

School of Engineering and Technology
Master of Technology (Computer Science & Engineering)
Program Outcomes, Program Specific Outcomes & Course Outcomes
(POs, PSOs & COs)

Program Outcomes

Program Outcome		Statement
PO 1	Core Engineering Knowledge	Apply fundamental knowledge in mathematics, science, and engineering to analyze, model, and solve complex engineering problems with proficiency.
PO 2	Analytical Problem Solving	Use analytical methods and engineering techniques to identify, model, and solve complex problems, ensuring the development of effective solutions.
PO 3	Solution Design and Innovation	Design and develop innovative engineering solutions to complex problems, while taking into account safety, public health, and socio-cultural and environmental factors.
PO 4	Research and Investigation	Employ scientific research methodologies, including experimentation, data analysis, and synthesis, to investigate complex engineering problems and derive accurate, evidence-based conclusions.
PO 5	Utilization of Modern Tools	Select and apply advanced engineering tools and technologies, such as simulation, modeling, and prediction software, to address and solve sophisticated engineering challenges, acknowledging their limitations.
PO 6	Societal and Ethical Responsibility	Recognize and address the societal, ethical, legal, and health-related issues in engineering practices, ensuring solutions are both responsible and sustainable.
PO 7	Sustainability in Engineering	Understand the environmental and societal consequences of engineering solutions and apply sustainable practices to promote long-term ecological and social well-being.
PO 8	Ethical Conduct	Demonstrate commitment to ethical principles in professional engineering practice, ensuring integrity, responsibility, and adherence to professional standards.
PO 9	Teamwork and Leadership	Work effectively as both an independent contributor and a collaborative team member, leading or participating in multidisciplinary teams to achieve project goals.
PO 10	Effective Technical Communication	Develop and apply communication skills to effectively articulate complex technical information in reports, presentations, and discussions, ensuring clarity for both technical and non-technical audiences.





**Shobhit
University**

EDUCATION EMPOWERS

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

PO 11	Management and Leadership in Projects	Apply project management principles, including time, cost, and resource management, to plan, execute, and lead engineering projects, both independently and within teams.
PO 12	Continuous Professional Development	Demonstrate a commitment to lifelong learning by staying current with emerging technologies, evolving research, and ongoing developments in the engineering field, ensuring professional growth throughout one's career.

Program Specific Outcomes (PSOs)

Program Specific Outcome	Statement
PSO 1	To equip students with advanced knowledge in core engineering subjects, enabling them to design, develop, and optimize systems and solutions for complex engineering challenges.
PSO 2	To develop expertise in emerging technologies such as Artificial Intelligence, Machine Learning, Internet of Things, and Robotics, preparing students to lead innovations in these high-demand fields.
PSO 3	To provide in-depth skills in research methodology, enabling students to conduct independent research, contribute to technological advancements, and develop novel solutions in their specialized areas.
PSO 4	To enhance problem-solving capabilities through practical applications, fostering the ability to analyze, design, and implement engineering systems that meet real-world technical and environmental challenges.
PSO 5	To instill a strong understanding of industry standards, quality control, and sustainable engineering practices, ensuring that students can contribute to projects with environmental and societal considerations.





**Shobhit
University**
EDUCATION EMPOWERS

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

Course Outcomes (COs)

1st Semester

Course: Software Engineering Methodologies

Course Outcomes	Statement
CO 1	Understand the principles of software engineering and the software lifecycle.
CO 2	Apply software requirement specifications and design principles.
CO 3	Develop an understanding of software metrics, quality, and risk management.
CO 4	Gain knowledge of CASE tools and their role in software development.
CO 5	Learn the fundamentals of object-oriented methodology for analysis and design.

Course: Analysis and Design of Algorithms

Course Outcomes	Statement
CO 1	Analyze algorithm time and space complexity.
CO 2	Understand dynamic sets, searching algorithms, and graph traversal techniques.
CO 3	Implement greedy and dynamic programming methods.
CO 4	Apply backtracking and branch-and-bound methods to solve problems.
CO 5	Understand parallel algorithms and approximation techniques for problem-solving.





**Shobhit
University**

EDUCATION EMPOWERS

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

Course: Advanced Database Management Systems

Course Outcomes	Statement
CO 1	Understand the architecture and data models of database management systems.
CO 2	Learn query processing strategies and optimization techniques.
CO 3	Apply recovery methods and transaction handling in centralized DBMS.
CO 4	Explore concurrency control and object-oriented database development.
CO 5	Understand distributed databases, data warehousing, and object-relational databases.

Course: Computer Communication and Networks

Course Outcomes	Statement
CO 1	Learn data transmission techniques and network models.
CO 2	Apply queuing theory and data link control protocols.
CO 3	Understand routing algorithms and congestion control mechanisms.
CO 4	Study transport layer issues, including quality of service and synchronization.
CO 5	Explore session and presentation layers, including data security and compression.





**Shobhit
University**

EDUCATION EMPOWERS

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

Course: Fundamental of Computer Programming

Course Outcomes	Statement
CO 1	Learn the basics of computer programming and software development.
CO 2	Understand data types, variables, operators, and expressions.
CO 3	Apply control structures like conditionals and loops in programming.
CO 4	Master functions, modular programming, recursion, and code reusability.
CO 5	Understand and implement basic data structures such as arrays and lists.

Course: Fundamental of Mathematics

Course Outcomes	Statement
CO 1	Understand number systems and their properties.
CO 2	Solve algebraic expressions and linear equations.
CO 3	Analyze and represent functions graphically.
CO 4	Apply trigonometric concepts and identities in problem-solving.
CO 5	Learn basic geometry concepts and theorems related to shapes.

Course: Mathematics

Course Outcomes	Statement
CO 1	Understand and apply number systems, including real numbers.
CO 2	Solve algebraic equations, inequalities, and polynomials.
CO 3	Master trigonometric functions, identities, and applications.
CO 4	Analyze coordinate geometry concepts and conic sections.
CO 5	Learn calculus principles, including limits and continuity.





**Shobhit
University**
EDUCATION EMPOWERS

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

Course: Basic Mathematics

Course Outcomes	Statement
CO 1	Master number systems and their properties.
CO 2	Perform arithmetic operations and understand the order of operations.
CO 3	Solve problems involving fractions and decimals.
CO 4	Apply ratios and proportions in real-world scenarios.
CO 5	Solve percentage-related problems in areas such as interest and discounts.

Course: Mathematics-I

Course Outcomes	Statement
CO 1	Understand sets, functions, and their operations.
CO 2	Solve algebraic expressions and quadratic equations.
CO 3	Master trigonometry, including ratios and inverse functions.
CO 4	Analyze geometric concepts using coordinate geometry.
CO 5	Learn the principles of limits and continuity in calculus.

Course: Advanced Applied Mathematics

Course Outcomes	Statement
CO 1	Learn linear algebra concepts like vector spaces and eigenvalues.
CO 2	Solve ordinary and partial differential equations.
CO 3	Understand real analysis concepts, including series and functions.
CO 4	Apply complex analysis in solving real-world problems.
CO 5	Use numerical methods for solving mathematical problems.





**Shobhit
University**

EDUCATION EMPOWERS

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

Course: Advanced Mathematics

Course Outcomes	Statement
CO 1	Master concepts of limits, differentiation, and integration techniques.
CO 2	Study vector spaces, matrices, eigenvalues, and their applications.
CO 3	Solve differential equations and systems using advanced methods.
CO 4	Understand sequences, series, and tests for convergence.
CO 5	Apply complex analysis in solving real-world problems.

Course: Algorithms Lab

Course Outcomes	Statement
CO 1	Apply advanced algorithmic techniques in practical scenarios
CO 2	Analyze and compare algorithm performance
CO 3	Design efficient solutions using suitable data structures
CO 4	Implement real-world problem-solving using algorithms
CO 5	Apply advanced algorithmic techniques in practical scenarios

Course: Seminar-I

Course Outcomes	Statement
CO 1	Improve technical presentation and communication skills
CO 2	Analyze and interpret recent research work effectively
CO 3	Develop critical thinking and constructive feedback skills
CO 4	Enhance literature review and report writing abilities
CO 5	Gain awareness of current trends and innovations in computer science





**Shobhit
University**

EDUCATION EMPOWERS

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

Course Outcomes (COs)
2nd Semester

Course: Resource Management of Computer Systems

Course Outcomes	Statement
CO 1	Understand operating system components and resource management.
CO 2	Study concurrent processes, mutual exclusion, and synchronization.
CO 3	Learn memory management techniques, including paging and virtual memory.
CO 4	Analyze file systems and distributed systems design issues.
CO 5	Explore protection, security, and case studies of UNIX and Windows OS.

Course: Soft Computing

Course Outcomes	Statement
CO 1	Understand neural network models and training algorithms.
CO 2	Apply fuzzy logic in decision-making and problem-solving.
CO 3	Perform arithmetic operations with fuzzy numbers and sets.
CO 4	Explore real-world applications of fuzzy logic.
CO 5	Study genetic algorithms and their use in engineering analysis.





**Shobhit
University**

EDUCATION EMPOWERS

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

Course: High Performance Computer Architecture

Course Outcomes	Statement
CO 1	Understand pipeline vs parallel processing and architectural design.
CO 2	Study hazards and resolution techniques in instruction processing pipelines.
CO 3	Learn scheduling algorithms for dynamic and static pipelines.
CO 4	Analyze interconnection networks and their routing algorithms.
CO 5	Study memory systems, multiprocessor designs, and performance modeling.

Course: Mobile & Wireless Communication

Course Outcomes	Statement
CO 1	Learn wireless transmission methods, frequencies, and modulation.
CO 2	Study MAC protocols like TDMA, FDMA, and GSM services.
CO 3	Understand satellite systems, broadcast communication, and wireless LAN.
CO 4	Explore mobile IP, routing in Adhoc networks, and transport layer issues.
CO 5	Study support for mobility, security, and communication protocols.





**Shobhit
University**

EDUCATION EMPOWERS

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

Course: Real Time System

Course Outcomes	Statement
CO 1	Understand real-time system issues, task performance measures, and structures.
CO 2	Study task assignment, scheduling algorithms, and fault-tolerant techniques.
CO 3	Learn real-time databases, transaction priorities, and concurrency control.
CO 4	Understand the programming languages and tools used in real-time systems.
CO 5	Study real-time communication protocols and fault tolerance in hardware and software.

Course: Cloud Computing

Course Outcomes	Statement
CO 1	Understand the fundamentals, architecture, and benefits of cloud computing.
CO 2	Explore cloud services like SaaS, PaaS, and cloud service development.
CO 3	Learn how to collaborate and manage projects using cloud-based tools.
CO 4	Use cloud services for tasks such as file sharing, document collaboration, and project management.
CO 5	Explore web-based communication tools, blogs, wikis, and social networks for collaboration.





**Shobhit
University**

EDUCATION EMPOWERS

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

Course: Operating Systems Lab

Course Outcomes	Statement
CO 1	Implement process management and scheduling techniques
CO 2	Demonstrate concepts of memory and storage management
CO 3	Develop programs for inter-process communication
CO 4	Analyze file system operations and synchronization methods
CO 5	Apply OS concepts to real-time and multi-threaded environments

Course: Seminar-II

Course Outcomes	Statement
CO 1	Enhance technical presentation and public speaking skills
CO 2	Critically evaluate and discuss advanced research topics
CO 3	Improve technical report writing and documentation
CO 4	Demonstrate depth in a chosen area of computer science
CO 5	Engage in peer review and constructive academic discussions





**Shobhit
University**

EDUCATION EMPOWERS

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

Course Outcomes (COs)
3rd Semester

Course: Data Mining and Warehousing

Course Outcomes	Statement
CO 1	Understand data mining functionalities, data preprocessing, and the importance of data cleaning.
CO 2	Gain knowledge of association rule mining and various efficient methods for frequent itemset mining.
CO 3	Learn classification and prediction techniques, including decision trees, SVM, and ensemble methods.
CO 4	Explore various clustering methods, including partitioning, hierarchical, and density-based clustering.
CO 5	Understand data warehousing, OLAP, and business analysis concepts with practical applications.

Course: Internet and Web Technology

Course Outcomes	Statement
CO 1	Understand Internet protocol models, IP routing, and access methods like PPP and SLIP.
CO 2	Learn the functioning of hubs, bridges, routers, and various routing protocols.
CO 3	Gain insights into web server technologies, including HTML, HTTP, and IIS.
CO 4	Master browsing systems and search engines, along with web crawlers and indexing techniques.
CO 5	Learn website development using technologies like XML, ASP.NET, and XML Schema.





**Shobhit
University**

EDUCATION EMPOWERS

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

Course: Medical Image Processing

Course Outcomes	Statement
CO 1	Understand fundamentals of image processing, including image acquisition, sampling, and pixel relationships.
CO 2	Learn image enhancement and restoration techniques in both spatial and frequency domains.
CO 3	Gain knowledge in image segmentation, feature analysis, and motion segmentation.
CO 4	Explore various medical imaging techniques like MRI, Ultrasound, and Radiography.
CO 5	Apply image processing in medical fields, including classification, fusion, and video motion analysis.

Course: Software Verification, Validation and Testing

Course Outcomes	Statement
CO 1	Learn testing terminology, goals, and methodologies, along with test case design.
CO 2	Understand verification and validation processes, focusing on requirement verification and design validation.
CO 3	Master black-box and white-box testing techniques like boundary value analysis and path testing.
CO 4	Understand static and validation testing, including unit, integration, system, and performance testing.
CO 5	Learn about test automation, debugging, and metrics to manage and optimize testing efforts.





**Shobhit
University**

EDUCATION EMPOWERS

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

Course: Security of Information System

Course Outcomes	Statement
CO 1	Understand encryption concepts, including cryptosystems, encryption algorithms, and cryptanalysis.
CO 2	Learn about secure encryption systems, NP-complete problems, and modular arithmetic.
CO 3	Master public key encryption systems, RSA, digital signatures, and hash algorithms.
CO 4	Explore applied cryptography, key management protocols, and security practices in operating systems.
CO 5	Understand network security concepts like IPSec, SSL, E-cash, and digital watermarking.

Course: Network Security

Course Outcomes	Statement
CO 1	Understand OSI security architecture and various security services, including symmetric encryption.
CO 2	Learn about public-key cryptography, digital signatures, and key management.
CO 3	Master security applications such as email security, IP security (IPSec), and Web security (SSL, TLS).
CO 4	Understand network management security, including SNMP and intrusion detection.
CO 5	Learn about malicious software, viruses, denial of service attacks, and firewall design principles.





**Shobhit
University**

EDUCATION EMPOWERS

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

Course: Minor Project

Course Outcomes	Statement
CO 1	Understand project objectives, scope, and the importance of planning and requirements gathering.
CO 2	Conduct a literature review of existing work related to the project topic.
CO 3	Develop a project plan, including a timeline, milestones, and resource allocation.
CO 4	Design system architecture, user interfaces, and prepare necessary design documents.
CO 5	Implement the project by coding and developing the system according to design specifications.

Course: Seminar-III

Course Outcomes	Statement
CO 1	Present in-depth analysis of specialized research topics
CO 2	Demonstrate improved clarity and confidence in communication
CO 3	Critically review and interpret complex technical literature
CO 4	Refine academic writing and documentation skills
CO 5	Engage in scholarly discussions and respond to feedback effectively

