SEMESTER	SUBJECT CODE	SUBJECT NAME	CO No.	COURSE OUTCOMES
	MAT 101	LINEAR ALGEBRA AND CALCULUS	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.
	PHT 100	ENGINEERING PHYSICSA	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	Analyze 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 magneticfields and use Maxwell's equations to diverse engineering problems
			CO5	Apply the comprehended knowledge about laser and fibre optic communication systems in various engineering applications
	EST 100	ENGINEERING MECHANICS	CO1	Recall principles and theorems related to rigid body mechanics
			CO2	Identify and describe the components of system of forces acting on the rigid body
			CO3	Apply the conditions of equilibrium to various practical problems involving different force system.
			CO4	Choose appropriate theorems, principles or formulae to solve problems of mechanics.
			CO5	Solve problems involving rigid bodies, applying the properties of distributed areas and masses
S1	EST 120	BASICS OF CIVIL & MECHANICAL	CO1	Recall the role of civil engineer in society and to relate the various disciplines of Civil Engineering.
			CO2	Explain different types of buildings, building components, building materials and building construction

		ENGINEERING	CO3	Describe the importance, objectives and principles of surveying.
			CO4	Summarise the basic infrastructure services MEP, HVAC, elevators, escalators and ramps
			CO5	Discuss the Materials, energy systems, water management and environment for green buildings.
			CO6	Analyse thermodynamic cycles and calculate its efficiency
			CO7	Illustrate the working and features of IC Engines
			CO8	Explain the basic principles of Refrigeration and Air Conditioning
			CO9	Describe the working of hydraulic machines
			CO10	Explain the working of power transmission elements
			CO11	Describe the basic manufacturing, metal joining and machining processes
			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
	HUT 101	**LIFE SKILLS**	CO6	Understand the basics of teamwork and leadership
			CO1	Apply modern instruments like CRO, strain gauge to measure the basic physical quantities viz. frequency and amplitude of a wave pattern,strain etc.Carryout measurement of wave pattern in a stretched string and the corresponding frequency values using a Melde's string apparatus.
			CO2	Determine the wavelength of monochromatic beam of light and thickness of micro-thin object etc. by forming Newton's rings pattern and an air wedge fringe pattern.
		ENGINEERING PHYSICS LAB	CO3	Carryout the measurement of wavelength by diffraction of plane transmission grating and the spectra formed by a monochromatic beam of light and a laser.
	PHL 120		CO4	Determine the wavelength of a laser beam using the plane transmission grating.Measurement of numerical aperture of an optic fibre and evaluate the properties

				of a solar cell and LED through itsI-Vcharacteristics.
			CO5	Determine the velocity of ultrasonic waves in liquid using ultrasonic diffractometer.Compare the magnetic moment of various magnets and determine the magnetic flux density using deflection/vibration Magnetometer.
			CO1	Name different devices and tools used for civil engineering measurements
			CO2	Explain the use of various tools and devices for various field measurements
			CO3	Demonstrate the steps involved in basic civil engineering activities like plot measurement, setting out operation, evaluating the natural profile of land, plumbing and undertaking simple construction work.
			CO4	Choose materials and methods required for basic civil engineering activities like field measurements, masonry work and plumbing.
			CO5	Compare different techniques and devices used in civil engineering measurements
			CO6	Identify Basic Mechanical workshop operations in accordance with the material and objects
		CIVIL & MECHANICAL WORKSHOP	CO7	Apply appropriate Tools and Instruments with respect to the mechanical workshop trades
	ESL 120		CO8	Apply appropriate safety measures with respect to the mechanical workshop trades
			CO1	Apply the concept of vector functions and learn to work with conservative vector field
		VECTOR CALCULUS, DIFFERENTIAL EQUATIONS AND TRANSFORMS	CO2	Apply computing integrals of scalar and vector field over surfaces in three-dimensional space.
			CO3	Solve homogeneous and non-homogeneous linear differential equation with constant coefficients
			CO4	Apply Laplace transforms to solve physical problems arising in engineering
	MAT 102		CO5	Apply Fourier transforms to solve physical problems arising in engineering
			CO1	Apply the basic concepts of electrochemistry and corrosion to explore its possible applications in various engineering fields.
S2	CYT 100	**ENGINEERING CHEMISTRY**	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 nanomaterials
			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
	EST 110	ENGINEERING GRAPHICS	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 tools
	EST 130	BASIC ELECTRICAL AND ELECTRONICS ENGINEERING	CO1	Apply fundamental concepts and circuit laws to solve simple DC electric and magnetic 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
	HUT 102	PROFESSIONAL COMMUNICATION	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

	EST 102	PROGRAMMING IN C	CO1	Analyze a computational problem and develop an algorithm/flowchart to find its solution
			CO 2	Develop readable* C programs with branching and looping statements, which uses Arithmetic, Logical, Relational or Bitwise operators
			CO 3	Write readable C programs with arrays, structure or union for storing the data to be processed
			CO 4	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
			CO 5	Write readable C programs which use pointers for array processing and parameter passing
			CO 6	Develop readable C programs with files for reading input and storing output
	CYL 120	ENGINEERING CHEMISTRY LAB	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
			CO5	Learn to design and carry out scientific experiments as well as accurately record and analyze the results of such experiments
			CO6	Function as a member of a team, communicate effectively and engage in further learning. Also understand how chemistry addresses social, economical and environmental problems and why it is an integral part of curriculum
	ESL 130	ELECTRICAL & ELECTRONICS WORKSHOP	CO1	Demonstrate safety measures against electric shocks.
			CO2	Identify the tools used for electrical wiring, electrical accessories, wires, cables, batteries and standard symbols.
			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
			CO7	Work in a team with good interpersonal skills
	MA 201	**LINEAR ALGEBRA AND COMPLEX ANALYSIS**	**CO1**	To equip the students with methods of solving a general system of linear equations.
			CO2	To familiarize them with the concept of Eigen values and diagonalization of a matrix which have many applications in Engineering.
			CO3	To understand the basic theory of functions of a complex variable and conformal Transformations.
	CS 201	**DISCRETE COMPUTATIO NAL STRUCTURES**	**CO 1**	Identify and apply operations on discrete structures such as sets, relations and functions in different areas of computing
			CO 2	Solve problems using counting techniques and combinatorics.
			CO 3	Apply recurrence relations to solve problems in different domains.
			CO4	Solve problems using algebraic structures.
			CO 5	Verify the validity of an argument using propositional and predicate logic.
			CO 6	Construct proofs using direct proof, proof by contraposition, proof by contradiction and proof by cases, and by mathematical induction.
	CS 203	**SWITCHING THEORY AND LOGIC DESIGN**	**CO 1**	Familiarize number system - representation, addition, subtraction, multiplication and division
			CO 2	Apply the basic concepts of Boolean algebra for the simplification and implementation of logic functions using suitable gates namely NAND, NOR etc.
			CO 3	Design simple Combinational Circuits such as Adders, Subtractors, Code Convertors, Decoders, Multiplexers, and Magnitude Comparators etc.
			CO4	Analyze and Design simple and commonly used Sequential Circuits viz. different types of Counters, Shift Registers, Serial Adders and Sequence Generators.
			CO 5	Use Hardware Description Language for describing simple logic circuits
			CO 6	Explain and illustrate algorithms for addition/subtraction operations on Binary, BCD and Floating Point Numbers
S3	CS 205	**DATA STRUCTURES**	**CO1**	Compare different programming methodologies and define asymptotic notations to analyze performance of algorithms.

			CO2	Use appropriate data structures like array, linked list, stack and queue to solve real world problems.
			CO3	Represent and manipulate data using nonlinear data structures like Tree and Graph
			CO4	Illustrate and compare various techniques for searching and sorting
			CO5	Illustrate various hashing techniques
	CS207	ELECTRONIC DEVICES AND CIRCUITS	CO1	To understand applications of diodes and transistors
			CO2	To understand working of voltage regulators and FET
			CO3	To provide insight into the working , analysis and design of basic analog circuits using BJT and MOSFET
			CO4	Ability to analyze different types of operational amplifiers
			CO5	Understand different types of integrated circuits.
	HS 210	LIFE SKILLS	CO1	Communicate Effectively
			CO2	Make Effective Presentations
			CO3	Write different types of reports
			CO4	Face Interview and Group Discussion
			CO5	Critically think on a particular problem
			CO6	Solve Problems
			CO7	Work in groups and teams
			CO8	Handle engineering ethics and human values
			CO9	Become an effective leader
	CS 231	DATA STRUCRURES LAB	CO1	Appreciate the importance of structure and abstract data type, and their basic usability in different applications
			CO2	Analyze and differentiate different algorithms based on their time complexity.
			CO3	Implement linear and non-linear data structures using linked lists.
			CO4	Understand and apply various data structure such as stacks, queues, trees, graphs, etc. to solve various computing problems
			CO5	Implement various kinds of searching and sorting techniques, and decide when to choose which technique
			CO6	Identify and use a suitable data structure and algorithm to solve a real world problem

	CS 233	ELECTRONIC CIRCUITS LAB	CO1	Identify basic electronic components design and develop electronic circuits.	
			CO2	Design and demonstrate functioning of various discrete analog circuits.	
			CO3	Be familiar with computer simulation of electronic circuits and how to use it proficiency for design and development of electronic circuits.	
			CO4	Understand the concept and their application in engineering	
			CO5	Communicate effectively the scientific procedures and explanation in formal technical reports.	
	HS 200	BUSINESS ECONOMICS	CO1	To familiarize the prospective engineers with elementary Principles of Economics and Managerial Economics	
			CO2	To acquaint the students with tools and techniques that are useful in their profession in Managerial Decision Making which will enhance their employability	
			CO3	**To gain understanding of some Macroeconomic concepts to improve their ability to understand the business climate**	
			CO4	**To prepare and understand balance sheet at an elementary level.**	
	MA 202	PROBABILITY DISTRIBUTIONS, TRANSFORMS AND NUMERICAL METHODS	CO1	To introduce the concept of random variables, probability distributions, specific discrete and continuous distributions with practical application in various Engineering and social life situations.	
			CO2	To know Laplace and Fourier transforms which has wide application in all Engineering courses.	
			CO3	To enable the students to solve various engineering problems using numerical methods	
	CS 202	COMPUTER ORGANIZATION AND ARCHITECTURE	CO1	Students will be able to identify the basic structure and functional units of a digital computer.	
			CO2	Analyze the effect of addressing modes on the execution time of a program.	
			CO3	Design processing unit using the concepts of ALU and control logic design	
			CO4	Identify the pros and cons of different types of control logic design in processors.	
			CO5	Select appropriate interfacing standards for I/O devices.	
			CO6	Identify the roles of various functional units of a computer in instruction execution.	
S4	CS 204	OPERATING SYSTEMS	CO1	Identify the significance of operating system in computing devices.	
			CO2	Exemplify the communication between application programs and hardware devices through system calls	

			CO3	Compare and illustrate various process scheduling algorithms.
			CO4	Apply appropriate memory and file management schemes.
			CO5	Illustrate various disk scheduling algorithms.
			CO6	Appreciate the need of access control and protection in an operating system.
	CS206	OBJECT ORIENTED PROGRAMMI NG	CO1	To introduce basic concepts of object oriented design techniques.
			CO2	To give a thorough understanding of Java language.
			CO3	To provide basic exposure to the basics of multithreading, database connectivity etc.
			CO4	To impart the techniques of creating GUI based applications
	CS 232	FREE AND OPEN SOURCE SOFTWARE LAB	CO 1	Identify and apply various Linux commands
			CO 2	Develop shell scripts and GUI for specific needs
			CO 3	Use tools like GIT
			CO 4	Perform basic level application deployment, kernel configuration and installation, packet management and installation etc.
	CS 208	PRINCIPLES OF DATABASE DESIGN	CO1	define, explain and illustrate the fundumental concepts of databases
			CO2	construct an entity relationship model from specifications and to perform the transformation of the conceptual model in to corresponding logical data structures
			CO3	Model and design a relational database following the design principles
			CO4	Develop queries for relational database in the context of practical applications
			CO5	Define ,explain and illustrate fundumental principles of data organization, query optimization and concurrent transaction processing
			CO6	Appreciate the latest trends in database
	CS 234	DIGITAL SYSTEMLAB	CO1	identify and explain the digital ICs and their use in implementing digital circuits
			CO2	design and implement different kinds of digital circuits
S5	CS 301	THEORY OF COMPUTATIO N	CO1	Classify formal languages into regular, context-free, context sensitive and unrestricted languages.
			CO2	Design finite state automata, regular grammar, regular expression and Myhill- Nerode relation representations for regular languages.
			CO3	Design push-down automata and context-free grammar representations for context-free languages

			CO4	Design Turing Machines for accepting recursively enumerable languages.
			CO5	Understand the notions of decidability and undecidability of problems, Halting problem.
	CS 303	SYSTEM SOFTWARE	CO1	Students will be able to distinguish different software into different categories.
			CO2	Students will be able to design analyze and implement one pass, two pass or multipass assembler.
			CO3	Students will be able to design analyze and implement loader and linker.
			CO4	Students will be able to design analyze and implement macro processor.
			CO5	Students will be able to critique the features of morderen editing/ debugging tools.
	CS305	MICROPROCESSOR AND MICROCONTROLLERS	CO1	Describe differenI modes of operations of a apical microprocessor nnd microcontroller
			CO2	Design nnd develop 8086 assembly langunge programs using sofIu›are ititerrupts and various assembler directives
			CO3	Interface microprocessors with variou s external dmices
			CO4	Analyze rind compare the fentures of microprocessors andmicrocontrollers.
			CO5	Design mid dmelop assembly lnnguage yrogrnms using 8051microcontroller
	CS 307	DATA COMMUNICATION	CO 1	Identify and list various issues present in the design of a data communication system
			CO 2	Apply the time domain and frequency domain concepts of signals in data communication
			CO 3	Compare and select transmission media based on transmission impairments and channel capacity
			CO 4	Select and use appropriate signal encoding techniques and multiplexing techniques for a given scenario
			CO 5	Design suitable error detection and error correction algorithms to achieve error free data communication and explain different switching techniques
	CS 309	GRAPH THEORY	CO 1	Demonstrate the knowledge of fundamental concepts in graph theory, including properties and characterization of graphs and trees.
			CO 2	Use graphs for solving real life problems.
			CO 3	Distinguish between planar and non-planar graphs and solve problems.
			CO 4	Develop efficient algorithms for graph related problems in different domains of engineering and science.

	CS 361	**SOFT COMPUTING**	CO 1	Learn about soft computing techniques and their applications.
			CO 2	Analyze various neural network architectures.
			CO 3	Define the fuzzy systems.
			CO 4	Understand the genetic algorithm concepts and their applications.
			CO 5	Identify and select a suitable Soft Computing technology to solve the problem; construct a solution and implement a Soft Computing solution
	CS 341	**DEGIGN PROJECT**	CO1	The students will be able to understand the engineering aspects of design of product
			CO2	The students will be able to think innovatively on the development of components, products, processes or technologies in the engineering field.
			CO3	The student will be able to analyze the problem requirements and arrive at workable design solutions
	CS 331	**SYSTEM SOFTWARE LAB**	CO1	Compare and analyze the cpu scheduling algorithms like FCFS,Round Robin, SJF and Priority
			CO2	Implement basic memory management scheme like paging
			CO3	Implement Synchronization techniques using semaphore.
			CO4	Implement bakers algorithm for deadlock avoidance.
			CO5	Implement memory management and page replacement schemes for file allocation and organization techniques.
			CO6	Implement system software such as loaders, assemblers and macro processor.
	CS 333	**APPLICATION SOFTWARE DEVELOPMEN T LAB**	CO1	Design and implement a database for given problem using database design principles
			CO2	Apply stored programming concepts using cursors and Triggers
			CO3	Use Graphical user interface, event handling and database connectivity to develop and deploy applications and applets
			CO4	Develop medium sized project in a team
S6	**CS302**	**DESIGN AND ANALYSIS OF ALGORITHMS**	CO1	Analyze a given algorithm and express its time and space complexities in asymptotic notations.
			CO2	Solve recurrence equations using Iteration Method, Recurrence Tree Method and Master's Theorem.
			CO3	Design algorithms using Divide and Conquer Strategy.
			CO4	Compare Dynamic Programming and Divide and Conquer Strategies.

			CO5	Solve Optimization problems using Greedy strategy
			CO6	Design efficient algorithms using Back Tracking and Branch Bound Techniques for solving problems.
			CO7	Classify computational problems into P, NP, NP-Hard and NP-Complete.
	CS 304	COMPILER DESIGN	CO1	Students will be able to explain the concepts and different phases of compilation with compile time error handling
			CO2	Students will be able to represent language tokens using regular expressions, context free grammar and finite automata and design lexical analyzet fot a language.
			CO3	Students will be able to compare top down with bottom up parsers, and develop appropriate parser to produce parse tree representation ofthe input.
			CO4	Students will be able to generate intermediate code for statements in high level language.
			CO5	Students will be able to design syntax directed translation schemes for a given context free grammar
			CO6	Students will be able to apply optimization techniques to intermediate code and generate machine code for high level language program.
	CS306	COMPUTER NETWORKS	CO1	Visualise the different aspects of networks,protocols and network design models
			CO2	Examine various Data Link layer design issues and DataLink protocols
			CO3	Analyse and compare different LAN protocols
			CO4	Compare and select appropriate routing algorithms for a network
			CO5	Examine the important aspects and functions of network layer,transport layer and application layer in internetworking
	CS 308	SOFTWARE ENGINEERIN G	CO1	Identify suitable life cycle models to be used
			CO2	Analyze a problem and identify and define the computing requirements to the problem
			CO3	Translate a requirement specification to a design using an appropriate software engineering methodology
			CO4	Formulate appropriate testing strategy for the given software system.
			CO5	Develop software projects based on current technology, by managing resources economically and keeping ethical values
	HS 300	PRINCIPLES OF	CO1	To recall and identify the relavance of management concepts
			CO2	To discribe, discuss and relate management techniques adopted within an organization.

		MANAGEMENT	CO3	To apply management techniques for meeting current and future management challenges faced by an organization.
			CO4	To compare the management theories and models critically and to inspect and question its validity in the real world.
			CO5	To access and modify different theories of management so as to relate it to current management challenges.
			CO6	To apply principles of management inorder to execute the role as a manager.
	CS 368	**WEB TECHNOLOGY**	CO1	To impart the design, development and implementation of Dynamic Web Pages.
			CO2	To develop programs for Web using Scripting Languages.
			CO3	To give an introduction to Data Interchange formats in Web
	CS 332	**MICROPROCESSOR LAB**	CO1	Develop Assembly Language programs for problem solving using interrupts and assembler directives.
			CO2	Implementation of interfacing of various I/O devices for Microprocessors and Microcontrollers.
	CS 334	**NETWORK PROGRAMMING LAB**	CO1	To introduce Network related commands and configuration files in Linux Operating System.
			CO2	To introduce tools for Network Traffic Analysis and Network Monitoring.
			CO3	To practice Network Programming using Linux System Calls
			CO4	To design and deploy Computer Networks.
	CS 352	**COMPREHENSIVE EXAM**	CO 1	To assess the comprehensive knowledge gained in basic courses relevent to the branch of study.
			CO 2	To comprehend the questions asked and answer them with confidence.
	CS 364	**MOBILE COMPUTING**	CO1	To impart basic understanding of the wireless communication systems.
			CO2	To expose students to various aspects of mobile and ad-hoc networks.
S7	**CS 401**	**COMPUTER GRAPHICS**	CO1	Compare various graphics devices
			CO2	Analyse and implement algorithms for line drawing, circle drawing and polygon filling
			CO3	Apply geometrical transformations on 2D and 3 D objects
			CO4	Analyse and implement algorithms for clipping
			CO5	Apply various projection techniques on 3D objects
			CO6	Summarize visible surface detection methods

			CO7	Interpret various concepts and basics of image processing
	CS 403	PROGRAMMING PARADIGMS	CO1	To introduce the basic constructs that underlie all programming languages
			CO2	To introduce the basics of programming language design and implementation
			CO3	To introduce the organizational framework for learning new programming languages.
	CS 405	COMPUTER SYSTEM ARCHITECTURE	CO1	Summarize different parallel computer models
			CO2	Analyze the advanced processor technologies
			CO3	Interpret memory hierarchy
			CO4	Compare different multiprocessor system interconnecting mechanisms
			CO5	Interpret the mechanisms for enforcing cache coherence
			CO6	Analyze different message passing mechanisms L
			CO7	Analyze different pipe lining techniques
			CO8	Appraise concepts of multithreaded and data flow architectures
	CS 407	DISTRIBUTED COMPUTING	CO1	Distinguish distributed computing paradigm from other computing paradigms.
			CO2	Identify the core concepts of distributed systwems.
			CO3	Illustrate the mechanism of inter process communication in distributed system.
			CO4	Apply appropriate distributed system principles in ensuring transparency, concurrency and fault tolerance in distributed file system.
			CO5	Compare the concurrency control mechanisms in distributed transactional environment.
			CO6	Outline the need for mutual exclusion and election algorithms in distributed systems.
	CS 409	CRYPTOGRAPHY AND NETWORK SECURITY	CO1	Summarize different classical encryption techniques
			CO2	Identify mathematical l concepts for different cryptographic algorithms
			CO3	Demonstrate different cryptographic algorithms for cryptographic algorithms
			CO4	Summarize different authentication and digital signatute schemes
			CO5	Identify security issues in network, transport and application layers and outline appropriate security protocols.
	CS 463	DIGITAL IMAGE PROCESSING	CO 1	compare different methods for image acquisition, storage and representation in digital devices and computers

			CO 2	appreciate role of image transforms in representing, highlighting, and modifying image features
			CO 3	interpret the mathematical principles in digital image enhancement and apply them in spatial domain and frequency domain
			CO 4	apply various methods for segmenting image and identifying image components
			CO 5	summarise different reshaping operations on the image and their practical applications
			CO 6	identify image representation techniques that enable encoding and decoding images
	CS 467	MACHINE LEARNING	CO1	Able to differentiate various learning approaches, and to interpret the concepts of supervised learning
			CO2	Understand different dimensionality reduction techniques
			CO3	Can apply theoretical foundations of decision trees to identify best split and Bayesian classifier to label data points
			C04	Can understand the working of classifier models like SVM, Neural Networks and identify classifier model for typical machine learning Applications
			C05	Can identify the state sequence and evaluate a sequence emission probability from a given HMM
			C06	Understand clustering algorithms and identify its applicability in real life problems
	CS 451	SEMINAR AND PROJECT PRILIMINARY	CO 1	Prepare comprehensive report based on literature survey/Topics related to different subjects in the semester
			CO 2	Identify the applicability of modern software tools and technology
			CO 3	Deliver presentation based on preparation
			CO 4	Answer queries posted by the listeners
			CO 5	Correct himself to improve presentation skills
	CS 431	COMPILER DESIGN LAB	CO1	To implement the different Phases of compiler.
			CO2	To implement and test simple optimization techniques.
			CO3	To give exposure to compiler writing tools.
	CS402	DATA MINING ANDWAREHO USING	CO 1	identify the key process of Data mining and Warehousing
			CO 2	apply appropriate techniques to convert raw data into suitable format for practical data mining tasks
			CO 3	analyze and compare various classification algorithms and apply in appropriate domain

			CO 4	evaluate the performance of various classification methods using performance metrics
			CO 5	make use of the concept of association rule mining in real world scenario
			CO 6	select appropriate clustering and algorithms for various applications
			CO 7	extend data mining methods to the new domains of data
	CS404	EMBEDDED SYSTEMS	CO 1	Demonstrate the role of individual components involved in a typical embedded system.
			CO 2	Analyze the characteristics of different computing elements and select the most appropriate one for an embedded system.
			CO 3	Model the operation of a given embedded system
			CO 4	Substantiate the role of different software modules in the development of an embedded system
			CO 5	Develop simple tasks to run on an RTOS
			CO 6	Examine the latest trends prevalent in embedded system design.
	CS 472	PRINCIPLES OF INFORMATIO N SECURITY	CO 1	Appreciate the common threats faced today
			CO2	Interpret the fundamental theory behind information security
			CO3	Design a secure system
			CO4	Identify the potential vulnerabilities in software
			CO5	Appreciate the relevance of security in various domains
			CO6	Develop secure web services and perform secure E-transactions
	CS468	CLOUD COMPUTING	CO1	Identify the significance of implementing virtualization techniques
			CO2	interpret the various cloud computing models and services
			CO3	compare the various public cloud platforms and software environments
			CO4	apply appropriate cloud programming methods to solve big data problems
			CO5	appreciae the need of security mechanisms in cloud
			CO6	illustrate the use of various cloud services avaliable online
	CS 466	DATA SCIENCE	CO1	Able to understand the significance of data science and its key functionalities
			CO2	Understand various models suitable for data science
			CO3	Able to perform preliminary statistical analysis using R language on simple data sets
			CO4	perform python-based predication and filtering on simple data sets

			CO5	Understand and perform Hadoop and Map-Reduce for data analysis
			CO6	Understand and perform data visualization techniques at a basic level
			CO1	Get general idea about hazards and disaster.
			CO2	Get general idea about earthquakes and landslides.
			CO3	Get general idea about floods and coastal disaster.
			CO4	Get general idea about Soil and soil degradation.
	CE 488	**DISASTER MANAGEMEN T**	CO5	Understand the concept of disaster management and measures to mitigate and contain common episodes of disasters.
			CO1	Apply fundamental and disciplinary concepts and methods in ways appropriate to their principal areas of study
			CO2	Think innovatively on the development of components, products, processes or technologies in the engineering field
	CS 492	**PROJECT**	CO3	Apply knowledge gained in solving real life engineering problems
	01CS6101	**MATHEMATI CAL FOUNDATION S OF COMPUTING SYSTEMS**	**CO 1**	Conceptual understanding of the above topics and ability to apply them in practical situations.
		TOPICS IN DATABASE TECHNOLOG Y	**CO 1**	To understand the implementation and management aspects of databases.
			CO 2	to understand the principles of distributed databases
			CO 3	To understand object based data models and their implementation.
	01CS6103		**CO 4**	To understand the recent advances in database technology.
		ADVANCED DATA STRUCTURES AND ALGORITHMS	**CO1**	Get deep conceptual understanding of advanced data structures and their applications
			CO2	Understand the theory behind various classes of algorithms.
	01CS6105		**CO3**	be able to design, prove the correctness and analyze new algorithms
		ADVANCED SOFTWARE	**CO 1**	To study the concepts and principles in Software Engineering.
M1	01CS6107		**CO 2**	To concentrate on engineering principles to apply for building quality software.

		ENGINEERING	CO 3	To design a software
			CO 4	To create a reliable software
			CO 5	To provide the necessary methods for testing the software.
	1CS6157	**IMAGE PROCESSING**	CO 1	To get deeper understanding of principles and techniques and algorithms for digital image processing
			CO 2	Be able to apply these techniques in practical scenarios
	01CS6193	**ALGORITHM DESIGN LABORATORY**	CO1	Can able to implement various advanced data structure Algorithms
	01CS6999	**RESEARCH METHODOLOGY**	CO1	Understand research concepts in terms of identifying the research problems
			CO2	Propose possible solutions based on research
			CO3	Write a technical paper based on findings
	01CS6191	**SEMINAR I**	CO1	To identify the current topics in the specific stream
			CO2	Collect recent publications related to identified topics
			CO3	Do a detailed study of a selected topic based on current journals, published papers and books
			CO4	Present a seminar on the selected topic on which a detailed study has been done
			CO5	Improve the writing and presentation skills
M2	01CS6102	**PARALLEL COMPUTER ARCHITECTURE**	CO1	Indepth knowledge in Measuring performane of processors
			CO2	Indepth knowledge in Instruction level parallelism
			CO3	Indepth knowledge in Vector Architecture
			CO4	Indepth knowledge in Multiprocessor systems and cache coherence
			CO5	Indepth knowledge in Interconnection networks
	01CS6104	**OPERATING SYSTEM DESIGN**	CO 1	Understand basic concepts of process management,scheduling and system calls in Linux
			CO 2	Understand interrupts and interrupt handlers, bottom halves and understand the way in which the different constructs are used
			CO 3	Understand different kernel synchronization methods
			CO 4	Understand Timers and Time Management, Jiffies,, Memory Management, Slab layer
			CO 5	Understand the Block I/O Layer, I/O Schedulers and portability

			CO 6	Understand Distributed processing, Distributed process management, distributed mutual exclusion and distributed deadlock
	01CS6104	ADVANCED COMPUTER NETWORKS	CO 1	To impart a deeper understanding of protocols, quality of service
			CO 2	Understand about congestion management, wireless transmission and compression
			CO 3	To analyze the issues of transmitting real time data
			CO 4	To identify the technologies that can transmit data efficiently
	01CS6154	SOFT COMPUTING	CO 1	Understand basic concepts in Artificial Neural Networks
			CO 2	Understand basic concepts in Fuzzy Logic
			CO 3	Understand basic concepts in Genetic Algorithm
			CO 4	Able to apply soft computing techniques to research problems
	01CS6176	CYBER LAWS AND ETHICS	CO1	Awareness of the different forms of IPR's and related rules and regulations, and of the laws applicable to computer and software related contracts.
			CO2	Exposure to different forms of Cyber crimes and the Indian and International laws to combat Cyber crimes and facilitate e-commerce.
			CO3	Capability to reason out different situations of ethics faced in the cyber world.
	01CS6192	MINI PROJECT	CO1	To design and develop a system or application in the area of their specialization
	01CS6194	NETWORK AND OS LAB	CO 1	Identify and solve various problems associated with designing and implementing a system or application.
			CO 2	Test the designed system or application.
	01CS7157	ADHOC AND SENSOR NETWORKS	CO 1	Familiar with the main standards and specifications of WSNs and identifies the key building blocks for them
			CO 2	Define and explain the essential challenges of resource constrained WSN design and implementation, including applications, interfaces, energy efficient protocols and platform functionalities.
M3	01CS7177	ADVANCED SOFTWARE PROJECT	CO1	Explain and exemplify to the different stages of planning a software project and managing it
			CO2	Capability to plan a large software project and to effectively monitor and control it.

		MANAGEMENT			
	01CS7191	**SEMINAR II**	CO 1	Get good exposure in the current topics in the specific stream
			CO 2	Improve the writing and presentation skills.
			CO 3	Explore domains of interest so as to pursue the course project.
	01CS7193	**PROJECT PHASE I**	CO 1	Identify the topic, objectives and methodology to carry out the project.
			CO 2	Finalize the project plan for their course project.
M4	**01CS 7194**	**PROJECT PHASE II**	CO 1	Get a good exposure to a domain of interest.
			CO 2	Get a good domain and experience to pursue future research activities.