DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

SUBJECT WISE COURSE OUTCOMES (2019 – 2023)

I – SEMESTER

T101 - Mathematics - I	Yr/Sem: I/I
CO 1	Apply knowledge of mathematics to solve functions of several variables.
CO 2	Identify, formulate and solve engineering problems like multiple integrals and their usage.
CO 3	To solve differential equations that model physical processes using effective mathematical tools
CO 4	Able to find equation of straight line of shortest distance, equation of plane, angle between straight lines.
CO 5	Gain the knowledge to solve first order differential equation arising in engineering.

T102 - Physics	Yr/Sem: I/I
CO 1	Apply knowledge of science and engineering to understand physics and its significant contribution in the advancement of technology and invention of new products that dramatically transform modern day society.
CO 2	Identify different areas of physics which have direct relevance and applications to different engineering disciplines
CO 3	Apply fundamental knowledge to understand applications of ultrasonics, optics and some optical devices, lasers and fiber optics, nuclear energy sources and wave mechanics.
CO 4	Understand the basic operating principles of laser, its applications, optical fiber, and its types, transmission characteristics, applications of optical fibers.
CO 5	Understand the basic operating principles of laser, its applications, optical fiber, and its types, transmission characteristics, applications of optical fibers.

T103 - Chemistry	Yr/Sem: I/I
CO 1	Apply knowledge of science and engineering to understand the importance of chemistry in engineering domain.
CO 2	Identify different electrochemical cells and their usage for industrial process.
CO 3	Apply fundamental knowledge of chemistry and build an interface of theoretical concepts with industrial applications/engineering applications.
CO 4	Guide the students to gain the knowledge about the cooling curves , phase diagrams, alloys and their practical importance.

CO 5	Strengthen the fundamentals of chemistry and then build an interface of theoretical concepts with their industrial/engineering applications.

T110 - Basic Civil and Mechanical Engineering　　　　　　　　　　　　　　　　**Yr/Sem: I/I**

CO 1	Understand the building classification as per National building code.
CO 2	Get the idea about construction procedure for various components of the building.
CO 3	Students understand the principles of surveying, construction procedure for roads, bridges and dams.
CO 4	Student will be able know about the working of Internal and external combustion systems
CO 5	Student will be able know about Non-Conventional Energy Systems
CO 6	Student will be able to know about manufacturing process.

T111- Engineering Mechanics　　　　　　　　　　　　　　　　　　　　　　**Yr/Sem: I/I**

CO 1	Understand the basic laws of mechanics and resolution of forces using different methods.
CO 2	Learn and apply the knowledge on analysis of forces acting on the trusses and effect of friction force on bodies.
CO 3	Learn about the centroid and moment of inertia for plane and solid figures.
CO 4	Understand the three laws of motion, principles of dynamics for particles.
CO 5	The student will able to analyse the laws of motion for rigid bodies.

T112- Communicative English　　　　　　　　　　　　　　　　　　　　　　**Yr/Sem: I/I**

CO 1	Learnt about the definition of communication, importance, concept. Sender, Ideation, the levels in communication, channels, oral and written way of communication, body language and non verbal communication, Accuracy, Brevity and Clarity, different barriers for Communication, techniques in making effective communication, listening importance and types of listening.
CO 2	Students learnt about the types of letters, report writing, notices and memo and also developed their skill in writing.
CO 3	Understands the comprehension, identifies the difference between Skimming and scanning, guess the meaning of the words, Identify to make notes.
CO 4	Students learnt the writing skills, how to write a paragraph in a proper manner, four modes of writing and how to make bibliographical entries.
CO 5	Students were able to develop their spoken skills by making them to involve in many activities related to it.

P 104 – Physics Lab　　　　　　　　　　　　　　　　　　　　　　　　　　**Yr/Sem: I/I**

CO 1	Able to understand how to find the thickness of the specimen and also to find the radius of curvature of glass using the phenomenon of interference of light
CO 2	Able to understand the specific rotatory power of an optical active solution using the principle of polarization.
CO 3	To understand about the thermal conductivity of bad conductor and rubber tube.
CO 4	Ability to understand about the optical properties like dispersive power, Resolving power by applying the knowledge of optics

CO 5	To acquire knowledge about the magnetometer due to current coil and jolly method of determining the pressure coefficient of air at constant volume.
CO 6	Ability to understand the basic knowledge of inference ,polarization ,Magnetic materials ,thermal conductivity that correlates the theory and practical

P 105 – Chemistry Lab   Yr/Sem: I/I

CO 1	Students will become well acquainted to test amount of hardness present in sample of water for their engineering needs.
CO 2	Students will be efficient in estimating acidity/alkalinity in given samples.
CO 3	Students will have knowledge about estimating amount of dissolved oxygen in water.
CO 4	Students will become well acquainted to estimate copper in brass.
CO 5	Students will have knowledge about determination of viscosity of sucrose using Ostwald"s viscometer.
CO 6	To develop an understanding of basic titration setup and methodologies for determining strength, hardness and alkalinity of various unknown solutions

P 106 – Workshop Practice   Yr/Sem: I/I

CO 1	Understand and comply with workshop safety regulations.
CO 2	Student will be able to make various joints in the given object with the available work material.
CO 3	Student will be able to know how much a joint will take for the assessment of time.
CO 4	Students can able to Identify the hand tools and instruments.
CO 5	Students can able to gain knowledge about various operations carried out in sheet metal.
CO 6	Students can able to gain skills about various tools used in welding to make simple joints.

II – SEMESTER

T 107 – Mathematics - II   Yr/Sem: I/II

CO 1	Apply knowledge of mathematics to solve matrix algebra technique for practical applications and Curl, divergence and integration of vectors in vector calculus.
CO 2	Identify, formulate and solve engineering problems like Laplace transform and to solve differential and integral equations.
CO 3	Apply formulae and analyze problems of Fourier transform techniques.
CO 4	Determine the Fourier transform , Fourier cosine and sine transform of elementary functions, properties of transforms and its application in engineering
CO 5	Acquire knowledge of matrix algebra technique, vector calculus, Laplace and Fourier Transform.

T108 – Material Science   Yr/Sem: I/II

CO 1	Apply core concepts in material science to solve engineering problems.
CO 2	Knowledgeable of contemporary issues relevant to material science and engineering
CO 3	Understand about the ferrites and its application to magnetic materials.
CO 4	Select materials for design and construction.
CO 5	Understand the importance and properties of materials.

T109 – Environmental Science	**Yr/Sem: I/II**
CO 1	Apply fundamental knowledge to understand about the environment.
CO 2	Identify environmental pollution through science.
CO 3	Apply basic knowledge to solve various environmental issues and problems.
CO 4	Ability to consider issues of environment and sustainable development in his personal and professional undertakings.
CO 5	Provides a comprehensive knowledge in environmental science, environmental issues and the management from an interdisciplinary perspective.

T104 – Basic Electrical and Electronics Engineering	**Yr/Sem: I/II**
CO 1	Will learn the fundamentals of rotational and stationary machine operation, single-phase and three-phase power measurement, magnetic and electrical circuits, and these topics.
CO 2	Will learn the fundamentals of measuring devices, communication systems, and network models.
CO 3	Knowledge about non-conventional energy systems will be available to students.
CO 4	The varieties of metal joining will be known by the students.
CO 5	Students will learn about numerous engines, energies, and joints as well as construction and building components offered with diverse principles.

T105 – Engineering Thermodynamics	**Yr/Sem: I/II**
CO 1	Apply knowledge of mathematics, science and engineering to understand the basics of thermodynamics.
CO 2	Understand the importance of laws of thermodynamics applied to energy systems.
CO 3	Understanding refrigeration, heat pump and their physical mechanism.
CO 4	Understand the laws of motion for rigid bodies.
CO 5	Understand the effects of forces acting on the bodies in practical situation.

T106 – Computer Programming	**Yr/Sem: I/II**
CO 1	Know concepts in problem solving.
CO 2	To do programming in C language.
CO 3	To write diversified solutions using the C language.
CO 4	To know about structures, pointers and its manipulation.
CO 5	To know about the evaluation of computers, components and its applications. Basic knowledge on the internet, information technology, word processing and worksheets.

P101 - Computer Programming Laboratory	**Yr/Sem: I/II**
CO 1	Students can work with command line interface OS's, like MS-DOS.
CO 2	Students can solve most of the real time problems with C program.
CO 3	Students can interact with computer using C program, through various input and output functions.
CO 4	Students can make a use of various keywords, constants, variables, data types, operators, type conversion in C program.

CO 5	Students will have knowledge about arrays, functions, structures and pointers in C program.

P102 – Engineering Graphics	**Yr/Sem: I/II**

CO 1	Perform freehand sketching of basic geometrical constructions and multiple views of objects.
CO 2	Project orthographic projections of lines and plane surfaces.
CO 3	Draw projections and solids and development of surfaces.
CO 4	visualize and to project isometric and perspective sections of simple solids.
CO 5	Students will be able to draw orthographic projections and isometric projections.

P103 - Basic Electrical and Electronics Laboratory	**Yr/Sem: I/II**

CO 1	Know about basic electrical tools, applications and precautions
CO 2	Perform different types of wiring used in domestic and industrial applications.
CO 3	Measurements of voltage and phase using CRO, basic operation and applications of devices such as PN junction diode and transistors.
CO 4	Understand the function and applications of basic logic gates and flip flops.
CO 5	Gain knowledge in domestic wiring and application of electronics device in the field of electrical engineering.

P107 – NSS/NCC	**Yr/Sem: I/II**

CO 1	to create awareness in social and environmental issues.
CO 2	to participate in relief and rehabilitation work during natural calamities.
CO 3	to develop some proposals for local slum area development and waste disposal.
CO 4	to create team works among students and produce efficient results.
CO 5	to operate scientific instruments or advanced software.

III – SEMESTER

MA T31 – Mathematics – III	**Yr/Sem: II/III**

CO 1	Identify complex variable function, Apply CR equations for testing of analyticity of the complex function.
CO 2	Construct conformal mappings between regions. Solve problems on bilinear transformation and find the Taylor's and Laurent's series.
CO 3	Analyze the complex functions with reference to their analyticity, integration using Cauchy's integral theorem and Cauchy's Residue theorem.
CO 4	Express any periodic function as Fourier series, Fourier sine and Cosine series.
CO 5	Finding Fourier series for numerical values of any function. Interpret and use the basic concepts of analytic function, Taylor and Laurent series, singularities, residues, conformal mapping, Fourier series an harmonic analysis.

CS T32 - Electronic Devices and Circuits   **Yr/Sem: II/III**

CO 1	Classify semiconductor materials and discuss the construction and operation of PN junction diodes, Zener diodes. Need and use of Clippers, Clampers, Series and Shunt regulators.
CO 2	Discuss the construction, operation, and characteristics of transistors. Analyze the transistor biasing circuits using the stability factor. Discuss the creation and operation of Field Effect Transistor devices, MOSFET, BJT, as well as their V-I Characteristics curves. Analyze the important parameters of FET, JFET, MOSFET.
CO 3	Examine the circuit and operation of RC Coupled Amplifier, Class A, Class B, Class C and D amplifiers. Examine the Positive and Negative Feedback, Barkhausen Criterion, Wien Bridge, Hartley, Colpitts and Crystal Oscillator.
CO 4	Confer and examine op-amp characteristics, parameters and applications. Consider and review summer, subtractor, differentiator, integrator, comparator, multiplier, filters.
CO 5	Discuss the operation and principles of special purpose diodes, seven segment displays, OPTO – isolator. Examine characteristics and equivalent circuit of UJT, SCR, DIAC and TRIAC.

CS T33 – Object Oriented Programming and Design   **Yr/Sem: II/III**

CO 1	Confer and discuss the concepts, advantages of OOP. Examine the structure of C++ program, control structures. Consider and explain classes and objects, OOPs Concepts (Encapsulation), friend function, member function, overloading member function. Discuss the LValues, RValues, return references and function overloading.
CO 2	Review on the need of constructors, destructors, copy constructors, recursive constructor. Discuss about the overloading functions, classes and inheritance, pointers, and overloading member functions.
CO 3	Examine pointers and arrays to classes and objects, void pointers. Confer the memory models and dynamic objects. Discuss about polymorphism, virtual functions, string attributes.
CO 4	Discourse about file stream classes, binary and ASCII files, error handling functions. Converse generic programming, class templates and inheritance, operator overloading, class templates and exception handling.
CO 5	Discuss OO concepts, UML diagrams, OO design methodology.

CS T34 – Digital System Design   **Yr/Sem: II/III**

CO 1	Discuss Binary number systems, BCD codes, Excess-3 codes, Gray codes, Alphanumeric codes, Error detecting and correction codes. Confer DeMorgan's theorems, canonical form. Examine karnaugh maps, Quine-McCluskey method, universal gates.
CO 2	Confer combinational logic (adders, subtractors, multipliers), Encoders, Decoders, Multiplexers, Demultiplexers, comparators and parity checker.
CO 3	Discourse about flip flops, counters, types and applications of shift registers. Discuss the design of clocked sequential circuits, Mealy and Moore models, state reduction techniques.

CO 4	Discuss about organization of ROM and RAM, PLDs, PLAs, PAL devices, FPGAs and implementation using PROMs, PLAs, PALs.
CO 5	Discourse Verilog HDL, 4 bit ripple carry counter, Gate level Modeling, Dataflow Modeling. Discuss on counters, full adders and behavioral modeling.

CS T35 – Data Structures	**Yr/Sem: II/III**
CO 1	Confer and discuss on algorithmic notation, programming principles, arrays and its types, pointer arrays. Discourse the searching techniques and internal and external sorting techniques.
CO 2	Exchange views on definition, operation and applications of stack, queues and types of queues. Discuss linked list, types and applications of linked list along with dynamic storage management.
CO 3	Discuss about Binary tree, Binary search tree, AVL tree, B+ Tree, Trie Tree
CO 4	Discourse on graph, representation, traversals, topological sort, Operations, representation and applications on sets.
CO 5	Confer on tables, its types, static and dynamic tree tables, hash tables. Discuss on files and sorting with tapes and disks.

CS T36 – Computer Organization and Architecture	**Yr/Sem: II/III**
CO 1	Discuss on multiprocessors and multicomputer, instructions and instruction sequencing, addressing modes, basic input/output operations, stacks and queues, subroutines, shift and rotate instructions.
CO 2	Confer and discuss on registers and addressing, flow control, logic and i/o operations, subroutines, other instructions, program examples.
CO 3	Discourse about interrupts, controlling device reques, pentium interrupt structure, direct memory access, busses, interface circuits, and standard i/o interfaces.
CO 4	Exchange views on semiconductor ram memories, read-only memories, virtual memories, memory management requirements and secondary storage.
CO 5	Confer , multiple-bus organization, hardwired control, microprogrammed control, pipelining superscalar operations, performance considerations

CS P31 – Electronics Devices and Circuits Laboratory	**Yr/Sem: II/III**
CO 1	Demonstrate the V-I Characteristics of PN Junction diode, Zener diode , Clipper circuits, input & output Characteristics of BJT, JFET, MOSFET and UJT transistor configuration. Application of clippers, clampers.
CO 2	Application of OPAMP, Determination of ripple factor for of rectifiers with and without filters and Draw the Voltage regulation characteristics of shunt using IC

CS P32 – Data Structures Laboratory	Yr/Sem: II/III

CO 1	Understanding the concept of data abstraction and the problem of building implementations of abstract data types are emphasized with both Linear and Non linear data structures.
CO 2	Understanding the Selection of relevant data structures and combinations of relevant data structures for the given problems in terms of memory and run time efficiency and improve the problem solving ability.

CS P33 – Digital System Design Laboratory	Yr/Sem: II/III

CO 1	Comprehension:Discuss:--Discuss the combinational circuit as Adder,Subtractor, Magnitude comparator, Multiplexers, Encoders, Decoders and Demultiplexers using basic logic gates.
CO 2	Comprehension:Discuss:--Discuss the sequential circuitas Shift register, Ripple Counters, Synchronous Counterswith the help of digital basic logic gate. Simulation of combinational and sequential logic using HDL.

IV – SEMESTER

MA T41 – Mathematics – IV	Yr/Sem: II/IV
CO 1	Formulate and solve partial differential equation.
CO 2	Derive and obtain the solution of wave equation and boundary value problems.
CO 3	Derive and obtain the solution of heat equation and boundary value problems.
CO 4	Apply least square method to fit various curves for the given data investigate the validity of hypothesis by Z-distribution techniques.
CO 5	Calculation of analysis of variance and explain the use of the Chi-squared test and its calculation.

CS T42 – Microprocessors and Microcontrollers	Yr/Sem: II/IV

CO 1	Comprehension: Describe:- Describe the architecture of 8085 and development of assembly language program by using instruction sets, stack and subroutines, looping statements and discuss about addressing modes of a typical microprocessor.
CO 2	Comprehension: Describe:- Describe the function of different peripheral IC's 8253,8259,8237 to interface with external peripheral device.
CO 3	Application: Demonstrate:- Demonstrate the architecture of 8279, 8255 and also develop the assembly language program with the help of special function registers, timers and counters and demonstrate 8251 USART.
CO 4	Comprehension: Describe:- Describe the architecture of 8086 and also develop the ASM program with the help of instruction set and addressing modes.
CO 5	Confer and demonstrate Intel 8051 Microcontroller, Pins and signals, Timing and control, interrupts and Instruction set.

CS T43 – Automata Languages and Computations	Yr/Sem: II/IV

CO 1	Confer and discuss about regular expressions, finite automata, NFA, DFA, Moore Mooley and Mealey machines.

CO 2	Exchange views on regular sets, CFG, Chomsky Normal Forms, ambiguous and unambiguous grammar.
CO 3	Analyse and explore pushdown automata, CFG, CFL and its applications.
CO 4	Discuss TM, variations of TMs – Recursive and Recursive. Enumerable languages, Recursive Function, Partial and Total Recursive Function, Primitive Recursive Function.
CO 5	Confer NP hardness and NP Completeness.

CS T44 – Design and Analysis of Algorithms	**Yr/Sem: II/IV**
CO 1	Confer asymptotic notations –Heap, shell, radix, insertion, selection and bubble sort; sequential, binary and Fibonacci search. Discuss aboutrecurrence equations, analyzing control structures.
CO 2	Exchange views on Divide and Conquer Method, Strassen"s Matrix multiplication, knapsack problem – minimum spanning tree algorithms scheduling, optimal storage on tapes, optimal mergepatterns.
CO 3	Discuss on Dynamic Programming, all pair shortest path algorithm – 0/1 Knapsack and Traveling salesman problem – chained matrix multiplication. Techniques for binary trees and graphs – AND/OR graphs – biconnected components – topological sorting.
CO 4	Discourse – 8-queens problem – sum of subsets – graph coloring – Hamiltonian cycle – Knapsack problem.
CO 5	Discuss Least Cost (LC) search – the 15-puzzle problem – control abstractions for LC-Search – Bounding – FIFO Branch-and-Bound - 0/1 Knapsack problem – Traveling Salesman Problem, NP-Hard and NP-Completeness.

CS T45 – Object Oriented Programming	**Yr/Sem: II/IV**
CO 1	Confer about Java features, Java Platform, Java Fundamentals, Classes and Objects, Constructors, Destructors, Packages and Interfaces
CO 2	Discuss about Overloading - Inheritance – Files and Stream – Multithreading – Exception Handling
CO 3	Discuss on AWT package, Containers, Applets – Applet Application - Swing Fundamentals - SwingClasses.
CO 4	Confer on JDBC, Java security, I/O packages.
CO 5	Discourse on java beans, TCP/IP server, URL connection, RMI, Jar files.

CS T46 – Graphics and Image Processing		Yr/Sem: II/IV
CO 1	Extend the Fundamental Concepts of audio, video in analog and Digital formats using the components of multimedia software tools, Graphics and Image Data Representations, Data types and Storage requirements for multimedia applications and also explain the Need for Compression and Taxonomy of compression techniques	
CO 2	Discuss about Geometric Display Primitives and Attributes, 2D Transformations and Viewing, Window to view port transformations.	
CO 3	Confer about Image processing, Image storage and file formats - Image processing operations , Fourier Transforms and its properties, Hadamard, Discrete Cosine, Haar, Slant, SVD, KL and HotellingTransforms.	
CO 4	Exchange views on Image Quality and need for Enhancements – Point operations - Histogram Techniques – Spatial filtering– Image Smoothening – Image Sharpening - Image degradation and Noise Models.	
CO 5	Discuss about Image Compression, Image Segmentation, Color Image Processing, Morphological operations.	

CS P41 – Microprocessors and Microcontrollers Laboratory		Yr/Sem: II/IV
CO 1	Experiment using 8085 microprocessor and implement arithmetic operations, block operations, code conversions, real time examples	
CO 2	Experiment and implement using 8086 microprocessor and 8051 microcontroller	

CS P42 – Design and Analysis of Algorithms Laboratory		Yr/Sem: II/IV
CO 1	Implement the divide and conquer techniques, greedy techniques, dynamic programming techniques.	
CO 2	Implement the traversals, backtracking and branch and bound techniques.	

CS P43 – Object Oriented Programming Lab		Yr/Sem: II/IV
CO 1	Implement and understand the object oriented programming concept in C++.	
CO 2	Implement the JAVA connectivity and concepts.	

SP P44 – Physical Education		Yr/Sem: II/IV
CO 1	Understanding the opportunities of students' physical, cognitive, social and emotional development.	
CO 2	Understanding of individual and group motivation and behavior.	
CO 3	To create teamwork among students and produce efficient results.	
CO 4	The students were taught to operate advanced playing kits.	
CO 5	to motivate the students to prepare the professional and scientific reports	

CS T51 – Operating Systems		Yr/Sem: III/V
CO 1	Discuss about mainframe, distributed, multiprocessor, clustered, real time systems, OS services, system calls, system services, Inter process communication.	
CO 2	Discuss about scheduling criterias, threading issues, critical section, synchronization and semaphores.	
CO 3	Confer about deadlock, paging, segmentation.	
CO 4	Discourse file systems, access methods, file sharing.	
CO 5	Exchange views on disk scheduling, kernel and case study on linux system and windows.	

CS T52 – Computer Networks		Yr/Sem: III/V
CO 1	Discuss about the network hardware and software, various layer in the OSI.	
CO 2	Discourse the data link layer in detail, services, design, protocols.	
CO 3	Confer the network layer in detail, services, design, addresses.	
CO 4	Exchange views on the transport layer in detail, services, design, congestion control.	
CO 5	Discourse the application layer in detail, services, design, protocols.	

CS T53 – Database Management Systems		Yr/Sem: III/V
CO 1	Discuss about database architecture, relational algebra, query languages, relational calculus, sql.	
CO 2	Discourse DB design and ER model, Indexing and hashing concepts, static and dynamic hashing, bitmap indices.	
CO 3	Confer relational DB design, normal forms, temporal data.	
CO 4	Discuss about query processing, query optimization, ACID properties, isolation levels, transactions as SQL statements	
CO 5	Exchange views on deadlocks, IBM DB2, My SQL, levels of consistency.	

CS T54 – Language Translators		Yr/Sem: III/V
CO 1	Overview of system software, machine structure, assembler, design, features, types of assembler.	
CO 2	Discuss on loaders and linkers, linkage editors, loader features, bootstrap loaders.	
CO 3	Discourse about lexical analyzer, role of lexical analyzer, tokens, specification and recognition.	
CO 4	Confer about parsing, techniques, code generations.	
CO 5	Exchange views about optimization, invariant code motion, code generation, DAG representation.	

CS T55 – Software Engineering		Yr/Sem: III/V
CO 1	Understanding various approach in Software Development life Cycle.	
CO 2	Discuss about complete strategic approaches towards project management and estimation techniques followed in software development.	
CO 3	Discourse the good software design and the function oriented software design.	
CO 4	Confer the concepts of object oriented design approach.	
CO 5	Understanding the process involved in user interface design and studying various testing methods.	

CS P51 – Operating Systems Laboratory		Yr/Sem: III/V
CO 1	Implement basic UNIX /LINUX commands, programs implementing I/O system calls, implement scheduling algorithms.	
CO 2	Implement synchronization problem, memory management schemes, and develop application using RTOS.	

CS P52 – Computer Networks Laboratory		Yr/Sem: III/V
CO 1	Implement a socket program to transfer file using TCP, UDP, program for CRC and Hamming code, program for sliding window protocols, TCP module implementation.	
CO 2	Implementation of routing protocols, ARP, security compromise on a node using NS2, implementation of traffic sources using NS2.	

CS P53 – Database Management System Laboratory		Yr/Sem: III/V
CO 1	Study database, SQL, Query types and procedural query language.	
CO 2	Design and develop real time applications.	

HS P54 – General Proficiency – I		Yr/Sem: III/V
CO 1	To understand and practice the art of communication	
CO 2	able to practice and showcase soft skills.	
CO 3	To understand the importance of writing.	
CO 4	To practice speaking skill.	
CO 5	To practice verbal, non verbal and numerical aptitude.	

CST61 – Enterprise Solutions	**Yr/Sem: III/VI**
CO 1	Understand in-depth about basic ERP implementation and basic SCM, CRM and BPR
CO 2	Understanding about SAP architecture with SAP modules and ABAP programming environment.
CO 3	Confer in depth about SQL, PL/SQL, Forms and Reports.
CO 4	Gain knowledge about People soft and People Soft Enterprise HRMs and financial management.
CO 5	Gain knowledge about Siebel Business components and business objects.

CS T62 – Embedded Systems	**Yr/Sem: III/VI**
CO 1	Confer various embedded processor features and ARM family details.
CO 2	Exchange views on registers and data processing instructions based on ARM instructions.
CO 3	Exchange views on registers and data processing instructions based on THUMB instructions.
CO 4	Understand the execution of ARM based C program implementation.
CO 5	Understand the various real time OS and their needs that support for scheduling various tasks.

CS T63 – Web Technology	**Yr/Sem: III/VI**
CO 1	Confer major components and protocols of internet applications and design web page.
CO 2	Discuss about client side and server side programming languages for web.
CO 3	Enable to design and develop web page using xml language by schema techniques and formatting objects.
CO 4	Confer the importance of multimedia in web designing and usage of web application development.
CO 5	Understand web services and modules involved in building in service. Confer and develop programs using ajax concepts.

CS E61 – Object Oriented Analysis and Design	**Yr/Sem: III/VI**
CO 1	Confer about life cycle model and different object methodologies.
CO 2	Discuss about UML for specifying, constructing, visualizing and documenting the software system.
CO 3	Analyse a complete, unambiguous, and consistent picture of the requirements.
CO 4	Formalize the design process in establishing a scientific foundation for OO design process.
CO 5	Understand problems occurring during software development and avoid error.

CS E63 – E-Business	**Yr/Sem: III/VI**
CO 1	Confer an understanding of the foundation and importance of E-commerce.
CO 2	Exchange views on secure electronic transaction and its mechanism to protect their transaction and payment through online.

CO 3	Discourse the importance of encryption mechanism to protect personal information using various security threats.
CO 4	Confer and acquire knowledge on flow of secure electronic transaction using master/ visa card and secure Email technologies.
CO 5	Discuss on internet and website establishment, internet charges and internet access and architecture.

CS P61– Enterprise Solutions Laboratory	**Yr/Sem: III/VI**
CO 1	Understand and create simple application using ERP packages. Study SQL and PL/SQL. Understand and use various components of Oracle and SAP.
CO 2	Confer Peoplesoft and SIEBEL concepts and develop simple applications using the same.

CS P62 – Embedded Systems Laboratory	**Yr/Sem: III/VI**
CO 1	Understand and implement programs on ARM based processors
CO 2	Implement programs using ARM Tool chain and library.

CS P63 – Web Technology Laboratory	**Yr/Sem: III/VI**
CO 1	Understand and work with client side scripting, ActiveX, web servers and Java Server Pages.
CO 2	Work and develop applications using XML, Server Side scripting, Ajax programming, Web services and mini project on E-commerce application.

CS P64 – Industrial Visits/ Training	**Yr/Sem: III/VI**
CO 1	Ability to demonstrate the use, interpretation and application of an appropriate international engineering standard in a specific situation.
CO 2	Ability to analyze a given engineering problem, identify an appropriate problem solving methodology and propose a meaningful solution.

HS P65 – General Proficiency – II	**Yr/Sem: III/VI**
CO 1	Understand the composition analysis.
CO 2	Developing letter and resume writing skills.
CO 3	Understand and practice oral skills through group discussions and negotiation activities.
CO 4	Practice corporate etiquette, grooming and dressing.
CO 5	Practice verbal, non-verbal and numerical aptitude.

CS T71 – Artificial Intelligence	Yr/Sem: IV/VII
CO 1	Confer history of AI, exchange views on Heuristic Search Techniques, Means Ends Analysis, Intelligent agents.
CO 2	Discuss about propositional logic, predicate logic, forward and backward reasoning, filler structure, Based agents.
CO 3	Discourse about non-monotonic reasoning, certainty factors, Bayesian networks, Fuzzy logic.
CO 4	Confer and analyze the planning techniques, forms of learning.
CO 5	Discuss about minimax search procedure, expert system representation, expert system shells, robotics.

CS T72 – Computer Hardware and Network Trouble Shooting	Yr/Sem: IV/VII
CO 1	Understand basic internal structures and evaluation of computers.
CO 2	Identify and understand various components of motherboard, bus standards, SMPS and BIOS.
CO 3	Understand memory hierarchy and needs of primary and secondary storage troubleshooting the memory problems.
CO 4	Understand about various kinds of input and output devices and troubleshoot I/O related problems.
CO 5	Interface external I/O devices with network topologies and troubleshoot network related problems.

CS T73 – Platform Technology	Yr/Sem: IV/VII
CO 1	Confer knowledge of .NET framework, CLR, Class library, MSIL, components of CLR namespace, input and output, serialization, enterprise services, interoperability, GUIs.
CO 2	Ability to write C# .NET programs and knowledge on object oriented concepts.
CO 3	Ability to write VB .NET programs and knowledge on object oriented concepts.
CO 4	Direct access to data, accessing data with datasets and gain knowledge on the same
CO 5	Gain knowledge of J2EE: Enterprise edition.

CS E77 – Network Protocols	Yr/Sem: IV/VII
CO 1	Understand the network architectures, OSI model, TCP/IP model, ATM model and application layer protocols.
CO 2	Confer and exchange knowledge on protocols in the presentation and transport layer.
CO 3	Exchange views about network layer and the corresponding related protocols.
CO 4	Exchange views about data link layer and the corresponding related protocols.
CO 5	Discuss about network security protocols.

CS P71 – Artificial Intelligence Laboratory	Yr/Sem: IV/VII
CO 1	Understanding concepts of prolog and implementing recursive algorithms.
CO 2	Understand and apply the search and traversal concepts and knowledge representation using prepositional and predicate logic.

CS P72 – Troubleshooting Laboratory	Yr/Sem: IV/VII
CO 1	Assemble personal computer, OS installation, circuit tracing, USB port programming and interfacing.
CO 2	Troubleshooting printer port, serial port, USB port, PCI bus, networking devices using Bluetooth interface.

CS P73 – Platform Technology Laboratory	Yr/Sem: IV/VII
CO 1	Analyze and program using C# .NET, ADO.NET
CO 2	Real time application using .NET framework.

CS PW7 – Project Phase – I	Yr/Sem: IV/VII
CO 1	Motivate students to select application related projects.
CO 2	Students study the reference papers from various domain and select domain of their wish.
CO 3	Students have detailed survey on selected domain and identify base paper and give presentation.
CO 4	Students identified problem formulation of their existing work.
CO 5	Students performed survey, identified the base paper, problem formulation and gave presentation.

VIII – SEMESTER

CS T81 – Professional Ethics	Yr/Sem: IV/VIII
CO 1	Discuss engineering ethics, moral issues, ethical theories and their uses in engineering.
CO 2	Realize code of ethics, engineer's responsibility for safety, rights and responsibilities.

CS T82 – Engineering Economics and Management	Yr/Sem: IV/VIII
CO 1	Confer the micro and macro, its applications, demand and supply concepts, break even analysis.
CO 2	Discuss production and marketing management, concept of productivity, channels of distribution.
CO 3	Discourse financial management, balance sheet, interest formulae.
CO 4	Discuss methods of depreciation, declining method of depreciation.
CO 5	Confer present and future worth method, annual equivalent method, rate of return method and examples.

CS T83 – Information Security	Yr/Sem: IV/VIII
CO 1	Confer knowledge about security SDLC, providing security to components and make balance between security and access.
CO 2	Ability to apply basic knowledge to handle threats, attacks, and legal professional issues while implementing security.
CO 3	Analyze and access the impact of risk and they can make remedial measures to control risk on any organization.
CO 4	Understand process involved in information security cycle and study security standard procedures.
CO 5	Understand study of security technology and implement cryptography algorithms.

CS E84 – Mobile Computing	Yr/Sem: IV/VIII
CO 1	To understand basic concepts of wireless and mobile communication.
CO 2	Exchange views about the state of art industry standards in wireless networking.
CO 3	Confer the various facilities available for mobile communication including protocol and security mechanism.
CO 4	Discuss various transaction models associated with mobile data management in mobile computing.
CO 5	Discourse the widely used mobile computing models.

CS E811 – Cloud Computing	Yr/Sem: IV/VIII
CO 1	Confer roots of cloud computing, layers and types of cloud, features, challenges and risks.
CO 2	Discuss cloud architecture, services, applications.
CO 3	Discourse abstraction and virtualization, Virtual machines, provisioning in the cloud context.
CO 4	Understand how to manage and secure data in cloud.
CO 5	Understand the services provided by various clouds.

CS P81 – Seminar	Yr/Sem: IV/VII
CO 1	Students must be able to make critical review of literature.
CO 2	Preparation of report on the topic.

CS P82 – Comprehensive Viva-Voce	Yr/Sem: IV/VIII
CO 1	Remember all areas of Computer Science and engineering.

CS PW8 – Project Phase II	Yr/Sem: IV/VIII
CO 1	Student installed and learnt the software simulation tool.
CO 2	System architecture is designed and implementation of modules were done.
CO 3	Review was conducted.
CO 4	Demonstration of project and performance analysis is done.

CO 5	Presentation is done and report is submitted.