	COLLEGE OF ENGINEERING TRIKARIPUR
	COLLEGE OF ENGINEERING TRIKARIPUR **DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING** **COURSE OUTCOMES(2019 Scheme)**

Sem & Subject	CO#	Course Outcomes
MAT101-LINEAR ALGEBRA AND CALCULUS (S1)	**CO1**	Solve systems of linear equations, diagonalize matrices and characterise quadratic forms.
	CO2	Compute the partial and total derivatives and maxima and minima of multivariable functions.
	CO3	Compute multiple integrals and apply them to find areas and volumes of geometrical shapes, mass and centre of gravity of plane laminas.
	CO4	Perform various tests to determine whether a given series is convergent, absolutely convergent or conditionally convergent.
	CO5	Determine the Taylor and Fourier series expansion of functions and learn their applications.
CYT100-ENGINEERING CHEMISTRY (S1)	CO1	Apply the basic concepts of electrochemistry and corrosion to explore its possible applications in various engineering fields.
	CO2	Understand various spectroscopic techniques like UV-Visible, IR, NMR and its applications.
	CO3	Apply the knowledge of analytical method for characterizing a chemical mixture or a compound. Understand the basic concept of SEM for surface characterisation of nano materials.
	CO4	Learn about the basics of stereochemistry and its application. Apply the knowledge of conducting polymers and advanced polymers in engineering.
	CO5	Study various types of water treatment methods to develop skills for treating wastewater.
EST120-BASICS OF CIVIL AND MECHANICAL ENGINEERING (S1)	CO1	Recall the role of civil engineer in society and to relate the various disciplines of Civil Engineering and Explain different types of buildings, building components, building materials and building construction.
	CO2	Describe the importance, objectives and principles of surveying and Summarise the basic infrastructure services MEP, HVAC, elevators, escalators and ramps.
	CO3	Discuss the Materials, energy systems, water management and environment for green buildings.
	CO4	Analyse thermodynamic cycles and calculate its efficiency and Illustrate the working and features of IC Engines.
	CO5	Explain the basic principles of Refrigeration and Air Conditioning and Describe the working of hydraulic machines.
	CO6	Explain the working of power transmission elements and Describe the basic manufacturing, metal joining and machining processes.

EST100-ENGINEERING MECHANICS (S1)	CO1	To recall principles and theorems related to rigid body mechanics.
	CO2	To identify and describe components of system of forces acting on the rigid body.
	CO3	To apply the conditions of equilibrium to various practical problem involving different force system.
	CO4	To choose appropriate theorems, principle or formulae to solve problems of mechanics.
	CO5	To solve problems involving rigid bodies, applying the properties of distributed areas and masses.
HUN101- Life Skills (S1)	CO1	Define and Identify different life skills required in personal and professional life
	CO2	Develop an awareness of the self and apply well-defined techniques to cope with emotions and stress.
	CO3	Explain the basic mechanics of effective communication and demonstrate these through presentations.
	CO4	Take part in group discussions
	CO5	Use appropriate thinking and problem solving techniques to solve new problems
	CO6	Understand the basics of teamwork and leadership
CYL120-ENGINEERING CHEMISTRY LAB (S1)	CO1	Understand and practice different techniques of quantitative chemical analysis to generate experimental skills and apply these skills to various analyses.
	CO2	Develop skills relevant to synthesize organic polymers and acquire the practical skill to use TLC for the identification of drugs.
	CO3	Develop the ability to understand and explain the use of modern spectroscopic techniques for analysing and interpreting the IR spectra and NMR spectra of some organic compounds.
	CO4	Acquire the ability to understand, explain and use instrumental techniques for chemical analysis.
	C05	Learn to design and carry out scientific experiments as well as accurately record and 2analyse the results of such experiments.
MAT 102-VECTOR CALCULUS, DIFFERENTIAL EQUATIONS AND TRANSFORMS (S2)	CO1	Compute the derivatives and line integrals of vector functions and learn their applications.
	CO2	Evaluate surface and volume integrals and learn their inter-relations and applications.
	CO3	Solve homogeneous and non-homogeneous linear differential equation with constant coefficients.
	CO4	Compute Laplace transform and apply them to solve ODEs arising in engineering.
	CO5	Determine the Fourier transforms of functions and apply them to solve problems arising in engineering.

PHT100-ENGINEERING PHYSICS (S2)	CO1	Compute the quantitative aspects of waves and oscillations in engineering systems.
	CO2	Apply the interaction of light with matter through interference, diffraction and identify these phenomena in different natural optical processes and optical instruments.
	CO3	Analyse the behaviour of matter in the atomic and subatomic level through the principles of quantum mechanics to perceive the microscopic processes in electronic devices.
	CO4	Classify the properties of magnetic materials and apply vector calculus to static magnetic fields and use Maxwell's equations to diverse engineering problems.
	CO5	Analyse the principles behind various superconducting applications, explain the working of solid state lighting devices and fibre optic communication system.
EST110-ENGINERING GRAPHICS (S2)	CO1	Draw the projection of points and lines located in different quadrants.
	CO2	Prepare multiview orthographic projections of objects by visualizing them in different positions.
	CO3	Draw sectional views and develop surfaces of a given object.
	CO4	Prepare pictorial drawings using the principles of isometric and perspective projections to visualize objects in three dimensions.
	CO5	Convert 3D views to orthographic views and vice versa.
	CO6	Obtain multiview projections and solid models of objects using CAD Tool.
EST110-BASICS OF ELECTRICAL AND ELECTRONICS ENGINEERING (S2)	CO1	Apply fundamental concepts and circuit laws to solve simple DC electric circuits.
	CO2	Develop and solve models of magnetic circuits.
	CO3	Apply the fundamental laws of electrical engineering to solve simple ac circuits in steady state.
	CO4	Describe working of a voltage amplifier.
	CO5	Outline the principle of an electronic instrumentation system.
	CO6	Explain the principle of radio and cellular communication.
EST102-C PROGRAMMING (S2)	CO1	Analyse a computational problem and develop an algorithm/flowchart to find its solution.
	CO2	Develop readable* C programs with branching and looping statements, which uses Arithmetic,
	CO3	Write readable C programs with arrays, structure or union for storing the data to be processed.
	CO4	Divide a given computational problem into a number of modules and develop a readable multi-function C program by using recursion if required, to find the solution to the computational problem.
	CO5	Write readable C programs which use pointers for array processing and parameter passing.
	CO6	Develop readable C programs with files for reading input and storing output.

HUN102 Professional Communication(S2)	CO1	Develop vocabulary and language skills relevant to engineering as a profession
	CO2	Analyze, interpret and effectively summarize a variety of textual content
	CO3	Create effective technical presentations
	CO4	Discuss a given technical/non-technical topic in a group setting and arrive at generalizations/consensus
	CO5	Identify drawbacks in listening patterns and apply listening techniques for specific needs
	CO6	Create professional and technical documents that are clear and adhering to all the necessary conventions
ESL 130-ELECTRICAL AND ELECTRONICS WORKSHOP (S2)	CO1	Demonstrate safety measures against electric shocks.
	CO2	Identify the tools used for electrical wiring, electrical accessories, wires, cables, batteries and
	CO3	Develop the connection diagram, identify the suitable accessories and materials necessary for wiring simple lighting circuits for domestic buildings.
	CO4	Identify and test various electronic components.
	CO5	Draw circuit schematics with EDA tools.
	CO6	Assemble and test electronic circuits on boards.
PHL120-ENGINEERING PHYSICS LAB (S2)	CO1	Develop analytical/experimental skills and impart prerequisite hands on experience for engineering laboratories.
	CO2	Understand the need for precise measurement practices for data recording.
	CO3	Understand the principle, concept, working and applications of relevant technologies and comparison of results with theoretical calculations
	CO4	Analyse the techniques and skills associated with modern scientific tools such as lasers and fibre optics.
	CO5	Develop basic communication skills through working in groups in performing the laboratory experiments and by interpreting the results.
MAT203-DISCRETE MATHEMATICAL STRUCTURES (S3)	CO1	Check the validity of predicates in Propositional and Quantified Propositional Logic using truth tables, deductive reasoning and inference theory on Propositional Logic.
	CO2	Solve counting problems by applying the elementary counting techniques - Rule of Sum, Rule of Product, Permutation, Combination, Binomial Theorem, Pigeonhole Principle and Principle of Inclusion and Exclusion.
	CO3	Classify binary relations into various types and illustrate an application for each type of binary relation, in Computer Science.
	CO4	Illustrate an application for Partially Ordered Sets and Complete Lattices, in Computer Science.
	CO5	Explain Generating Functions and solve First Order and Second Order Linear Recurrence Relations with Constant Coefficients.

	CO6	Illustrate the abstract algebraic systems - Semigroups, Monoids, Groups, Homomorphism and Isomorphism of Monoids and Groups.
CST201-DATA STRUCTURES (S3)	CO1	Design an algorithm for a computational task and calculate the time/space.
	CO2	Identify the suitable data structure (array) to represent a data item required to be processed to solve a given computational problem and write an algorithm to find the solution of the computational problem.
	CO3	Identify the suitable data structure (linked list) to represent a data item required to be processed to solve a given computational problem and write an algorithm to find the solution of the computational problem.
	CO4	Write an algorithm to find the solution of a computational problem by selecting an appropriate data structure (binary tree/graph) to represent a data item to be processed.
	CO5	Select appropriate sorting algorithms to be used in specific circumstances.
	CO6	Select appropriate sorting algorithms to be used in specific circumstances AND Store a given dataset using an appropriate Hash Function to enable efficient access of data in the given set.
CST203-LOGIC SYSTEM DESIGN (S3)	CO1	Illustrate decimal, binary, octal, hexadecimal and BCD number systems, perform conversions among them and do the operations - complementation, addition, subtraction, multiplication and division on binary numbers.
	CO2	Simplify a given Boolean Function and design a combinational circuit to implement the simplified function using Digital Logic Gates.
	CO3	Design combinational circuits Adders, Code Convertors, Decoders, magnitude Comparator, Parity Generator/Checker.
	CO4	Design sequential circuits - Registers, Counters and Shift Registers.
	CO5	Use algorithms to perform addition and subtraction on binary, BCD and floating point Numbers and design the Programmable Logic Devices -ROM and PLA.
CST205-OBJECT ORIENTED PROGRAMMING USING JAVA (S3)	CO1	Understand the concepts of Object Oriented Programming, features of Java Programming Language and to Apply Object Oriented Design Concepts.
	CO2	Utilize data types, operators, control statements, built in packages and Object Oriented constructs like classes and objects in Java to develop programs.
	CO3	Deploy the object oriented concepts - Data hiding, inheritance and polymorphism in Java programs.
	CO4	Illustrate how robust programs can be written in Java using exception handling mechanism, Packages , Files and streams.
	CO5	Write application programs in Java using strings, collections and multithreading.
	CO6	Write Graphical User Interface based application programs by utilizing event handling features , Swing and JDBC.
EST200-DESIGN & ENGINEE	CO1	Explain the different concepts and principals involved in design engineering.
	CO2	Apply design thinking while learning and practicing engineering.

	CO3	Develop innovative, reliable, sustainable and economically viable designs incorporating knowledge in engineering.
MCN201-SUSTAINABLE ENGINEERING (S3)	CO1	Understand the relevance and the concept of sustainability and the global initiatives in this direction.
	CO2	Explain the different types of environmental pollution problems and their sustainable solutions.
	CO3	Discuss the environmental regulations and standards.
	CO4	Outline the concepts related to conventional and non-conventional energy.
	CO5	Demonstrate the broad perspective of sustainable practices by utilizing engineering knowledge and principles.
CSL201-DATA STRUCTURES LAB (S3)	CO1	Write a time/space efficient program using arrays/ linked lists /trees /graphs to provide necessary functionalities meeting a given set of user requirements.
	CO2	Write a time/space efficient program to sort a list of records based on a given key in the record.
	CO3	Examine a given Data Structure to determine its space complexity and time complexities of operations on it.
	CO4	Design and implement an efficient data structure to represent given data.
	CO5	Write a time/space efficient program to convert an arithmetic expression from one notation to another.
	CO6	Write a program using linked lists to simulate Memory Allocation and Garbage Collection.
CSL203-OBJECT ORIENTED PROGRAMMING LAB (S3)	CO1	Implement programs in Java which use datatypes, operators, control statements, built in packages.
	CO2	Implement java programs using basic object oriented concepts like constructors and overloading.
	CO3	Implement Java Programs with inheritance and polymorphism.
	CO4	Implement programs in Java which uses Input/ Output streams and Files.
	CO5	Implement robust application programs in Java using exception handling and multithreading.
	CO6	Implement Graphical User Interface based application programs by utilizing event handling features and Swing in Java.
MAT206-GRAPH THEORY (S4)	CO1	Explain vertices and their properties, types of paths, classification of graphs and their properties.
	CO2	Demonstrate the fundamental theorems on Eulerian and Hamiltonian graphs.
	CO3	Illustrate the working of Prim's and Kruskal's algorithm for finding minimum cost spanning tree and Dijikstra's and Floyd Warshall algorithm for finding shortest paths.
	CO4	Explain planar graph, their properties and an application for planar graph.
	CO5	Illustrate how one can represent a graph in a computer.
	CO6	Explain the vertex color problem in graphs and illustrate an example application for vertex coloring

CST202-COMPUTER ORGANIZATION AND ARCHITECTURE (S4)	CO1	Recognize and express the relevance of basic components, and demonstrate the control signals required for the execution of a given instruction
	CO2	Illustrate the design of Arithmetic Logic Unit and explain the usage of registers in it.
	CO3	Explain the implementation aspects of arithmetic algorithms in a digital computer, recognize and express the relevance of pipelining schemes in a digital computer.
	CO4	Develop the control logic for a given arithmetic problem.
	CO5	Explain the types of memory systems and mapping functions used in memory systems, recognize and express the relevance of I/O organization in digital computer.
CST204-DATABASE MANAGEMENT SYSTEMS (S4)	CO1	Summarize and exemplify fundamental nature and characteristics of database systems.
	CO2	Model real word scenarios given as informal descriptions, using Entity Relationship diagrams.
	CO3	Model and design solutions for efficiently representing and querying data using relational model.
	CO4	Demonstrate the features of indexing and hashing in database applications.
	CO5	Discuss and compare the aspects of Concurrency Control and Recovery in Database Systems.
	CO6	Explain various types of NoSQL databases.
CST-206OPEARTING SYSTEM (S4)	CO1	Explain the relevance, structure and functions of Operating Systems in computing devices.
	CO2	Illustrate the concepts of process management and process scheduling mechanisms employed in Operating Systems.
	CO3	Explain process synchronization in Operating Systems and illustrate process synchronization
	CO4	Explain any one method for detection, prevention, avoidance and recovery for managing deadlocks in Operating Systems.
	CO5	Explain the memory management algorithms in Operating Systems.
	CO6	Explain the security aspects and algorithms for file and storage management in Operating Systems.
HUT200-PROFESSIONAL ETHICS (S4)	CO1	Understand the core values that shape the ethical behaviour of a professional.
	CO2	Adopt a good character and follow an ethical life.
	CO3	Explain the role and responsibility in technological development by keeping personal ethics and legal ethics.
	CO4	Solve moral and ethical problems through exploration and assessment by established experiments.
	CO5	Apply the knowledge of human values and social values to contemporary ethical values and global issues.
MCN202-CONSTITUTION OF INDIA	CO1	Understand the background and features of constitution of India and enlist the clauses in Part I &II of Indian Constitution.
	CO2	Utilize the fundamental rights and duties and enlist Directive Principles of State Policy.

	CO3	Understand the working of the union executive, parliament and judiciary.
	CO4	Understand the working of the state executive, legislature and judiciary.
	CO5	Understand the special provisions and statutory institutions.
	CO6	Show national and patriotic spirit as responsible citizens of the country.
CSL202-DIGITAL LAB (S4)	CO1	Design and implement combinational logic circuits using Logic Gates
	CO2	Design and implement sequential logic circuits using Integrated Circuits
	CO3	Simulate functioning of digital circuits using programs written in a Hardware Description Language
	CO4	Function effectively as an individual and in a team to accomplish a given task of designing and implementing digital circuits
CSL204-OPERATING SYSTEM LAB (S4)	CO1	Illustrate the use of systems calls in Operating Systems.
	CO2	Implement Process Creation and Inter Process Communication in Operating Systems.
	CO3	Implement Fist Come First Served, Shortest Job First, Round Robin and Priority based CPU
	CO4	Illustrate the performance of First In First Out, Least Recently Used and Least Frequently Used Page Replacement Algorithms.
	CO5	Implement modules for Deadlock Detection and Deadlock Avoidance in Operating Systems.
	CO6	Implement modules for Storage Management and Disk Scheduling in Operating Systems.
CST301-FORMAL LANGUAGES AND AUTOMATA THEORY (S5)	CO1	Classify a given formal language into Regular, Context-Free, Context Sensitive, Recursive or Recursively Enumerable and understanding and design of different types of finite automata.
	CO2	Explain a formal representation of a given regular language as a finite state automaton, regular grammar, regular expression and Myhill-Nerode relation and find minimum state DFA.
	CO3	Design a Pushdown Automaton and a Context-Free Grammar for a given context-free language.
	CO4	Design Turing machines as language acceptors or transducers.
	CO5	Explain the notion of decidability.
CST303-COMPUTER NETWOR	CO1	Explain the features of computer networks, protocols, and network design models.
	CO2	Describe the fundamental characteristics of the physical layer and identify the usage in network communication.

	CO3	Explain the design issues of data link layer, link layer protocols, bridges and switches.
	CO4	Illustrate wired LAN protocols (IEEE 802.3) and wireless LAN protocols (IEEE 802.11).
	CO5	Select appropriate routing algorithms, congestion control techniques, and Quality of Service requirements for a network.
	CO6	Illustrate the functions and protocols of the network layer, transport layer, and application layer in inter-networking.
CST305- SYSTEM SOFTWARE (S5)	CO1	Distinguish software into different categories by using the features of SIC and SIC/XE machine.
	CO2	Analyse two pass assembler using SIC Program.
	CO3	Identify machine dependent and machine independent features of assembler.
	CO4	Analyse and design Loaders and Linkers.
	CO5	Analyse and design microprocessor.
	CO6	Understand the features of device drivers and editing & debugging tools.
CST307-MICROPROCESSORS AND MICROCONTROLLERS (S5)	CO1	Illustrate the architecture, modes of operation and addressing modes of microprocessors.
	CO2	Develop 8086 assembly language programs.
	CO3	Demonstrate interrupts, its handling and programming in 8086.
	CO4	Illustrate how different peripherals (8255,8254,8257) and memory are interfaced with microprocessors.
	CO5	Outline features of microcontrollers and develop low level programs.
CST309-MANAGEMEN OF SOFTWARE SYSTEMS (S5)	CO1	Demonstrate Traditional and Agile Software Development approaches.
	CO2	Prepare Software Requirement Specification and Software Design for a given problem.
	CO3	Justify the significance of design patterns and licensing terms in software development, prepare testing, maintenance and DevOps strategies for a project.
	CO4	Make use of software project management concepts while planning, estimation, scheduling, tracking and change management of a project, with a traditional/agile framework.
	CO5	Utilize SQA practices, Process Improvement techniques and Technology, advancements in cloud based software models and containers & micro services.
	CO1	Discuss the system of earth and define various terminologies used in disaster management.

MCN301-DISASTER MANAGEMENT (S5)	CO2	Distinguish between different hazard types and vulnerability types and do vulnerability assessment.
	CO3	Explain the core elements, phases and measures of Disaster Risk Management.
	CO4	Identify factors that determine the nature of various disaster response and disaster response actions.
	CO5	Explain stakeholder participation and crisis counseling in disaster management.
	CO6	Explain various legislations and best practices for disaster management.
CSL331-SYSTEM SOFTWARE AND MICROPROCESSORS LAB (S5)	CO1	Develop 8086 programs and execute it using a microprocessor kit.
	CO2	Develop 8086 programs and, debug and execute it using MASM assemblers.
	CO3	Implement and execute different file allocation and paging algorithms in OS.
	CO4	Design and implement assemblers, Loaders and macro processors.
	CO5	Develop and execute programs to interface stepper motor, 8255, 8279 and digital to analog converters with 8086 trainer kit.
CSL333-DATABASE MANAGEMENT SYSTEMS LAB (S5)	CO1	Design database schema for a given real world problem-domain using standard design and modeling approaches.
	CO2	Construct queries using SQL for database creation, interaction, modification, and updation.
	CO3	Design and implement triggers.
	CO4	Implement procedures, functions, and control structures using SQL.
	CO5	Develop database applications using front-end tools and back-end DBMS.
	CO6	Perform CRUD operations in NoSQL Databases.
CST302-COMPILER DESIGN (S6)	CO1	Explain the phases in compilation process(lexical analysis, syntax analysis, semantic analysis, intermediate code generation, code optimization and code generation) and model a lexical analyser.
	CO2	Model language syntax using Context Free Grammar and develop parse tree representation using leftmost and rightmost derivations.

	CO3	Compare different types of parsers(Bottom-up and Top-down) and construct parser for a given grammar.
	CO4	Build Syntax Directed Translation for a context free grammar, compare various storage allocation strategies and classify intermediate representations.
	CO5	Illustrate code optimization and code generation techniques in compilation.

CST304-COMPUTER GRAPHICS AND IMAGE PROCESSING (S6)	CO1	Understand the working principles of Computer Graphics and illustrate Line drawing Circle drawing Algorithms.
	CO2	Illustrate polygon filling Algorithms and Demonstrate geometric representations, transformations on 2D & 3D objects.
	CO3	Demonstrate Clipping and Projection Algorithms.
	CO4	Summarize visible surface detection methods.
	CO5	Summarize the concepts of digital image representation, processing and demonstrate pixel relationship.
	CO6	Solve image enhancement and segmentation problems using spatial domain techniques.

CST306-ALGORITHM ANALYSIS AND DESIGN (S6)	CO1	Analyse a given algorithm using iteration method, substitution method, recursion tree method & Master Theorem and express its time and space complexities in asymptotic notations.
	CO2	Derive recurrence equations and solve it using Iteration, Recurrence Tree, Substitution and Master's Method to compute time complexity of algorithms.
	CO3	Illustrate Graph traversal algorithms & applications and Advanced Data structures like AVL trees and Disjoint set operations.
	CO4	Demonstrate Divide-and-conquer, Greedy Strategy, Dynamic programming, Branch-and Bound and Backtracking algorithm design techniques.
	CO5	Classify a problem as computationally tractable or intractable, and discuss strategies to address intractability.
	CO6	Identify the suitable design strategy to solve a given problem.

CST308-COMPREHENSIVE COURSE WORK (S6)	CO1	Comprehend the concepts and applications of data structures.
	CO2	Comprehend the concepts, functions and algorithms in Operating System.
	CO3	Comprehend the organization and architecture of computer systems.
	CO4	Comprehend the fundamental principles of database design and manipulation.
	CO5	Comprehend the concepts in formal languages and automata theory.

CST362-PROGRAMMIN G IN PYTHON (S6)	CO1	Write, test and debug Python programs.
	CO2	Illustrate uses of conditional (if, if-else and if-elif-else) and iterative (while and for) statements in Python programs.
	CO3	Develop programs by utilizing the Python programming constructs such as Lists, Tuples, Sets and Dictionaries.

	CO4	Develop graphical user interface for solutions using Python libraries.
	CO5	Implement Object Oriented programs with exception handling.
	CO6	Write programs in Python to process data stored in files by utilizing Numpy, Matplotlib, and Pandas.
CST332-FOUNDATIONS OF SECURITY IN COMPUTING (S6)	CO1	Illustrate the operations and properties of algebraic structures, integer arithmetic and modular arithmetic.
	CO2	Use the concepts of prime numbers and factorization for ensuring security in computing systems.
	CO3	Illustrate the concepts of Linear Congruence, Primitive Roots, Discrete Logarithms and Elliptic Curve Arithmetic.
	CO4	Summarize the threats and attacks related to computer and program security.
	CO5	Outline the key aspects of operating system.
	CO6	Outline the key aspects of database system.
HUT300-INDUSTRIAL ECONOMICS & FOREIGN TRADE (S6)	CO1	Explain the problem of scarcity of resources and consumer behavior, and to evaluate the impact of government policies on the general economic welfare.
	CO2	Take appropriate decisions regarding volume of output and to evaluate the social cost of production.
	CO3	Determine the functional requirement of a firm under various competitive conditions.
	CO4	Examine the overall performance of the economy, and the regulation of economic fluctuations and its impact on various sections in the society.
	CO5	Determine the impact of changes in global economic policies on the business opportunities of a firm.
CSL332-NETWORKING LAB (S6)	CO1	Use network related commands and configuration files in Linux Operating System.
	CO2	Develop network application programs and protocols.
	CO3	Analyse network traffic using network monitoring tools.
	CO4	Design and setup a network and configure different network protocols.
	CO5	Develop simulation of fundamental network concepts using a network simulator.
CSD334-MINIPROJECT (S6)	CO1	Identify technically and economically feasible problems.
	CO2	Identify and survey the relevant literature for getting exposed to related solutions and get familiarized with software development processes.
	CO3	Perform requirement analysis, identify design methodologies and develop adaptable solutions.
	CO4	Demonstrate the proficiency of Computer Programming Languages & Other Emerging technologies & Tools for Project Implementation.

	CO5	Prepare technical report and deliver presentation.
	CO6	Apply engineering and management principles to achieve the goal of the project.
CST401-ARTIFICIAL INTELLIGENCE (S7)	CO1	Explain the fundamental concepts of intelligent systems and their architecture.
	CO2	Illustrate uninformed and informed search techniques for problem solving in intelligent systems.
	CO3	Solve Constraint Satisfaction Problems using search techniques.
	CO4	Represent AI domain knowledge using logic systems and use inference techniques for reasoning in intelligent systems.
	CO5	Illustrate different types of learning techniques used in intelligent systems.
CST433-SECURITY IN COMPUTING (S7)	CO1	Identify the security services provided against different types of security attacks.
	CO2	Illustrate classical encryption techniques for information hiding.
	CO3	Illustrate symmetric/asymmetric key cryptosystems for secure communication.
	CO4	Explain message integrity and authentication methods in a secure communication scenario.
	CO5	Interpret public/secret key distribution techniques for secure communication.
	CO6	Identify the effects of intruders, malicious software and distributed denial of service attacks on system security.
CST463-WEB PROGRAMMING (S7)	CO1	Use HyperText Markup Language (HTML) for authoring web pages and understand the fundamentals of WWW.
	CO2	Construct and visually format responsive, interactive web pages using CSS and JavaScript (JS).
	CO3	Construct websites using advanced sever side programming tool PHP.
	CO4	Develop dynamic web applications using PHP and perform MySQL database operations.
	CO5	Explain the importance of object exchange formats using JSON.
	CO6	MVC based web application development frameworks (Laravel).
MCN401-INDUSTRIAL SAFEY ENGINEERING (S7)	CO1	Describe the theories of accident causation and preventive measures of industrial accidents.
	CO2	Explain about personal protective equipment, its selection, safety performance & indicators and importance of housekeeping.
	CO3	Explain different issues in construction industries
	CO4	Describe various hazards associated with different machines and mechanical material handling.

	CO5	Utilise different hazard identification tools in different industries with the knowledge of different types of chemical hazards.
	CO6	Analysis of Hazards and risk associated with various industry.
CSL411-COMPILER LAB (S7)	CO1	Implement lexical analyser using the tool LEX.
	CO2	Implement Syntax analyser using the tool YACC.
	CO3	Design NFA and DFA for a problem and write programs to perform operations on it.
	CO4	Design and Implement Top-Down parsers.
	CO5	Design and Implement Bottom-Up parsers.
	CO6	Implement intermediate code for expressions and target code for the corresponding intermediate code.
CSQ413-SEMINAR (S7)	CO1	Identify academic documents from the literature which are related to her/his areas of interest.
	CO2	Read and apprehend an academic document from the literature which is related to her/ his areas of interest.
	CO3	Prepare a presentation about an academic document.
	CO4	Give a presentation about an academic document.
	CO5	Prepare a technical report.
CSD415-PROJECT DESIGN (S7)	CO1	Model and solve real world problems by applying knowledge across domains.
	CO2	Develop products, processes or technologies for sustainable and socially relevant applications.
	CO3	Function effectively as an individual and as a leader in diverse teams and to comprehend and execute designated tasks.
	CO4	Plan and execute tasks utilizing available resources within timelines, following ethical and professional norms.
	CO5	Identify technology/research gaps and propose innovative/creative solutions.
	CO6	Organize and communicate technical and scientific findings effectively in written and oral forms.
	CO1	Summarize various aspects of distributed computation model and logical time.

CST402-DISTRIBUTED COMPUTING (S8)	CO2	Illustrate election algorithm, global snapshot algorithm and termination detection algorithm.
	CO3	Compare token based, non-token based and quorum based mutual exclusion algorithms.
	CO4	Recognize the significance of deadlock detection and shared memory in distributed systems.
	CO5	Explain the concepts of failure recovery and consensus.
	CO6	Illustrate distributed file system architectures.
CST434-NETWORK SECURITY PROOTOCOL	CO1	Explain authentication protocols, X.509 authentication service and Public Key Infrastructure (PKI).
	CO2	Identify the security mechanisms in E mail security services.
	CO3	Summarize the network and transport layer security services provided in a secure communication scenario.
	CO4	Describe real time communication security and application layer security protocols.
	CO5	Explain the concepts of firewalls and wireless network security.
CST474-COMPUTER VISION (S8)	CO1	Summarize basic concepts, terminology, theories, models and methods in the field of computer vision.
	CO2	Explain basic methods of computer vision related to multi-scale representation, edge detection, detection of other primitives, stereo, motion and object recognition.
	CO3	Describe principles of Segmentation.
	CO4	Describe principles of Motion Segmentation and Classification.
	CO5	Select appropriate object Tracking and detection methods for computer vision applications.
	CO6	Implement a computer vision system for a specific problem.
CST466-DATA MINING (S8)	CO1	Explain the key process of data mining and data warehousing concepts in application domains.
	CO2	Use appropriate pre-processing techniques to convert raw data into suitable format for practical data mining tasks.
	CO3	Apply classification algorithms in different real world scenario and evaluate their performance using appropriate performance evaluation metrics
	CO4	Understand the basic concept and different types of clustering and apply appropriate clustering technique to solve real world problems.
	CO5	Apply the concept of association rule mining in real world scenario.

	CO6	Explain advanced data mining concepts and their applications in emerging domains (Understand).
CST428-BLOCKCHAIN TECHNOLOGY (S8)	CO1	Illustrate the cryptographic building blocks of blockchain technology.
	CO2	Explain the fundamental concepts of blockchain technology.
	CO3	Summarize the classification of consensus algorithms.
	CO4	Explain the concepts of first decentralized crypto currency bitcoin.
	CO5	Explain the use of smart contracts and its use cases.
	CO6	Develop simple applications using Solidity language on Ethereum platform.
CSD416-PROJECT (S8)	CO1	Model and solve real world problems by applying knowledge across domains
	CO2	Develop products, processes or technologies for sustainable and socially relevant applications
	CO3	Function effectively as an individual and as a leader in diverse teams and to comprehend and execute designated tasks
	CO4	Plan and execute tasks utilizing available resources within timelines, following ethical and professional norms
	CO5	Identify technology/research gaps and propose innovative/creative solutions
	CO6	Organize and communicate technical and scientific findings effectively in written and oral forms