5	Understand web hosting, domain registration, and FTP for website deployment.





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Course Outcomes	Statement
CO 1	Understand DFA, NFA, and their equivalence, and apply automata theory.
CO 2	Learn about regular languages, regular expressions, and pumping lemma.
CO 3	Grasp context-free grammars and their applications in push-down automata.
CO 4	Study Turing machines and their variations for problem-solving.
CO 5	Analyze the concept of uncomputability and unsolvable problems.

Course Outcomes	Statement
CO 1	Understand the basic concepts and types of multimedia.
CO 2	Learn about multimedia hardware, software, and authoring tools.
CO 3	Explore the creation and editing of multimedia elements (text, images, sound).
CO 4	Learn the role of multimedia in the internet and web development.
CO 5	Understand emerging multimedia technologies like virtual reality and digital communication.





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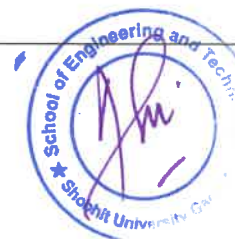
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Course: Optimization Techniques

Course Outcomes	Statement
CO 1	Learn central tendency and dispersion measures for data analysis.
CO 2	Apply correlation and regression analysis in business decision-making.
CO 3	Master linear programming and queuing models for optimization.
CO 4	Solve transportation and assignment problems in business operations.
CO 5	Apply optimization techniques for practical problem-solving.

Course: Elements of Statistics

Course Outcomes	Statement
CO 1	Understand the basics of statistics and types of data.
CO 2	Apply measures of central tendency and dispersion for data interpretation.
CO 3	Grasp probability theory and various probability distributions.
CO 4	Learn different sampling methods and estimation techniques.
CO 5	Study correlation, regression, and time series analysis for statistical modeling.





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Course: Combinatorial Optimization

Course Outcomes	Statement
CO 1	Understand the basics and real-world applications of combinatorial optimization.
CO 2	Learn about greedy algorithms and dynamic programming techniques.
CO 3	Apply network flow algorithms to solve optimization problems.
CO 4	Study approximation algorithms and their applications in optimization.
CO 5	Explore heuristic methods like genetic algorithms and simulated annealing for large-scale problems

Course: Multi-Objective Optimization

Course Outcomes	Statement
CO 1	Understand the basics of multi-objective optimization and Pareto optimality.
CO 2	Learn techniques like weighted sum, ϵ -constraint, goal programming, and evolutionary algorithms.
CO 3	Develop skills in multi-criteria decision-making (MCDM) and methods like AHP and TOPSIS.
CO 4	Apply optimization techniques to real-world problems in engineering, finance, and logistics.
CO 5	Explore advanced topics like fuzzy multi-objective optimization and hybrid optimization techniques.





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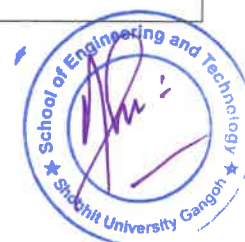
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Course: Biostatistics

Course Outcomes	Statement
CO 1	Grasp the fundamentals of biostatistics and types of data in biological sciences.
CO 2	Learn key probability distributions (Normal, Binomial, Poisson) and their biological applications.
CO 3	Master hypothesis testing, including t-tests, chi-square, ANOVA, and confidence intervals.
CO 4	Understand regression and correlation techniques for biological and medical research.
CO 5	Apply biostatistical methods to analyze data and support decision-making in biology and healthcare.

Course: Operating Systems Lab

Course Outcomes	Statement
CO 1	Understand the basic functions and components of operating systems, including memory management and file systems.
CO 2	Develop skills in process management, including creation, scheduling, and termination of processes.
CO 3	Implement system-level programming to manage hardware resources and perform I/O operations.
CO 4	Practice using OS commands and utilities for troubleshooting and system monitoring.
CO 5	Analyze and simulate operating system algorithms such as CPU scheduling and page replacement.





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Course: HTML Programming Lab

Course Outcomes	Statement
CO 1	Understand the fundamentals of HTML and its role in web development.
CO 2	Develop skills in creating and structuring web pages using HTML tags and attributes.
CO 3	Implement multimedia elements like images, audio, and video in web pages.
CO 4	Use HTML forms to gather user input and interact with web applications.
CO 5	Apply best practices for creating accessible, responsive, and well-structured web content.

Course: Seminar Based on Learning

Course Outcomes	Statement
CO 1	Develop research and analytical skills by selecting and exploring relevant topics.
CO 2	Enhance presentation and communication skills through structured seminar delivery.
CO 3	Strengthen critical thinking by evaluating sources and synthesizing information.
CO 4	Foster peer learning through group discussions, feedback, and knowledge sharing.
CO 5	Build confidence in presenting complex ideas clearly and engagingly to an audience.





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Course Outcomes (COs) 4th Semester

Course: Data Structures

Course Outcomes	Statement
CO 1	Understand basic data types, memory allocation, and recursion.
CO 2	Implement stacks, queues, and linked lists with applications.
CO 3	Master binary trees and various tree operations.
CO 4	Analyze and implement sorting algorithms for efficiency.
CO 5	Develop searching techniques with optimization in mind.

Course: Java Programming

Course Outcomes	Statement
CO 1	Grasp fundamentals of Java programming, classes, and inheritance.
CO 2	Understand Java library functions, including string handling and I/O.
CO 3	Learn exception handling, multithreading, and synchronization.
CO 4	Explore software development using applets, AWT, and Swing controls.
CO 5	Implement networking basics, JDBC, and Java servlets.

Course: Computer System Architecture

Course Outcomes	Statement
CO 1	Learn about register transfer, micro-operations, and memory transfers.
CO 2	Study basic computer organization and design principles.
CO 3	Understand microprogrammed control units and CPU organization.
CO 4	Analyze computer arithmetic, I/O organization, and DMA.
CO 5	Explore memory organization and management techniques.





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Course: Knowledge Management

Course Outcomes	Statement
CO 1	Understand the foundations, culture, and challenges of knowledge management.
CO 2	Build a learning organization and foster knowledge sharing.
CO 3	Study tools and technologies supporting knowledge management.
CO 4	Apply knowledge management strategies in real-world scenarios.
CO 5	Evaluate future trends and case studies in knowledge management.

Course: Knowledge Transfer

Course Outcomes	Statement
CO 1	Grasp the importance and scope of knowledge transfer.
CO 2	Study models like SECI, Wiig's Cycle, and communities of practice.
CO 3	Learn techniques for effective knowledge transfer (e.g., mentoring, workshops).
CO 4	Understand the role of leadership and culture in knowledge transfer.
CO 5	Explore emerging technologies and case studies in knowledge transfer.





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Course: Knowledge Mapping

Course Outcomes	Statement
CO 1	Understand the concept and purpose of knowledge mapping in organizing and visualizing information.
CO 2	Develop skills in creating visual representations of knowledge using tools like mind maps and concept maps.
CO 3	Analyze the relationships between different pieces of knowledge to enhance learning and problem-solving.
CO 4	Apply knowledge mapping techniques to simplify complex topics and improve comprehension.
CO 5	Use knowledge maps for effective knowledge sharing and decision-making in team environments.

Course: Knowledge Management Systems

Course Outcomes	Statement
CO 1	Understand the key concepts and components of knowledge management systems (KMS).
CO 2	Develop skills to design and implement systems for capturing, storing, and sharing organizational knowledge.
CO 3	Analyze the role of technology in enhancing knowledge sharing and collaboration within organizations.
CO 4	Apply strategies for managing both tacit and explicit knowledge in a business context.
CO 5	Evaluate the effectiveness of KMS in improving decision-making, innovation, and organizational learning.





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Course: Information Systems for KM

Course Outcomes	Statement
CO 1	Understand the role of information systems in supporting knowledge management (KM) processes.
CO 2	Develop skills in designing and implementing information systems that facilitate knowledge sharing and collaboration.
CO 3	Analyze various types of information systems used for managing organizational knowledge, such as intranets and databases.
CO 4	Apply tools and technologies like content management systems (CMS) and knowledge repositories to enhance knowledge accessibility.
CO 5	Evaluate the effectiveness of information systems in improving decision-making, innovation, and organizational performance.

Course: Data Structures Lab

Course Outcomes	Statement
CO 1	Understand the implementation and application of basic data structures like arrays, stacks, and queues.
CO 2	Develop skills in using linked lists, trees, and graphs for organizing and manipulating data.
CO 3	Apply algorithms for sorting, searching, and traversal in different data structures.
CO 4	Practice memory management and optimization techniques to improve data structure performance.
CO 5	Implement and test real-world applications using appropriate data structures for problem-solving.





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Course: Java Programming Lab

Course Outcomes	Statement
CO 1	Understand the fundamentals of Java programming, including syntax, data types, and control structures.
CO 2	Develop skills in object-oriented programming concepts like classes, objects, inheritance, and polymorphism.
CO 3	Apply exception handling, file I/O, and multi-threading techniques in Java programs.
CO 4	Practice designing and implementing GUI applications using Java frameworks like Swing.
CO 5	Debug, test, and optimize Java code for performance and functionality.

Course: Computer System Architecture Lab

Course Outcomes	Statement
CO 1	Understand the basic components and architecture of a computer system, including CPU, memory, and I/O devices.
CO 2	Develop skills in simulating and analyzing the operation of different computer system components.
CO 3	Apply concepts of instruction set architecture (ISA) and assembly language programming.
CO 4	Practice performance measurement and optimization techniques for hardware and software systems.
CO 5	Implement simple hardware-software interactions and analyze their impact on system performance.





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Course: Seminar Based on Learning

Course Outcomes	Statement
CO 1	Enhance research skills by selecting, analyzing, and synthesizing relevant topics.
CO 2	Develop public speaking and presentation skills through structured seminar delivery.
CO 3	Strengthen critical thinking and evaluation abilities when discussing complex subjects.
CO 4	Encourage peer-to-peer learning by facilitating group discussions and sharing insights.
CO 5	Build confidence in presenting ideas clearly and engagingly to diverse audiences.





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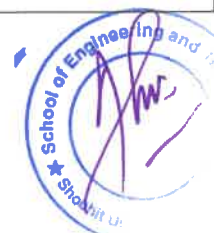
Course Outcomes (COs)
5th Semester

Course: Software Engineering

Course Outcomes	Statement
CO 1	Grasp software engineering principles, evolution, and process models.
CO 2	Analyze and document software requirements and specifications.
CO 3	Apply system design principles like object-oriented and event-driven design.
CO 4	Implement testing strategies and perform software verification and validation.
CO 5	Manage software projects using tools like COCOMO and CASE, focusing on quality control and assurance.

Course: Analysis of Algorithm and Data Structures

Course Outcomes	Statement
CO 1	Implement and analyze linear and non-linear data structures.
CO 2	Apply Big O and other asymptotic notations for algorithm complexity analysis.
CO 3	Solve problems using algorithmic strategies like divide-and-conquer and dynamic programming.
CO 4	Implement sorting, searching, and graph algorithms effectively.
CO 5	Understand and solve NP-complete problems using approximation and intelligent algorithms.





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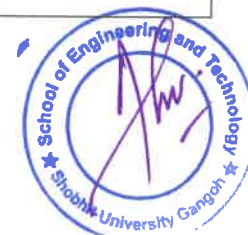
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Course: Mobile Computing

Course Outcomes	Statement
CO 1	Learn mobile computing fundamentals and communication technologies.
CO 2	Explore cellular systems, mobile telecommunication protocols, and security.
CO 3	Study wireless LANs, satellite networks, and IEEE standards.
CO 4	Analyze mobile IP, routing protocols, and mobile transport layers.
CO 5	Develop mobile applications while addressing constraints and security issues.

Course: Big Data and Machine Learning

Course Outcomes	Statement
CO 1	Understand business intelligence concepts and its lifecycle.
CO 2	Learn data analytics techniques such as correlation, regression, and clustering.
CO 3	Implement machine learning methods like supervised, unsupervised, and reinforcement learning.
CO 4	Apply clustering algorithms (e.g., K-Means) and distance measures.
CO 5	Build decision tree models and implement Bayesian learning for classification tasks.





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Course: Software Engineering Lab

Course Outcomes	Statement
CO 1	Understand the software development life cycle (SDLC) and apply it to real-world projects.
CO 2	Develop skills in requirement gathering, system design, and coding for software applications.
CO 3	Implement software testing methods to ensure functionality, performance, and reliability.
CO 4	Apply version control tools and collaborate effectively on team-based software development projects.
CO 5	Evaluate and improve software design and architecture based on user feedback and performance analysis.

Course: Algorithms and Data Structures with C++ Lab

Course Outcomes	Statement
CO 1	Understand the implementation and application of fundamental algorithms using C++.
CO 2	Develop skills in working with data structures like arrays, stacks, queues, and linked lists.
CO 3	Apply sorting and searching algorithms to solve practical problems efficiently.
CO 4	Implement advanced data structures like trees, graphs, and hash tables in C++.
CO 5	Analyze algorithmic complexity and optimize code for better performance in real-world applications.





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Course: Research Project-I

Course Outcomes	Statement
CO 1	Develop skills in conducting independent research on a chosen topic or problem.
CO 2	Apply research methodologies to gather, analyze, and synthesize relevant data and information.
CO 3	Enhance problem-solving abilities by formulating hypotheses and testing them through experiments or analysis.
CO 4	Communicate research findings effectively through written reports and presentations.
CO 5	Foster critical thinking and innovation by exploring new ideas and potential solutions in the project domain.





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Course Outcomes (COs)
6th Semester

Course: Data Communication and Computer Network

Course Outcomes	Statement
CO 1	Understand Internet organization, ISP, and network performance criteria.
CO 2	Learn about LAN topologies, wireless LANs, and network protocols (e.g., Ethernet, IEEE 802.11).
CO 3	Implement error and flow control techniques in reliable data delivery.
CO 4	Explore routing, forwarding, and multicast routing algorithms.
CO 5	Develop network applications using DNS, HTTP, and email protocols.

Course: Artificial Intelligence

Course Outcomes	Statement
CO 1	Grasp foundations, problems, and approaches of AI and intelligent agents.
CO 2	Learn knowledge representation methods and reasoning techniques.
CO 3	Study planning as search and reasoning with uncertain knowledge (Bayesian networks).
CO 4	Understand decision-making, machine learning methods, and Q-learning.
CO 5	Build expert systems and implement AI algorithms (e.g., search, heuristic search).





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Course: Cyber Security and Cyber Law

Course Outcomes	Statement
CO 1	Understand information security, cyber security, and cybercrime types.
CO 2	Study information policies, digital divide, and convergence.
CO 3	Explore IT Act, security protocols, and fairness in information exchanges.
CO 4	Learn about trusted third parties and information security infrastructure.
CO 5	Understand international cyber laws and data privacy rules.

Course: Software Project Management

Course Outcomes	Statement
CO 1	Learn project management basics, including cost, time, and quality objectives.
CO 2	Explore planning methods and Agile software principles for project management.
CO 3	Study project quality management techniques like Six Sigma and ISO standards.
CO 4	Understand risk management processes and tools for assessing project risks.
CO 5	Implement software configuration management and version control practices.





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Course Outcomes	Statement
CO 1	Understand the fundamental concepts of computer networks, including protocols, IP addressing, and routing.
CO 2	Develop skills in configuring and managing network devices like routers, switches, and hubs.
CO 3	Implement and analyze various network protocols such as TCP/IP, HTTP, and DNS.
CO 4	Conduct experiments on data transmission, error detection, and network security.
CO 5	Troubleshoot and optimize network performance through hands-on lab exercises and simulations.

Course Outcomes	Statement
CO 1	Enhance research and analytical skills by selecting and exploring relevant topics.
CO 2	Develop effective communication skills through structured presentations and group discussions.
CO 3	Foster teamwork and collaboration by engaging in productive group discussions.
CO 4	Improve critical thinking by evaluating diverse viewpoints and providing constructive feedback.
CO 5	Build confidence in public speaking and presenting ideas clearly to an audience.





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Course: Research Project-II

Course Outcomes	Statement
CO 1	Conduct in-depth research on a specialized topic, building upon prior knowledge and findings.
CO 2	Apply advanced research methodologies and techniques to collect, analyze, and interpret data.
CO 3	Develop problem-solving skills by addressing complex challenges and proposing innovative solutions.
CO 4	Communicate research outcomes through detailed reports, presentations, and publications.
CO 5	Collaborate effectively with peers and mentors for feedback, improvement, and knowledge sharing.

