

## Course outcome statements

<b>SECOND YEAR (SEM I)</b>	
<b>SUBJECT : Discrete Mathematics</b>	
<i>Course Outcomes : Students will be able to</i>	
C201.1	Solve different types of counting problems and related probability
C201.2	Solve the basic principles of logical reasoning, methods of proof and test their validity.
C201.3.	Write relation among object of sets & function as input output relation.
C201.4	Solve real life problems such as Travelling salesman problem, shortest path algorithm.
C201.5	Solve binary search tree ,spanning tree algorithm
C201.6	Write algebraic structure ,group, rings and fields.
<b>SUBJECT :</b>	
<i>Course Outcomes : Students will be able to</i>	
<b>C202.1</b>	Describe the evolution of computer and performance metric.
<b>C202.2</b>	Demonstrate the knowledge of instruction set and processor structure.
<b>C202.3</b>	Explain various mechanisms used for control unit design.
<b>C202.4</b>	Classify memory and explain the relation between virtual, cache and main memory.
<b>C202.5</b>	Demonstrate the knowledge MIPS pipeline and impact of hazards on it
<b>C202.6</b>	Make base for further learning in the field of parallel architecture.
<b>SUBJECT : Digital Electronics and Logic Design</b>	
<i>Course Outcomes : Students will be able to</i>	
<b>C203.1</b>	Recognize and understand the concept of K maps and Boolean algebra.
<b>C203.2</b>	Design and implement sequential and combinational digital circuits using flip flops and converters
<b>C203.3</b>	Apply concepts of ASM's and VHDL and design minimum systems.
<b>C203.4</b>	Illustrate the difference between fixed function IC's and programmable PLD's and design digital circuits.
<b>C203.5</b>	Apply the knowledge to choose various logic families IC packages like TTL, ECL, RTL and CMOS.
<b>C203.6</b>	Differentiate microcontrollers and microprocessors and develop these embedded systems for some real world application.
<b>SUBJECT : Fundamentals of Data Structures</b>	
<i>Course Outcomes : Students will be able to</i>	
<b>C204.1</b>	Apply programming constructs in software development
<b>C204.2</b>	Use functions in program development
<b>C204.3</b>	Analyze algorithms for time complexity and space complexity

<b>C204.4</b>	Trade off the application of searching and sorting algorithms
<b>C204.5</b>	Use linear data structures like 1-D arrays and 2-D arrays
<b>C204.6</b>	Make use of linked representation for dynamic data structures
<b>SUBJECT : Problem Solving and Object Oriented programming</b>	
<i>Course Outcomes : Students will be able to</i>	
<b>C205.1</b>	Develop algorithms for solving problems by using modular programming concepts
<b>C205.2</b>	Design software solutions using object-oriented principles and strategies and build object models from abstracted data and entities
<b>C205.3</b>	Apply basic concepts of object-oriented programming.
<b>C205.4</b>	Design and develop programs using concepts of object-oriented like operator overloading and inheritance.
<b>C205.5</b>	Apply virtual function and template concepts in real time object oriented applications.
<b>C205.6</b>	Apply exception handling and file input output features to solve real time problems.
<b>SUBJECT : Soft Skills</b>	
<i>Course Outcomes : Students will be able to</i>	
<b>C206.1</b>	Effectively communicate through verbal/oral communication and improve listening skills.
<b>C206.2</b>	Write precise briefs or reports and technical documents.
<b>C206.3</b>	Actively participate in group discussions/meetings/interviews and prepare & deliver presentations.
<b>C206.4</b>	Become more effective individual through goal/target setting, self-motivation and practicing creative thinking.
<b>C206.5</b>	Function effectively in multi-disciplinary teams through the knowledge of team work, inter-personal relationships, conflict management and leadership quality.
<b>SECOND YEAR (SEM II)</b>	
<b>SUBJECT : Engineering Mathematics III</b>	
<i>Course Outcomes : Students will be able to</i>	
<b>C207.1</b>	Solve higher order linear differential equation using appropriate techniques for modelling and analyzing electrical circuits.
<b>C207.2</b>	Solve problems related to Fourier Transform, Z-Transform and applications to Signal and Image Processing.
<b>C207.3</b>	Perform statistical methods like correlation and regression to analyze the data.
<b>C207.4</b>	Solve probability theory for analysis and prediction of given data.
<b>C207.5</b>	Transform physical phenomena into vectors, describe gradient, curl and divergence also understand Vector Calculus and its applications.
<b>C207.6</b>	Analyze conformal mappings, transformations and perform contour integration of complex functions required in Image processing, Digital Graphics.
<b>SUBJECT : Computer Graphics</b>	
<i>Course Outcomes : Students will be able to</i>	
<b>C208.1</b>	Illustrate the learning like graphics engineering knowledge.
<b>C208.2</b>	Explain the geometric, mathematical and algorithmic Concepts.
<b>C208.3</b>	Implement bresenham's, DDA line and circle drawing algorithm.
<b>C208.4</b>	Create a interest in computer graphics animation.
<b>C208.5</b>	Prepare the students for advance courses like Multimedia/Computer vision
<b>SUBJECT :</b>	

<b>Course Outcomes : Students will be able to</b>	
C209.1	Describe features and architectures of different microcomputers.
C209.2	Use 8086 and 80386 instructions for assembly language programming.
C209.3	Explain interrupt processing in various 80386 modes.
C209.4	Illustrate 8051 microcontroller architecture, memory organization.
C209.5	Configure timers and serial port in different operating modes.
C209.6	Interface stepper motor, ADC, DAC etc. to 8051 microprocessor and form strong foundation for related advanced courses.
<b>SUBJECT : Data Structures &amp; Files</b>	
<b>Course Outcomes : Students will be able to</b>	
C210.1	Develop and use stack data structure.
C210.2	Develop and use queue data structure
C210.3	Use dynamic data structures like linked lists.
C210.4	Explain computing optimal solutions using graph algos like Dijkstra,Prims algos
C210.5	Use tree data structure to store data in tree data structures.
C210.6	Describe File organizations and operations.
<b>SUBJECT : Foundations of Communication and Computer Network</b>	
<b>Course Outcomes : Students will be able to</b>	
C211.1	Describe analog and digital transmission over communication media.
C211.2	Explain various modulation techniques in communication
C211.3	Apply error correction and detection techniques.
C211.4	Analyze various spread spectrum and multiplexing techniques.
C211.5	Explain and classify transmission media.
<b>THIRD YEAR (SEM I)</b>	
<b>SUBJECT : Theory of Computation</b>	
<b>Course Outcomes : Students will be able to</b>	
C301.1	Design finite state machines, their relationship with different types of languages.
C301.2	Write formal language into regular expression
C301.3	Construct context free grammar for given language
C301.4	Design push down automata and post machines for CFG
C301.5	Design turing machine for unrestricted languages.
C301.6	Analyze computational complexity
<b>SUBJECT : Database Management Systems</b>	
<b>Course Outcomes : Students will be able to</b>	
C302.1	Define basic function of DBMS & RDBMS.
C302.2	Analyze database models & entity relationship models
C302.3	Design and implement a database schema for a given problem domain.
C302.4	Populate and query a database using SQL DML/DDDL commands.
C302.5	Programming PL/SQL including stored procedure ,stored function, cursor and packages
C302.6	Identify the scope for further learning
<b>SUBJECT : Software Engineering and Project Management</b>	

<b>Course Outcomes : Students will be able to</b>	
<b>C303.1</b>	Identify unique features of various software application domains and classify software applications.
<b>C303.2</b>	Choose and apply appropriate lifecycle model of software development.
<b>C303.3</b>	Describe principles of agile development, discuss the SCRUM process and distinguish agile process model from other process models.
<b>C303.4</b>	Analyze software requirements by applying various modeling techniques.
<b>C303.5</b>	Discuss and classify CASE tools and discuss recent trends and research in software engineering.
<b>C303.6</b>	Explain qp IT project management through life cycle of the project and future trends in IT Project Management
<b>SUBJECT : Operating System</b>	
<b>Course Outcomes : Students will be able to</b>	
<b>C304.1</b>	Explain objectives and functions of operating system and design consideration for different operating systems.
<b>C304.2</b>	Explain concept of process, threads and scheduling algorithm.
<b>C304.3</b>	Describe deadlock and different ways to handle it.
<b>C304.4</b>	Discuss various memory management techniques
<b>C304.5</b>	Explain the concept of I/O management, file management.
<b>C304.6</b>	Explain the concept Linux operating system.
<b>SUBJECT : Human-Computer Interaction</b>	
<b>Course Outcomes : Students will be able to</b>	
<b>C305.1</b>	To introduce to the field of human-computer-interaction study.
<b>C305.2</b>	To explain role the human factor in human-computer-interactions.
<b>C305.3</b>	To introduce students to techniques of user interface design, interaction paradigms, and current trends in HCI research and development.
<b>C305.4</b>	To discuss HCI design processes.
<b>C305.5</b>	To explain the standards, guidelines, rules and evaluation methods of human-computer-interactions
<b>C305.6</b>	To discuss different models and theories in HCI.
<b>THIRD YEAR (SEM II)</b>	
<b>SUBJECT : Computer Network Technology</b>	
<b>Course Outcomes : Students will be able to</b>	
<b>C306.1</b>	To describe the working, services offered and protocol used at each layer of network.
<b>C306.2</b>	To apply the knowledge and write socket program under Transport layer
<b>C306.3</b>	To identify the networking issues and learn application layer protocols.
<b>C306.4</b>	To classify know the different wireless technologies and IEEE standards.
<b>C306.5</b>	To demonstrate the knowledge of Adhoc wirelesses networks and its design issues.
<b>C306.6</b>	To make the base for further learning in communication network domain
<b>SUBJECT : System Programming</b>	
<b>Course Outcomes : Students will be able to</b>	
<b>C307.1</b>	Demonstrate the knowledge of basic concepts and need of system software.
<b>C307.2</b>	To design and implement assemblers macro processors and loaders
<b>C307.3</b>	To use tool LEX for generation of Lexical Analyzer.
<b>C307.4</b>	To apply and use YACC tool for generation of syntax analyzer.

<b>C307.5</b>	To demonstrate all the phases of compiler.
<b>C307.6</b>	To apply code optimization in the compilation process.
<b>SUBJECT : Design and Analysis of Algorithms</b>	
<i>Course Outcomes : Students will be able to</i>	
<b>C308.1</b>	Apply Knowledge of Mathematics to perform asymptotic analysis of algorithms.
<b>C308.2</b>	Demonstrate a familiarity with major algorithms and data structures.
<b>C308.3</b>	Apply important algorithmic design paradigms and methods of analysis.
<b>C308.4</b>	Synthesize efficient algorithms in common engineering design situations.
<b>C308.5</b>	Compare between different data structures. Pick an appropriate data structure for a design situation.
<b>SUBJECT : Cloud Computing</b>	
<i>Course Outcomes : Students will be able to</i>	
<b>C309.1</b>	Discuss Cloud Computing and its ecosystem
<b>C309.2</b>	Discuss basics of virtualization and its importance
<b>C309.3</b>	Adapt in-depth analysis of Cloud Computing capabilities
<b>C309.4</b>	Discuss technical overview of Cloud Programming and Services
<b>C309.5</b>	Construct Ubiquitous Cloud and Internet of Things
<b>SUBJECT : Data Science &amp; Big Data Analytics</b>	
<i>Course Outcomes : Students will be able to</i>	
<b>C310.1</b>	Understand Big Data primitives.
<b>C310.2</b>	Learn and apply different mathematical models for Big Data.
<b>C310.3</b>	Demonstrate Big Data learning skills by developing industry or research applications.
<b>C310.4</b>	Analyze each learning model come from a different algorithmic approach and it will perform differently under different datasets.
<b>C310.5</b>	Understand needs, challenges and techniques for big data visualization.
<b>C310.6</b>	Learn different programming platforms for big data analytics.
<b>FINAL YEAR (SEM I)</b>	
<b>SUBJECT : Information and Cyber Security</b>	
<i>Course Outcomes : Students will be able to</i>	
<b>C401.1</b>	Describe basic concepts of Cryptography and Network Security
<b>C401.2</b>	Apply appropriate cryptographic principle, algorithm and techniques to write analysis report.
<b>C401.3</b>	Explain the concept of various authentication and integrity strategies.
<b>C401.4</b>	Understand different types of risk in network security issues
<b>C401.5</b>	Use appropriate security tool to identify threats
<b>C401.6</b>	Describe cyber security laws and identify scope for further learning.
<b>SUBJECT : Machine Learning and Applications</b>	
<i>Course Outcomes : Students will be able to</i>	
<b>C402.1</b>	To illustrate learning primitives like machine learning models, tasks.
<b>C402.2</b>	To solve classification problems and explain geometry of support vector machine
<b>C402.3</b>	To explain geometry of linear models such as linear regression and theory of generalization.
<b>C402.4</b>	To perform distance based ,rule based , tree based classification and clustering.
<b>C402.5</b>	To implement probabilistic models such as naïve Bayes classifier

<b>C402.6</b>	To explain trends in machine learning like bagging , boosting, deep learning , reinforcement learning.
<b>SUBJECT : Software Design and Modeling</b>	
<i>Course Outcomes : Students will be able to</i>	
<b>C403.1</b>	Describe object oriented methodologies, basics of Unified Modeling Language (UML).
<b>C403.2</b>	Describe and apply analysis process, use case modeling, domain/class modeling.
<b>C403.3</b>	Describe and apply interaction and behavior modeling.
<b>C403.4</b>	Describe and define design process and business, access and view layer class design
<b>C403.5</b>	Describe on study of GRASP principles and GoF design patterns.
<b>C403.6</b>	Describe architectural design principles and guidelines in the various type of application development.
<b>SUBJECT : Elective-I Wireless Communications</b>	
<i>Course Outcomes : Students will be able to</i>	
<b>C404c.1</b>	Use the basics of propagation of radio signals
<b>C404c.2</b>	Demonstrate the basic concepts of basic Cellular System and the design requirements
<b>C404c.3</b>	Apply an understanding of the basic principles behind radio resource management techniques such as power control, channel allocation and handoffs.
<b>C404c.4</b>	Describe mobile radio propagation models and how the diversity can be exploited to improve performance
<b>C404c.5</b>	Analyze and apply knowledge and awareness of the technologies for how to effectively share spectrum through multiple access techniques i.e. TDMA, CDMA, FDMA etc.
<b>C404c.6</b>	Compute of the emerging trends in Wireless communication like WiFi, WiMAX, Software Defined Radio (SDR) and related issues and challenges.
<b>SUBJECT : Software Testing and Quality Assurance</b>	
<i>Course Outcomes : Students will be able to</i>	
<b>C405b.1</b>	Apply the testing strategies and methodologies in projects
<b>C405b.2</b>	Understand test management strategies and tools for testing.
<b>C405b.3</b>	Understand the open problems in software testing and maintenance.
<b>C405b.4</b>	Explain quality assurance and various tools used in quality management
<b>C405b.5</b>	Explain in detail about various quality assurance models.
<b>C405b.6</b>	Understand the audit and assessment procedures to achieve quality.
<b>SUBJECT : Project</b>	
<i>Course Outcomes : Students will be able to</i>	
<b>C406.1</b>	Apply the knowledge of mathematics, science and engineering fundamentals to the solution of complex engineering problems.
<b>C406.2</b>	Implement practically, ideas/real time industrial problems, current application of respective/multi-disciplinary engineering branches.
<b>C406.3</b>	Apply project management skills to design a system/product by taking into consideration different issue such as safety, ethics and social.
<b>C406.4</b>	Use different modern tools and equipments like Raspberry Pi, Arduino board, cloudsim, J2EE, J2SE & J2ME, R-programming, eclipse, python, android studio, oracle, IoT, etc.
<b>C406.5</b>	Participate in national/international paper presentation/publication/project competition activities.
<b>C406.6</b>	Prepare project report (proposals) and present their project work in English.
<b>FINAL YEAR (SEM II)</b>	
<b>SUBJECT : Distributed Computing System</b>	
<i>Course Outcomes : Students will be able to</i>	

<b>C407.1</b>	To provide fundamental concepts & architecture of distributed systems.
<b>C407.2</b>	To prepare student to implement distributed applications based on TCP/UDP Sockets, IPC and RPC/RMI.
<b>C407.3</b>	To make students describe the concepts of replication and fault tolerance in distributed system as well as catching & replication in web.
<b>C407.4</b>	To make students to describe the concepts of distributed file system & distributed multimedia systems.
<b>C407.5</b>	To provide knowledge of the architecture and design of distributed web based systems.
<b>C407.6</b>	To make students aware about security issues and protection mechanism for distributed environment.
<b>SUBJECT : Ubiquitous Computing</b>	
<i>Course Outcomes : Students will be able to</i>	
<b>C408.1</b>	Demonstrate the knowledge of design of UbiComp and its applications.
<b>C408.2</b>	Demonstrate the knowledge of design of UbiComp and its applications.
<b>C408.3</b>	Describe the significance of actuators and controllers in real time application design
<b>C408.4</b>	Use the concept of HCI to understand the design of automation applications.
<b>C408.5</b>	Classify UbiComp privacy and explain the challenges associated with UbiComp privacy.
<b>C408.6</b>	Get the knowledge of ubiquitous and service oriented networks along with UbiComp management
<b>SUBJECT : Elective-III</b>	
<i>Course Outcomes : Students will be able to</i>	
<b>C409c.1</b>	Demonstrate the knowledge of static website using basic tools.
<b>C409c.2</b>	Develop client side programming skills.
<b>C409c.3</b>	Develop server side programming skills.
<b>C409c.4</b>	Use web services and handle content management tools.
<b>C409c.5</b>	Develop mobile website using mobile web development tools.
<b>C409c.6</b>	Apply aspects of web security and cyber ethics.
<b>SUBJECT : Elective-IV</b>	
<i>Course Outcomes : Students will be able to</i>	
<b>C410a.1</b>	Understand the basics of Social Media Analytics.
<b>C410a.2</b>	Explain the significance of Data mining in Social media.
<b>C410a.3</b>	Demonstrate the algorithms used for text mining.
<b>C410a.4</b>	Apply network measures for social media data.
<b>C410a.5</b>	Explain Behavior Analytics techniques used for social media data.
<b>C410a.6</b>	Apply social media analytics for Facebook and Twitter kind of applications.
<b>SUBJECT : Project</b>	
<i>Course Outcomes : Students will be able to</i>	
<b>C411.1</b>	Apply the knowledge of mathematics, science and engineering fundamentals to the solution of complex engineering problems.
<b>C411.2</b>	Implement practically, ideas/real time industrial problems, current application of respective/multi-disciplinary engineering branches.
<b>C411.3</b>	Apply project management skills to design a system/product by taking into consideration different issue such as safety, ethics and social.
<b>C411.4</b>	Use different modern tools and equipments like Raspberry Pi, Arduino board, cloudsim, J2EE, J2SE & J2ME, R-programming, eclipse, python, android studio, oracle, IoT, etc.
<b>C411.5</b>	Participate in national/international paper presentation/publication/project competition activities.
<b>C411.6</b>	Prepare project report (proposals) and present their project work in English.