

**Students performance and learning outcome**

**DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING**

**Course outcomes**

**SEMESTER - 1 & 2**

Course code	Course Name	Course outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	
MAT 101	LINEAR ALGEBRA AND CALCULUS	CO 1 solve systems of linear equations, diagonalize matrices and characterise	3	3	3	3	2	1			1	2		2	
		CO 2 compute the partial and total derivatives and maxima and minima of	3	3	3	3	2	1			1	2		2	
		CO 3 compute multiple integrals and apply them to find areas and volumes of geometrical shapes, mass and centre of gravity of plane laminas	3	3	3	3	2	1			1	2		2	
		CO 4 perform various tests to determine whether a given series is convergent, absolutely convergent or conditionally convergent	3	2	3	2	1	1			1	2		2	
		CO 5 Determine the Taylor and Fourier series expansion of functions and learn	3	3	3	3	2	1			1	2		2	
PHT 100	ENGINEERING PHYSICS A (FOR CIRCUIT BRANCHES)	CO 1 Compute the quantitative aspects of waves and oscillations in engineering systems.	3	2						1	2			1	
		CO 2 Apply the interaction of light with matter through interference, diffraction and identify these phenomena in different natural optical processes and optical instruments.	3	2							1	2			1
		CO 3 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.	3	2							1	2			1
		CO 4 Classify the properties of magnetic materials and apply vector calculus to static magnetic fields and use Maxwell's equations to diverse engineering problems	3	1							1	2			1
		CO 5 Analyze the principles behind various superconducting applications, explain the working of solid state lighting devices and fibre optic communication system	3	1							1	2			1
CYT 100	ENGINEERING CHEMISTRY	CO 1 Apply the basic concepts of electrochemistry and corrosion to explore its possible applications in various engineering fields.	1	2	1										
		CO 2 Understand various spectroscopic techniques like UV-Visible, IR, NMR and its applications.	1	1		1	2								
		CO 3 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.	1	1		1	2								
		CO 4 Learn about the basics of stereochemistry and its application. Apply the knowledge of conducting polymers and advanced polymers in engineering.	2	1											
		CO 5 Study various types of water treatment methods to develop skills for treating wastewater.	1			1				3					



EST 130	BASICS OF ELECTRICAL AND ELECTRONICS ENGINEERING	CO 1	Apply fundamental concepts and circuit laws to solve simple DC electric circuits	3	1														2	
		CO 2	Develop and solve models of magnetic circuits	3	1															2
		CO 3	Apply the fundamental laws of electrical engineering to solve simple ac circuits in steady state	3	1															2
		CO 4	Describe working of a voltage amplifier	2																
		CO 5	Outline the principle of an electronic instrumentation system	2																2
		CO 6	Explain the principle of radio and cellular communication	2																2
HUN 101	LIFE SKILLS	CO 1	Define and Identify different life skills required in personal and professional l							2		1	2	2	1			3		
		CO 2	Develop an awareness of the self and apply well-defined techniques to cope with emotions										3						2	
		CO 3	Explain the basic mechanics of effective communication and demonstrate these through						1				1	3						
		CO 4	Take part in group discussions											3					1	
		CO 5	Use appropriate thinking and problem solving techniques to solve new problems		3		2	1												
		CO 6	Understand the basics of teamwork and leadership						1				3							
MAT 102	VECTOR CALCULUS, DIFFERENTIAL EQUATIONS AND TRANSFORMS	CO 1	Compute the derivatives and line integrals of vector functions and learn their applications	3	3	3	3	2	1			1	2					2		
		CO 2	Evaluate surface and volume integrals and learn their inter-relations and applications	3	3	3	3	2	1			1	2						2	
		CO 3	Solve homogeneous and non-homogeneous linear differential equation with constant	3	3	3	3	2	1			1	2						2	
		CO 4	Compute Laplace transform and apply them to solve ODEs arising in engineering	3	3	3	3	2	1			1	2						2	
		CO 5	Determine the Fourier transforms of functions and apply them to solve problems arising in engineering	3	3	3	3	2	1			1	2						2	
HUN 102	PROFESSIONAL COMMUNICATI ON	CO 1	Develop vocabulary and language skills relevant to engineering as a profession										3					2		
		CO 2	Analyze, interpret and effectively summarize a variety of textual content										1					3		
		CO 3	Create effective technical presentations						1			1	3							
		CO 4	Discuss a given technical/non-technical topic in a group setting and arrive at generalizations/consensus										3						1	
		CO 5	Identify drawbacks in listening patterns and apply listening techniques for specific needs		1								2	3						
		CO 6	Create professional and technical documents that are clear and adhering to all the necessary conventions	1					1				1	3						

EST 102	PROGRAMING IN C	CO 1	Analyze a computational problem and develop an algorithm/flowchart to find its solution	3	2	3	2		2				1	1	1	
		CO 2	Develop readable C programs with branching and looping statements, which uses Arithmetic, Logical, Relational or Bitwise operators.	3	2	3	2	2						1		1
		CO 3	Write readable C programs with arrays, structure or union for storing the data to be processed	3	2	3	2	2						1		1
		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	3	2	3	2	2						1	1	1
		CO 5	Write readable C programs which use pointers for array processing and parameter passing	3	2			2						1		1
		CO 6	Develop readable C programs with files for reading input and storing output	3	2			2						1		1
PHL 120	ENGINEERING PHYSICS LAB	CO 1	Develop analytical/experimental skills and impart prerequisite hands on experience for engineering laboratories					3			1	2			1	
		CO 2	Understand the need for precise measurement practices for data recording					3			1	2			1	
		CO 3	Understand the principle, concept, working and applications of relevant technologies and comparison of results with theoretical calculations					3			1	2			1	
		CO 4	Analyze the techniques and skills associated with modern scientific tools such as lasers and fiber optics					3			1	2			1	
		CO 5	Develop basic communication skills through working in groups in performing the laboratory					3			1	2			1	
CYL 120	ENGINEERING CHEMISTRY LAB	CO 1	Understand and practice different techniques of quantitative chemical analysis to generate experimental skills and apply these skills to various	3				2								
		CO 2	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	3				3								
		CO 3	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	3				3								
		CO 4	Acquire the ability to understand, explain and use instrumental techniques for chemical analysis	3				3								
		CO 5	Learn to design and carry out scientific experiments as well as accurately record and analyze the results of such experiments	3				1								
		CO 6	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	3				1								

ESL 120	CIVIL & MECHANICAL WORKSHOP	CO 1	Name different devices and tools used for civil engineering measurements	1				1	1			2	2		
		CO 2	Explain the use of various tools and devices for various field measurements	1				1	1			2	2		
		CO 3	Demonstrate the steps involved in basic civil engineering activities like plot measurement, setting out operation, evaluating the natural profile of land, plumbing	1				1	1		2	2	2	1	
		CO 4	Choose materials and methods required for basic civil engineering activities like field measurements, masonry work and plumbing.	1				1	1		2	2	2	1	1
		CO 5	Compare different techniques and devices used in civil engineering	1				1	1			2	2		1
		CO 6	Identify Basic Mechanical workshop operations in accordance with the material and objects	1											
		CO 7	Apply appropriate Tools and Instruments with respect to the mechanical	2											
		CO 8	Apply appropriate safety measures with respect to the mechanical workshop t	2											
ESL 130	ELECTRICAL & ELECTRONICS WORKSHOP	CO 1	Demonstrate safety measures against electric shocks						3						1
		CO 2	Identify the tools used for electrical wiring, electrical accessories, wires, cables, batteries	2									1		
		CO 3	Develop the connection diagram, identify the suitable accessories and materials necessary for wiring simple lighting circuits for domestic buildings	2			1		1		1	2	2		2
		CO 4	Identify and test various electronic components	3											2
		CO 5	Draw circuit schematics with EDA tools	3				2							2
		CO 6	Assemble and test electronic circuits on boards	3				2							1
		CO 7	Work in a team with good interpersonal skills									3	2		2

### SEMESTER - 3

Course code	Course Name	Course outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	
MAT203	DISCRETE MATHEMATICS	CO 1	Check the validity of predicates in Propositional and Quantified Propositional Logic	2	2	2	2								
		CO 2	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	2	2	2	2								
		CO 3	Classify binary relations into various types and illustrate an application for each type	2	2	2	2		1						1
		CO 4	Explain Generating Functions and solve First Order and Second Order Linear Recurrence Relations with Constant Coefficients	2	2	2	2		1						1
		CO 5	Illustrate the abstract algebraic systems - Semigroups, Monoids, Groups, Homomorphism and Isomorphism of Monoids and Groups	2	2	2	2		1						1



EST 200	DESIGN AND ENGINEERING	CO 1	Explain the different concepts and principles involved in design engineering.	2	1					1			1			
		CO 2	Apply design thinking while learning and practicing engineering.		2				1		1					2
		CO 3	Develop innovative, reliable, sustainable and economically viable designs incorporating knowledge in engineering.			2			1	1		2	2			1
HUT 200	PROFESSIONAL ETHICS	CO 1	Understand the core values that shape the ethical behaviour of a professional.							2				2		
		CO 2	Adopt a good character and follow an ethical life.							2					2	
		CO 3	Explain the role and responsibility in technological development by keeping personal ethics and legal ethics.								3					2
		CO 4	Solve moral and ethical problems through exploration and assessment by established experiments.								3					2
		CO 5	Apply the knowledge of human values and social values to contemporary ethical values and global issues.								3					2
MCN201	SUSTAINABLE ENGINEERING	CO 1	Understand the relevance and the concept of sustainability and the global initiatives in this direction						2	3					2	
		CO 2	Explain the different types of environmental pollution problems and their sustainable solutions						2	3						2
		CO 3	Discuss the environmental regulations and standards						2	3						2
		CO 4	Outline the concepts related to conventional and non-conventional energy						2	3						2
		CO 5	Demonstrate the broad perspective of sustainable practices by utilizing engineering knowledge and principles						2	3						2
CSL 201	DATA STRUCTURES LAB	CO 1	Write a time/space efficient program using arrays/linked lists/trees/graphs to provide necessary functionalities meeting a given set of user requirements	3	2	3	3		2		1		1		2	
		CO 2	Write a time/space efficient program to sort a list of records based on a given key in the record	3	2	3	2				1		1		2	
		CO 3	Examine a given Data Structure to determine its space complexity and time complexities of operations on it	2	2	3	2				1		1		2	
		CO 4	Design and implement an efficient data structure to represent given data	2	2	3	2				1		1		2	
		CO5	Write a time/space efficient program to convert an arithmetic expression from one notation to another	1	1	2					1		1		1	
		CO 6	Write a program using linked lists to simulate Memory Allocation and Garbage Collection	1	1	2					1		1		1	
CSL 203	OBJECT ORIENTED PROGRAMMING LAB (IN JAVA)	CO 1	Implement the Object Oriented concepts - constructors, inheritance, method overloading & overriding and polymorphism in Java	3	3	3					2				2	
		CO 2	Implement programs in Java which use datatypes, operators, control statements, built in packages & interfaces, Input/Output streams and Files	3	3	3					2				2	
		CO 3	Implement robust application programs in Java using exception handling	3	3	3					2				2	

CSL 203	OBJECT ORIENTED PROGRAMMING LAB (IN JAVA)	CO 4	Implement application programs in Java using multithreading and database connectivity	3	3	3					2				2
		CO 5	Implement Graphical User Interface based application programs by utilizing event handling features and Swing in Java	3	3	3					2				

**SEMESTER - 4**

Course code	Course Name	Course outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
MAT 206	GRAPH THEORY	CO 1	Explain vertices and their properties, types of paths, classification of graphs and trees & their properties.	3	3	3	3	3	2	2	2	1	2	1
		CO 2	Demonstrate the fundamental theorems on Eulerian and Hamiltonian graphs.	3	3	3	3	3	2	2	2	1	1	1
		CO 3	Illustrate the working of Prim's and Kruskal's algorithms for finding minimum cost spanning tree and Dijkstra's and Floyd-Warshall algorithms	3	3	3	3	2	3	3	3	1	1	2
		CO 4	Illustrate how one can represent a graph in a computer.	3	2	3	3	2	3	3	3	2	1	1
		CO5	Explain the Vertex Color problem in graphs and illustrate an example application	3	2	2			3				2	2
CST 202	COMPUTER ORGANIZATION AND ARCHITECTURE	CO 1	Recognize and express the relevance of basic components, I/O organization and pipelining schemes in a digital computer	2	2	2	1							2
		CO 2	Explain the types of memory systems and mapping functions used in memory systems	3	2	2	1						1	2
		CO 3	Demonstrate the control signals required for the execution of a given instruction	3	2	2	1						1	2
		CO 4	Illustrate the design of Arithmetic Logic Unit and explain the usage of registers in it	3	2	2	1						1	2
		CO 5	Explain the implementation aspects of arithmetic algorithms in a digital computer	3	2	2							1	2
		CO 6	Develop the control logic for a given arithmetic problem	3	2	2	1							2
CST 204	DATABASE MANAGEMENT SYSTEMS	CO 1	Summarize and exemplify fundamental nature and characteristics of database systems	2	2	2								1
		CO 2	Model real word scenarios given as informal descriptions, using Entity Relationship diagrams.	2	2	2	2							1
		CO 3	Model and design solutions for efficiently representing and querying data using relational model	2	2	2	2							1
		CO 4	Demonstrate the features of indexing and hashing in database applications	2	2	2							2	1
		CO 5	Discuss and compare the aspects of Concurrency Control and Recovery in Database	2	2	2							2	1
		CO 6	Explain various types of NoSQL databases	1	2	2		3					2	1



CST 206	OPERATING SYSTEMS	CO 1	Explain the relevance, structure and functions of Operating Systems in computing devices.	2	1	1							2		3			
		CO 2	Illustrate the concepts of process management and process scheduling mechanisms	3	3	3	3							2		3		
		CO 3	Explain process synchronization in Operating Systems and illustrate process synchronization mechanisms using Mutex Locks, Semaphores and Monitors	3	3	3	3								2		3	
		CO 4	Explain any one method for detection, prevention, avoidance and recovery for managing deadlocks in Operating Systems.	3	3	3	3								2		3	
		CO 5	Explain the memory management algorithms in Operating Systems.	3	2	3	2								2		3	
		CO 6	Explain the security aspects and algorithms for file and storage management in Operating Systems.	2	2	1	1								2		3	
EST 200	DESIGN AND ENGINEERING	CO 1	Explain the different concepts and principles involved in design engineering.	2	1					1				1				
		CO 2	Apply design thinking while learning and practicing engineering		2					1		1					2	
		CO 3	Develop innovative, reliable, sustainable and economically viable designs incorporating knowledge in engineering.			2				1	1		2	2			1	
HUT 200	PROFESSIONAL ETHICS	CO 1	Understand the core values that shape the ethical behaviour of a professional.									2			2			
		CO 2	Adopt a good character and follow an ethical life.									2				2		
		CO 3	Explain the role and responsibility in technological development by keeping personal ethics										3				2	
		CO 4	Solve moral and ethical problems through exploration and assessment by established experiments.										3				2	
		CO 5	Apply the knowledge of human values and social values to contemporary ethical values and global issues.										3				2	
MCN202	CONSTITUTION OF INDIA	CO 1	Explain the background of the present constitution of India and features							2	2	2		2				
		CO 2	Utilize the fundamental rights and duties.							3	3	3		3				
		CO 3	Understand the working of the union executive, parliament and judiciary.							3	2	3		3				
		CO 4	Understand the working of the state executive, legislature and judiciary.							3	2	3		3				
		CO 5	Utilize the special provisions and statutory institutions.							3	2	3		3				
		CO 6	Show national and patriotic spirit as responsible citizens of the country							3	3	3		2				
CSL 202	DIGITAL LAB	CO 1	Design and implement combinational logic circuits using Logic Gates	3	3	3	2					2				3		
		CO 2	Design and implement sequential logic circuits using Integrated Circuits	3	3	3	2					2					3	
		CO 3	Simulate functioning of digital circuits using programs written in a Hardware	3	3	3	2	3				2					3	
		CO 4	Function effectively as an individual and in a team to accomplish a given	3	3	3	2					2	3				3	
CSL 204	OPERATING SYSTEMS LAB	CO 1	Illustrate the use of systems calls in Operating Systems.	3	3	3						1		1		2		
		CO 2	Implement Process Creation and Inter Process Communication in Operating Systems.	3	3	3						1		1			2	
		CO 3	Implement First Come First Served, Shortest Job First, Round Robin and	3	3	3	2					1		1			2	

CSL 204	OPERATING SYSTEMS LAB	CO 4	Illustrate the performance of First In First Out, Least Recently Used and Least Frequently Used Page Replacement Algorithms.	3	3	3	2				1		1		2
		CO 5	Implement modules for Deadlock Detection and Deadlock Avoidance in Operating Systems.	3	3	3	2				1		1		2
		CO 6	Implement modules for Storage Management and Disk Scheduling in Operating Systems.	3	3	3	2				1		1		1

**SEMESTER - 5**

Course code	Course Name	Course outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	
CST 301	FORMAL LANGUAGES AND AUTOMATA THEORY	CO 1	Classify a given formal language into Regular, Context-Free, Context Sensitive, Recursive or Recursively Enumerable.	3	3	3								3	
		CO 2	Explain a formal representation of a given regular language as a finite state automaton, regular grammar, regular expression and Myhill-Nerode relation.	3	3	3	3								3
		CO 3	Design a Pushdown Automaton and a Context-Free Grammar for a given context-free language.	3	3	3	3								3
		CO 4	Design Turing machines as language acceptors or transducers.	3	2	3	3								3
		CO 5	Explain the notion of decidability.	3	3	3	3								3
CST303	COMPUTER NETWORKS	CO 1	Explain the features of computer networks, protocols, and network design models	2	2										
		CO 2	Describe the fundamental characteristics of the physical layer and identify the usage in network communication	2	2	2									
		CO 3	Explain the design issues of data link layer, link layer protocols, bridges and switches	2	3	3									
		CO 4	Illustrate wired LAN protocols (IEEE 802.3) and wireless LAN protocols (IEEE 802.11)	2	2	3									
		CO5	Select appropriate routing algorithms, congestion control techniques, and Quality of Service requirements for a network	2	2	2	2								
		CO 6	Illustrate the functions and protocols of the network layer, transport layer, and application layer in inter-networking	2	2	2			2						
CST 305	SYSTEM SOFTWARE	CO 1	Distinguish softwares into system and application software categories.	2	2			2						2	
		CO 2	Identify standard and extended architectural features of machines.	2	2	2								2	
		CO 3	Identify machine dependent features of system software	2	2	2								2	
		CO 4	Identify machine independent features of system software.	2	2									2	
		CO 5	Design algorithms for system softwares and analyze the effect of data structures.	2	2	2	2							2	
		CO 6	Understand the features of device drivers and editing & debugging tools.	2	2			2						2	







CST 322	DATA ANALYTICS	CO 1	Illustrate the mathematical concepts for data analytics	2	3	2									2	
		CO 2	Explain the basic concepts of data analytics	2	3	2	2									2
		CO 3	Illustrate various predictive and descriptive analytics algorithms	2	3	2	2									2
		CO 4	Describe the key concepts and applications of Big Data Analytics	2	3	2	2									2
		CO5	Demonstrate the usage of Map Reduce paradigm for Big Data Analytics	2	3	2	2	2								2
		CO 6	Use R programming tool to perform data analysis and visualization	2	3	2	2	2								2
CST362	PROGRAMMING IN PYTHON	CO 1	Write, test and debug Python programs	3	3	3		3							3	
		CO 2	Illustrate uses of conditional (if, if-else and if-elif-else ) and iterative (while and for) statements in Python programs.	3	3	3										3
		CO 3	Develop programs by utilizing the Python programming constructs such as Lists,Tuples, Sets and Dictionaries.	3	3	3	2	3								3
		CO4	Develop graphical user interface for solutions using Python libraries.	3	3	3	1	3								2
		CO5	Implement Object Oriented programs with exception handling.	3	3	3	1	3								3
		CO6	Write programs in Python to process data stored in files by utilizing Numpy, Matplotlib, and Pandas.	3	3	3	3	3	2							2
CSL 332	NETWORKING LAB	CO 1	Use network related commands and configuration files in Linux Operating	3	3	3				2		2			2	
		CO 2	Develop network application programs and protocols.	3	3	3	3			2		2				2
		CO 3	Analyze network traffic using network monitoring tools.	3	3	3	3	2		2		2				2
		CO 4	Design and setup a network and configure different network protocols.	3	3	3	3	2	2	2		2				2
		CO 5	Develop simulation of fundamental network concepts using a network	3	3	3	3	2		2		2				2
CSD 334	MINI PROJECT	CO 1	Identify technically and economically feasible problems	3	3	3	2	3		3	3	3	3	2	2	
		CO 2	Identify and survey the relevant literature for getting exposed to related solutions and get familiarized with software development processe	3	2	3	2	3	2	3		3	3	2	2	
		CO 3	Perform requirement analysis, identify design methodologies and develop adaptable & reusable solutions of minimal complexity by using modern tools & advanced programming techniques	3	3	3	2	3	2	3	2	3	3	2	2	
		CO4	Prepare technical report and deliver presentation	3	3	3	2	3	2			3	3	2	3	
		CO5	Apply engineering and management principles to achieve the goal of the project	3	2	3	2	3	2	3	2	3	3	2	3	

SEMESTER - 7

Course code	Course Name	Course outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	
CST 401	ARTIFICIAL INTELLIGENCE	CO 1	Explain the fundamental concepts of intelligent systems and their architecture.	3											
		CO 2	Illustrate uninformed and informed search techniques for problem solving in intelligent systems.	3	2									3	
		CO 3	Solve Constraint Satisfaction Problems using search techniques.	3	2	2	3								3
		CO 4	Represent AI domain knowledge using logic systems and use inference techniques for reasoning in intelligent systems.	2	1	2	3								3
		CO 5	Illustrate different types of learning techniques used in intelligent systems	2	2			3							3
MCN 401	INDUSTRIAL SAFETY ENGINEERING	CO 1	Describe the theories of accident causation and preventive measures of industrial accidents.	2	2				2	2	2			1	
		CO 2	Explain about personal protective equipment, its selection, safety performance & indicators and importance of housekeeping.	2	1	2		1	1	1	1				1
		CO 3	Explain different issues in construction industries.	2	2	2		1	1	1	1	1	1		1
		CO 4	Describe various hazards associated with different machines and mechanical material handling.	2	2	2		1	1	1	1	1	1		1
		CO 5	Utilise different hazard identification tools in different industries with the knowledge of different types of chemical hazards.	2	2	2	1	1	1	1	1	1	1		1
CST 423	CLOUD COMPUTING	CO 1	Explain the various cloud computing models and services.	2										1	
		CO 2	Demonstrate the significance of implementing virtualization techniques.	2	2	3								1	
		CO 3	Explain different cloud enabling technologies and compare private cloud platforms	2											1
		CO 4	Apply appropriate cloud programming methods to solve big data problems.	2	2	3	2	2							1
		CO5	Describe the need for security mechanisms in cloud	2	2										1
		CO 6	Compare the different popular cloud computing platforms	2				2							1
CST 433	SECURITY IN COMPUTING	CO 1	Identify the security services provided against different types of security attacks.	3	3	3								3	
		CO 2	Illustrate classical encryption techniques for information hiding.	3	3	2									3
		CO 3	Illustrate symmetric/asymmetric key cryptosystems for secure communication.	3	3	3		2							3
		CO 4	Explain message integrity and authentication methods in a secure communication scenario.	3	3	3			2						3

CST 433	SECURITY IN COMPUTING	CO5	Interpret public/secret key distribution techniques for secure communication.	3	3	3									3
		CO 6	Identify the effects of intruders, malicious software and distributed denial of service attacks on system security.	3	3	3			2		1				
MET 445	RENEWABLE ENERGY ENGINEERING	CO 1	Explain renewable energy sources and evaluate the implication of renewable energy. To predict solar radiation at a location	3	3										3
		CO 2	Explain solar energy collectors, storages, solar cell characteristics and applications	3	3			1	1	1				1	3
		CO 3	Explain the different types of wind power machines and control strategies of wind turbines	3	3			1	1	1				1	3
		CO 4	Explain the ocean energy and conversion devices and different Geothermal sources	3	3			1	1	1				1	3
		CO5	Explain biomass energy conversion devices. Calculate the Net Present value and payback period	3	3			1	1	1				1	3
CSQ413	SEMINAR	CO 1	Identify academic documents from the literature which are related to her/his areas of interest	2	2	1	1		2	1					3
		CO 2	Read and apprehend an academic document from the literature which is related to her/ his areas of interest	3	3	2	3		2	1					3
		CO 3	Prepare a presentation about an academic document	3	2			3			1		2		3
		CO 4	Give a presentation about an academic document	3				2			1		3		2
		CO 5	Prepare a technical report	3	3	3	3	2	2		2		3		3
CSD415	PROJECT PHASE I	CO 1	Model and solve real world problems by applying knowledge across domains	2	2	2	1	2	2	2	1	1	1	1	2
		CO 2	Develop products, processes or technologies for sustainable and socially relevant applications	2	2	2		1	3	3	1	1		1	1
		CO 3	Function effectively as an individual and as a leader in diverse teams and to comprehend and execute designated tasks									3	2	2	1
		CO 4	Plan and execute tasks utilizing available resources within timelines, following ethical and professional norms					2			3	2	2	3	2
		CO 5	Identify technology/research gaps and propose innovative/creative solutions					2			3	2	2	3	2
		CO 6	Organize and communicate technical and scientific findings effectively in written and oral forms					2			2	2	3	1	1
CSL411	COMPILER LAB	CO 1	Implement lexical analyzer using the tool LEX.	3	3	3	2	3			2		1		3
		CO 2	Implement Syntax analyzer using the tool YACC.	3	3	3	2	3			2		1		3
		CO 3	Design NFA and DFA for a problem and write programs to perform operations on it.	3	3	3	2				2		1		3
		CO4	Design and Implement Top-Down parsers.	3	3	3	2				2		1		3
		CO5	Design and Implement Bottom-Up parsers.	3	3	3	2				2		1		3
		CO6	Implement intermediate code for expressions.	3	3	3	2				2		1		3





CST 404	COMPREHENSIVE COURSE VIVA	CO 1	The objective of this Course viva is to ensure the basic knowledge of each student in the most fundamental core courses in the curriculum.	3	1	3		1	3	1	2	3	2		2
		CO 2	The viva voce shall be conducted based on the core subjects studied from third to eighth semester	3	3	3	1		3	1		2		2	2
		CO 3	helps the learner to become competent in placement tests and other competitive examinations.	3	2	3	2	2	3	1	2	2	2	1	2
CSD 416	PROJECT PHASE II	CO 1	Model and solve real world problems by applying knowledge across domains	2	2	2	1	2	2	2	1	1	1	1	2
		CO 2	Develop products, processes or technologies for sustainable and socially relevant applications	2	2	2		1	3	3	1	1		1	1
		CO 3	Function effectively as an individual and as a leader in diverse teams and to comprehend and execute designated tasks									3	2	2	1
		CO 4	Plan and execute tasks utilizing available resources within timelines,					2			3	2	2	3	2
		CO 5	Identify technology/research gaps and propose innovative/creative solutions	2	3	3	1	2							
		CO 6	Organize and communicate technical and scientific findings effectively in written and oral forms					2			2	2	3	1	1