2.6.1 - Programme Outcomes and Course Outcomes for all Programmes offered by the institution are stated and displayed on the website and communicated to teachers and students
Give the List of COs for all courses of the Department in pdf separately

PROGRAM OUTCOMES
B. TECH. (MECHANICAL ENGINEERING)

PO-1	**ENGINEERING KNOWLEDGE:** Student will demonstrate knowledge in fundamentals of mathematics, science and engineering.
PO-2	**PROBLEM ANALYSIS:** Student will demonstrate an ability to identify, formulate and solve problems in key areas of Design, Production and Thermal of Mechanical Engineering discipline.
PO-3	**DESIGN / DEVELOPMENT OF SOLUTIONS:** Student will demonstrate an ability to design and conduct experiments, analyze and interpret data related to various areas of Mechanical Engineering.
PO-4	**COMPLEX PROBLEM ANALYSIS:** Student will demonstrate ability in conducting investigations to solve problems using research based knowledge and methods to provide logical conclusions.
PO-5	**MODERN TOOLS USAGE:** Student will demonstrate skills to use modern engineering and IT tools, softwares and equipment to analyze the problems in Mechanical Engineering.
PO-6	**ENGINEER AND SOCIETY:** Student will show the understanding of impact of engineering solutions on the society to assess health, safety, legal, and social issues in Mechanical Engineering.
PO-7	**ENVIRONMENT AND SUSTAINABILITY:** Student will demonstrate the impact of professional engineering solutions in environmental context and to be able to respond effectively to the needs of sustainable development.
PO-8	**PROFESSIONAL ETHICS:** Student will demonstrate the knowledge of Professional and ethical responsibilities.
PO-9	**INDIVIDUAL AND TEAM WORK:** Student will demonstrate an ability to work effectively as an individual and as a team member / leader in multidisciplinary areas.
PO-10	**COMMUNICATION:** Student will be able to critique writing samples (abstract, executive summary, project report), and oral presentations.
PO-11	**PROJECT MANAGEMENT AND FINANCE:** Student will demonstrate knowledge of management principles and apply these to manage projects in multidisciplinary environments.
PO-12	**LIFE-LONG LEARNING:** Student will recognize the need of self-education and ability to engage in life - long learning.

PROGRAMME SPECIFIC OUTCOMES
B. TECH. (MECHANICAL ENGINEERING)

PSO-1	To analyze, design and develop solutions by applying foundational concepts of mechanical engineering, prepare for higher education and research in mechanical engineering and allied disciplines.
PSO-2	To apply design principles, practical and software tool knowledge, and best practices for developing quality products for scientific, technological and business applications in mechanical and multi-disciplinary areas.
PSO-3	To adapt to emerging mechanical, information and communication technologies (ICT) and AI-based technologies, and hone personality skills to develop solutions to existing problems, develop novel solutions / innovations, for lifelong learning and successful career in industry / R&D / academics.

S.No	Course Code	Title	Course Objectives	Course Outcomes
1	8HC06	APPLIED PHYSICS	• To understand basic fundamentals of crystallography, crystal structures andtheir properties.	Get the knowledge to classify the crystal structures, their parameters and draw the various crystal planes using Miller indices.
			• To understand the various defects of a crystal and strain hardening.	Understand and analyze the various crystal defects-its types, strain hardening.
			• To know the various types of vibrations, radius of gyration, moment of inertia and Ultrasonics and their importance.	Understand about the vibrations, radius of gyration, moment of inertia and ultrasonic.
			• To make the students to widen the conceptual understanding of the fundamental principles of interference and diffraction.	Analyze the wave nature of light, superposition principle, differentiation between interference, diffraction and their applications
			• To understand the basic concepts of normal light, Laser and its applicationsand to know about the fundamentals of radioactivity and its applications.	Explain aboutthe types of emissions, laser principle, working of different types of lasers and their applications.To understand the nuclear fission and fusion,radioactivity emission of alpha, beta and gamma rays.
			• To discuss about the nano-technology, preparation techniques and characterization (XRD, SEM & TEM), CNTs.	To understand the nano & bulk concepts, surface to volume ratio,quantum confinement,CNTs and preparation methods. Analysis techniques like XRD, SEM, TEM.
2	8HC09	Calculus and Matrix Methods (CMM)	*1. About the linear system and some analytical methods for solution.*	1Check the consistency or inconsistency of a linear system and ability to solve real time problems.
			2. Concept of Eigen values and Eigen vectors their properties and applications.	Calculate the Eigen values and Eigen vectors of a matrix and their application for orthogonal transformation.
			3. Concept of convergence of a series and expansion of a function in sine and cosine terms.	Define the convergence, divergence or oscillating nature of a series and express the function as Fourier series.
			4. Mean value theorems and their applications to the given functions, series expansions of a function.	Verify the mean value theorems and also express the given function in series form using Taylor's theorem.
			5. Special functions such as Beta & Gamma functions and their properties, evaluation of improper integrals.	Solve the problems using special functions; evaluating the improper integrals..
			6. Basic concepts of multivariable differential calculus.	Compute the extreme values of a function defined with and without constraints.
3	8BC02	Engineering Graphics	To teach students the basic principles of Engineering graphics and instruments used	To teach students the basic principles of Engineering graphics and instruments used
			To introduce the concept of projections in drawing and its applications for simple drawing entities	To introduce the concept of projections in drawing and its applications for simple drawing entities
			To impart the knowledge of various types of solids and their projections in different position wrt principle planes	To impart the knowledge of various types of solids and their projections in different position wrt principle planes
			To teach the concept of sections of solids and their applications	To teach the concept of sections of solids and their applications
			To develop a clear understanding of the basic principles involved in three dimensional Engineering drawings.	To develop a clear understanding of the basic principles involved in three dimensional Engineering drawings.
			To train the students for the extraction of multiple views from a solid model using AutoCAD	To train the students for the extraction of multiple views from a solid model using AutoCAD
4	8FC01	Problem Solving using C	• To acquire problem solving skills	To formulate simple algorithms for arithmetic, logical problems and to translate the algorithms to programs(in C language)
			• To be able to develop flowcharts	To test and execute the programs and correct syntax and logical errors, to implement conditional branching, iteration and recursion
			• To understand structured programming concepts	To decompose a problem into functions and synthesize a complete program using divide and conquer approach.
			• To be able to write programs in C Language	To use arrays, pointers and structures to formulate algorithms and programs.
				To apply programming to solve matrix addition and multiplication problems and searching and sorting problems.
				To apply programming to solve simple numerical method problems, namely rot finding of function, differentiation of function and simple integration.
5	8B103	Engineering Mechanics	Understand the Concepts o1f Resultant and Equilibrium of System of Forces, Properties of surfaces and volumes and Dynamics of	to analyse the system of forces, free body diagrams to solve problems dealing with forces in a plane or in spatial force systems.
				to analyse plane frame and solving using different methods like method of joints and method of sections
				to understand friction concept and applications like wedge friction.

		Mechanics	surfaces and volumes and Dynamics of Particle and Rigid Bodies.	to understand the properties of surfaces and volumes and roll played by centroid and centre of gravity in different applications.
				to understand second moment of area and its application strength of materials in evaluating strength.
				to understand mass moment of inertia and its role in the analysis of rigid body rotation and kinematics and kinetics of particle & rigid body.
6	**8HC02**	**Written Communication Skills**		upgrade their knowledge of basic writing skills, writing cohesive paragraphs and effective letters.
				differentiate between confusing words, learn correct spellings and have a sound grip over the use of phrasal verbs.
				master the techniques of reading passages and comprehend them.
				understand the nuances of technical communication and apply it in their academic and professional career.
				acquaint themselves with the concept of soft skills, having the right attitude towards their education, career and life in general.
				learn the importance of building a strong resume.
7	**8HC65**	**Applied Physics Lab**		Understand and search to apply the fundamentals of magnetic induction, Ampere's law, Oersted's law and the Biot-Savart law.
				Analyze the concept and application parts of radius of gyration and periodic vibrations.
				Summarize the fundamentals of modulus-types, stress, strain, elasticity, plasticity and Hook's law.
				Understand the concept of radiation, ionizing radiation, radiological protection and inverse square law.
				Demonstrate the resonance phenomenon and verify the transverse laws of stretched strings by using Sonometer.
				Describe the types of waves like longitudinal, transverse, stationary and progressive waves. Electromagnetic induction and its applications.
8	**8HC62**	**Written Communication Lab**		understand and differentiate different types of listening techniques used to interact with real world problems
				differentiate the speech sounds and improve their accent and modulation while speaking
				understand and illustrate different word roots, word derivatives – synonyms, antonyms and word inflections
				discriminate a variety of sentence types, their structure and use punctuations
				get acclimatized to reading strategies and note making.
				develop proficiency in writing and preparing resume
9	**8FC61**	**Problem Solving using C Lab**		To formulate the algorithms for simple problems
				To translate given algorithms to a working and correct program
				To be able to correct syntax errors as reported by the compilers
				To be able to identify and correct logical errors encountered at run time
				To be able to write iterative as well as recursive programs
				To be able to represent data in arrays, strings and structures and manipulate them through a program
10	**8B191**	**Comprehensive test and Viva-voce-I**		Comprehend the concepts in the core and elective courses.
				Exhibit technical knowlegde to face interviews.
				Exhibit life long Learning skills for higher education and to persue Professional practice.
11	**8B185**	**Technical Seminar I**		Identify current general, political and technology related topics.
				Arrange and present seminar in a effective manner
				Collect, survey and organize content in presentable manner
				Demonstrate oratory skills with the aid of Power Point Presentations
				Exhibit interview facing skills and team leading qualities
				Learns Being a human, understands human values and purpose of education
				Understands the importance of different harmony levels needed.

12	**8HC18**	**Orientation Course**		Understand Self and being in the current moment are the sources of happiness.
				Improves Learning capabilities and communication skills.
				Understands and appreciate the importance of personality development and yoga for a holistic life.
				Understands the essence of Morals, Ethics, Values and Social responsibilities for successful life.
13	**8HC04**	**Engineering Chemistry**	1. To understand microscopic chemistry in terms of atomic and molecular orbitals	Understand and analyse microscopic chemistry in terms of atomic orbitals, molecular orbitals and intermolecular forces.
			2. To learn the preparation and applications of commercial and conducting polymers and lubricant materials	Identify and differentiate polymers, thermoplastic, thermosetting plastics and various lubricants.
			3. To learn the industrial problems caused by water and municipal water treatment	Recognize and select the domestic and industrial problems caused by hard water and also learn about the municipal water treatment using various methods.
			4. To acquire knowledge about different types of batteries and their working mechanism	Understand and interpret the important fundamental concepts of electrochemistry and solve the problems related to batteries.
			5. To develop the concepts and types of corrosion and the factors influence corrosion	Differentiate the types of corrosion and methods used to prevent the corrosion, surface coating techniques
			6. To understand the control methods and protective coatings for metals and other surfaces	Learn and implement synthesis of drug molecules and learn fundamentals of analytical techniques like electronic, vibrational and rotational spectroscopy.
14	**8HC12**	**Differential Equations & Integral Calculus (DEIC)**	*1. Various analytical methods to solve first order and first degree ordinary differential equations.*	Find the solutions of first order first degree and not of first degree differential equations and their applications such as Newton's law of cooling, Natural growth and decay.
			2. Methods to solve higher order ordinary differential equations.	Identify and solve higher order ordinary differential equations with constant coefficients using some standard methods and also their applications in vibration of motion.
			3. Formation of partial differential equation and to solve linear and non-linear differential equations.	Solve first order partial differential equations.
			4. Solve higer order partial differential equations with method of separation of variables particularly wave and heat equations.	Solve the problems of Heat and wave equations.
			5. Solve the problems of multiple integration and apply these concepts for finding the parameters like surface area, volume, center of mass and centre of gravity.	Solve the problems of multipleintegration and apply these concepts for finding the parameters like surface area, volume, center of mass and centre of gravity.
			6 Solve line, surface and volume integral problems	Solve the problems on surface area, volume etc. using Greens, Gauss-divergence and Stokes theorem.
15	**8HC08**	**Introductory Mathematics, Analysis and Reasoning (IMAR)**	By learning Quantitative Aptitude and Logical Reasoning, a student can answergeneral problems in his everyday life within a short time with the help of quicker methods. Also it improves thecertain skills of a student such as numerical and logical ability, mental capacityand also in sharpening minds. This course is very much useful for competitive examinations.	The questions given on testing divisibility, prime number and questions of HCF and LCM .
				The questions given on averages, percentage and profit and loss.
				The questions given on ratio and proportion.
				The questions given on series completion and analogy.
				The questions given on odd one out in classification and coding and decoding.
				The questions given on blood relations.
16	**8EC01**	**Data Structure and C++**	1. Understand the concepts of Abstract data Type, linear data structures such as stacks, queues and lists and their applications.	Explain Abstract data type, stack and Queues with their applications
			2. Comprehend different nonlinear data structures such as trees and graphs and analyze their time complexities.	Write programs on Singly linked lists, doubly linked lists, Circular list and explain their operations.
			3. Understand object-oriented programming and advanced C++ concepts and be able to write programs with C++ features such as composition of objects, operator overloads, dynamic memory allocation, inheritance and polymorphism, Templates etc.	Explain concepts of Trees, AVL Trees and Graphs with examples and applications.
				Describe and solve problems of searching and sorting and evaluate the time complexity of each algorithm.
				Explain concepts of OOPs and implement programs using objects, classes, constructors and destructors.
				Explain and apply concepts of oops, write programs implementing functions, operator overloading and inheritance.
17	**8HC01**	**Oral Communication Skills**		enhance oral communication skills
				develop the skill of speaking extemporaneously
				enrich their vocabulary and subsequently hone their verbal aptitude
				learn to make formal presentations both online and offline.
				learn to listen and comprehend well

				learn the nuances of the art of group discussion
18	**8BC01**	**Workshop/ Manufacturing processes (Theory)**	Upon completion of this course, the students will gain knowledge of the different manufacturing processes which are commonly employed in the industry, to fabricate components using different materials.	To understand various basic tools to perform simple joints using metal.
				To understand the principle of various electrical and electronic appliances and their applications.
				To understand the basic wooden joints, their prepartation methods and applications.
				To understand the fabrication processes and tools used for Plastic components and Glass.
				To have basic understanding of various manufacturing processes like casting, welding and press tools and their applications
				To gain knowledge of basic machining processes and their applications
19	**8B205**	**Mechanics of solids**	The objective is to learn the fundamental concepts of stresses, strains, and deformation of solids with applications to beams and columns. Fundamentals of applying equilibrium, compatibility, and force-deformation relationships to structural elements in order to evaluate the strength of materials.	To Understand simple stresses and strains of uniform bars, cross- section varying bars, compound bars and statically in-determinate bars
				To Understand principle stresses, strains and torsion of circular shafts
				To Understand Shear Force Diagrams (SFD) and Bending Moment Diagrams(BMD) for various types of beams
				To Understand bending stresses and shear stresses of different types of beams
				To understand how to determine deflections of various beams and buckling load of slender columns.
				To Understand how to find out various stresses that are developed in thin and thick cylinders
20	**8BC61**	**Workshop/ Manufacturing processes Lab**		Use various types of conventional manufacturing Processes
				CO-2: Manufacture components from wood, MS flat, GI Sheet etc. – hands on experience
				CO-3: manufacturing of components by machining like shafts, holes & threaded holes, surface finishing of components etc.
				CO-4: Produce small devices / products /appliances by assembling different components
21	**8HC61**	**Oral Communication Lab**		understand and differentiate different types of listening techniques used to interact with real world problems
				differentiate the speech sounds and improve their accent and modulation while speaking
				understand and illustrate different word roots, word derivatives – synonyms, antonyms and word inflections
				discriminate a variety of sentence types, their structure and use punctuations
				get acclimatized to reading strategies and note making.
				develop proficiency in writing and preparing resume
22	**8HC64**	**Engineering Chemistry Lab**		Methods to prepare inorganic complexes.
				The process to determine surface tension of different liquids using stagnometer
				The process to determine viscosity of lubricants by using redwood viscometer.
				How to find acid value of an oil.
				The principle and determination of Hardness of a water sample.
				The methods to estimate amount of chlorine in water
23	**8EC61**	**Data Structure (C and C++) Lab**		Write programs to implement Stacks, Queues and circular queues.
				Write programs using tree traversals. Inorder, preorder and post order.
				Write Programs on searching, sorting and hashing operations.
				Write programs on Binary trees
				Write programs in C++ to implement classes and operator overloading.
				Construct Isometric Scale, Isometric Projections and Views and convert 3D views to 2D orthographic views

24	**8B262**	**Advanced Engineering Graphics & CAD**		Understand from basic sketching through 2D and 3-D solid modeling using computer aided design (CAD) software
25	**8B292**	**Comprehensive test and Viva-voce-II**		Comprehend the concepts in the core and elective courses.
				Exhibit technical knowlegde to face interviews.
				Exhibit life long Learning skills for higher education and to persue Professional practice.
26	**8B286**	**Technical Seminar II**		Identify current general, political and technology related topics.
				Arrange and present seminar in a effective manner
				Collect, survey and organize content in presentable manner
				Demonstrate oratory skills with the aid of Power Point Presentations
				Exhibit interview facing skills and team leading qualities
	7HC12	**Engineering Mathematics–III (Partial differential equations, Probability and Statistics)**	*1. Form partial differential equations and find the solution to first order linear and nonlinear partial differential equations.*	Form partial differential equations and find the solution to first order linear and nonlinear partial differential equations.
			2. Applications of PDE.	Applications of PDE.
			3. Concepts of the probability, types of random variables and probability distributions.	Learn basic concepts of probability and able to evaluate probability.
			4. Sampling distributions and their properties, concepts on estimation.	Will able to solve problems on discrete and continuous probability distributions.
			5. Concepts on testing the hypothesis concerning to large samples.	Learn basic concepts of sampling distribution and able solve problems on estimation.
			6. Different kinds of tests related to small samples and tests concerned to small size samples and goodness of fit and independence of attributes using chi-square distribution.	Learn basic concepts of test of hypothesis and able solve problems.
	7B306	**THERMODYNAMICS**	· To learn about work and heat interactions, and balance of energy between system and its surroundings	The students will be able to apply energy balance to systems and control volumes, in situations involving heat and work interactions
			· To learn about application of I law to various energy conversion devices	Students can evaluate changes in thermodynamic properties of substances
			· To evaluate the changes in properties of substances in various processes	The students will be able to evaluate the performance of energy conversion devices
			· To understand the difference between high grade and low grade energies and II law limitations on energy conversion	The students will be able to differentiate between high grade and low grade energies.
			· To Learn the application of steam tables and Mollier charts for pure substances(steam)	The students will be able to use property table and Mollier charts to evaluate properties of steam at different states.
			· To understand the processes and efficiencies of basic power cycles	The students will be able to analyze and evaluate the performance of basic thermodynamics cycles
	7B307	**MECHANICS OF SOLIDS**	The objective is to learn the fundamental concepts of stresses, strains, and deformation of solids with applications to beams and columns. Fundamentals of applying equilibrium, compatibility, and force- deformation relationships to structural elements in order to evaluate the strength of materials.	To Understand simple stresses and strains of uniform bars, cross- section varying bars, compound bars and statically in-determinate bars
				To Understand principle stresses, strains and torsion of circular shafts
				To Understand Shear Force Diagrams (SFD) and Bending Moment Diagrams(BMD) for various types of beams
				To Understand bending stresses and shear stresses of different types of beams
				To Understand how to determine deflections of various beams and buckling load of slender columns.
				To Understand how to find out various stresses that are developed in thin and thick cylinders
	7B308	**MATERIALS ENGINEERING**	1. Understanding of the correlation between the internal structure of materials, their mechanical properties and various methods to quantify their mechanical integrity and failure criteria.	Student will be able to identify crystal structures for various materials and understand the defects in such structures.
			2. To provide a detailed interpretation of equilibrium phase diagrams.	Understand how to tailor material properties of ferrous and non-ferrous alloys
			3. Learning about different phases and heat treatment methods to tailor the properties of Fe- C alloys.	How to quantify mechanical integrity and failure in materials

	7B310	MACHINE DRAWING AND COMPUTER AIDED DRAWING PRACTICE	To familiarize with the standard conventions for different materials and machine parts in working drawings. To make part drawings including sectional views for various machine elements. To prepare assembly drawings given the details of part drawings.	Understand the principles and requirements of the machine drawings.
				Understand the various symbols used in machine drawing.
				Understand the principles and requirements of various Assembly drawings.
				Drawing of different machine components
				Imagine and drawing the assembly by seeing the components given.
				Ability to understand the existing geometric modeling and develop a geometric modeling for a new component in design process
	7B362	METALLURGY LAB & MECHANICS OF SOLIDS LAB	To learn the sample preparation technique, etch and observe optical microstructures of ferrous and nonferrous metals/alloys.	acquire the knowledge of preparation of samples for metallurgical study.
			The objective is to learn the fundamental concepts of stresses, strains, and deformation of solids with applications structural elements.	acquire the knowledge of preparation of sample for metallurgical study of a plain carbon steel, cast iron, alloy steel, heat treated steel and their interpretation.
				acquire the knowledge of preparation of sample for metallurgical study of nonferrous metal/alloy and interpretation
				know how to measure the hardness and impact strength of given materials
				measure the modulus of rigidity of given spring, and shaft.
				find the deflection of beams theoretically and paracticaly.
	7B363	FUELS AND LUBRICANTS LAB	• To determine the flash and fire point using Abels Apparatus	
			• To determine the flash and fire point using Pensky Martens Apparatus	To determine the flash and fire point using Abels Apparatus
			• To determine the Viscosity using Saybolt Viscometer	To determine the flash and fire point using Pensky Martens Apparatus
			• To determine the Calorific value using Bomb Calorimeter	To determine the Viscosity using Saybolt Viscometer
				To determine the Calorific value using Bomb Calorimeter
	7B364	FLUID MECHANICS AND HYDRAULIC MACHINERY LAB	To understand the basic principles of fluid mechanics and types of flows. To understand boundary layer concepts and flow through pipes. Evaluate the performance of hydraulic turbines and characteristic curves of pumps.	compute the performance of pelton wheel under working conditions
				compute the performance of francis turbine under working conditions
				compute performance of reciprocating pump under working conditions
				compute the Performance of centrifugal pump under working conditions
				compute the Performance of multistage pump under working conditions
				compute the coefficient of discharge of venturimeter of orifice meter under working conditions
	7HC21	ENVIRONMENTAL SCIENCE AND ECOLOGY	• Understanding the importance of ecological balance for sustainable development.	Understand about ecosystem and energy flow among the organisms.
			• Understanding the impacts of developmental activities and mitigation measures.	Know the resources available, use of them and overexploitation of the resources in the nature.
			• Understanding the environmental policies and regulations Course Outcomes:	Learn the value, use and value of biodiversity.
			• Based on this course, the Engineering graduate will understand /evaluate / develop technologies on the basis of ecological principles and environmental regulations which in turn helps in sustainable development	Understand the causes and effect of pollution and implement measures in control of pollution.
				Understand the sustainable development and implement green technology for sustainable development..
				Learn and implement policy to protect the environment.
	7B393	TECHNICAL SEMINAR III	**To learn the importance of delivering seminars on technologies for demonstrating oratory and interview facing skills.**	Deliver lecture on emerging technologies.
				Explain domain knowledge to resolve real time technical issues
				Demonstrate ability to lead and explain concepts and innovative ideas.
				Demonstrate team leading qualities.
				Demonstrate public speaking skills.
				Exchange new information that would not have been available otherwise.

	7B411	MANUFACTURING PROCESSES	1) To understand the basic casting process and calculate the pattern allowances and design the riser system needed for defect free casting and understand various types of castings and their applications	Select moulding material, pattern and calculate pattern allowances used in casting and design the gating system and Design a suitable riser for the casting and decide specific casting type for a defect free product
			2) To understand the importance of metal forming processes and study the Rolling process	Distinguish between different forming processes and Analyze the forces and power consumed in rolling operation
			3) To gain knowledge in the working principle of Extrusion and Forging operations and learn the various ways of performing theses operations.	Decide the specific forging/ extrusion process for making a part and identify the specific defects if any in the process
			4) To be acquainted with the fundamentals of sheet metal operations and distinguish between various types of operations and learn about plastic processing techniques.	Suggest the sheet metal process for making a part and decide the processing technology for a particular type of plastic.
			5) To understand the various welding processes and learn about the various types of welding operations and their applications.	Propose the type of welding joint and specific welding process for an application and estimate the effect of process variables on arc welding
			6) To gain understanding of powder based manufacturing technique and manufacturing methods of plastic based products	Choose appropriate technique for making discrete parts and opt the specific plastic processing method based on type of plastic.
	7B412	APPLIED THERMODYNAMICS – I	To understand the working principles of 2-stroke and 4-stroke cycles, combustion processes of S.I and CI Engines, working principles of compressors	Compare the air standard, actual and the fuel-air cycles of Internal Combustion Engines.
				Classify IC Engines, understand the working principles of 2-stroke and 4-stroke cycles, draw valve and port timing diagrams and explain different engine subsystems.
				Understand the combustion process in S.I and C.I Engines, the phenomenon of knocking, factors affecting knocking, and different types of combustion chambers for S.I and C.I Engines,
				Understand the performance parameters, methods of measurement of brake and friction power and Draw the heat balance diagram.
				Understand the working principles of Roots blower, vaned blower, reciprocating compressor- single stage and multi-stage compression with inter cooling.
				Understand the working principles of centrifugal and axial compressors and draw the velocity diagram and calculate the Compressor Power input and efficiency.
	7B413	KINEMATICS OF MACHINES	*The main objective of this course is intended to cover the field of engineering theory, analysis, design and practice that is generally described as mechanisms and kinematics of machines.*	Understand the basic concepts of mechanism, types of mechanisms and inversions difference between machine mechanism and structure.
				Understand velocity and acceleration diagram in order to evaluate the inertia forces in mechanism and machines.
				Understand the concept of steering gear mechanism, types and Hooke's joint with respect to an automobile
				In order to understand and design complex motions possible out of Cam's and Followers.
				Understand the concept of toothed gears and selection different types of gear trains in order obtain required velocity ratios.
				Understand transmission power by various means like belts, rope and chains and their advantages and limitations.
	7AC48	Electrical and Electronics Engineering		Understand the fundamentals of electrical engineering and DC machines.
				Understand the principles of AC circuits.
				Understand the principle and operation of three phase induction motor and measuring instruments.
				Understand the principle and operation of diode.
				Understand the principle and operation of transistor.
				Understand the principles of digital electronics
	7ZC22	(Open Elective-I) BASICS OF ENTREPRENEURSHIP		The students' will acquire basic knowledge on Skills of Entrepreneurship.
				The students' will understand the techniques of selecting the customers through the process of customer segmentation.
				Business Models and their validity are understood by the students'.
				The basic cost structure and the pricing policies are understood by the students'.
				The students' will acquire knowledge about the project management and its techniques.

				The students' get exposure on marketing strategies for the Start up.
	7ZC01	MANAGEMENT SCIENCE AND FINANCIAL ACCOUNTING (MSFA)	To make students understand the basics of management and Financial Accounting, its principles, practices and latest concepts for increasing the performance of engineering graduates in their respective fields, which facilitate them in making better planning and decisions.	Outlines the significance of management, defines the basic concepts and applicability of management principles in changing paradigms.
				Helps in understanding organization behavior, personality determinants and other key aspects
				Infers the need to understand the importance of Strategic management and Business environment in particular
				Enrich students with basic concepts of Financial Accounting.
				Understand basic concepts of Depreciation and need for preparing trial balance.
				Helps in preparation of Financial Statements (final accounts).
	7AC95	Electrical and Electronics Engineering Lab		Understand the fundamentals of electrical engineering and DC machines.
				Understand the principles of AC circuits.
				Understand the principle and operation of three phase induction motor and measuring instruments.
				Understand the principle and operation of diode.
				Understand the principle and operation of transistor.
				Understand the principles of digital electronics
	7B465	MANUFACTURING PROCESSES LAB		Make a pattern preparation of sand mould and cast the part
				Perform welding operation under different conditions and test the quality of the weld
				Make use of plasma technique for accurately cutting metals and also perform brazing operation
				Identify the various press working operations and various parts of hydraulic press and perform operations
				Choose the appropriate plastic moulding method to manufacture a plastic product
	7B494	TECHNICAL SEMINAR-IV		Deliver lecture on emerging technologies.
				Explain domain knowledge to resolve real time technical issues
				Demonstrate ability to lead and explain concepts and innovative ideas.
				Demonstrate team leading qualities.
				Demonstrate public speaking and lifelong learning skills for higher studies and to pursue professional practice.
				Exchange new information that would not have been available otherwise.
	7B466	COMPREHENSIVE VIVA VOCE - I		Comprehend the concepts in the core and elective courses.
				Exhibit technical knowlegde to face interviews.
				Exhibit life long Learning skills for higher education and to persue Professional practice.
	7B514	APPLIED THERMODYNAMICS – II	**The main objective of the course is to offer the students fundamental knowledge of Rankin cycles, Working of different boilers, working principle of different types of Turbines & Rocket engines.**	Understand steam power plants and the Rankine cycle on p-v, T-S and h-s diagrams and working principles and basic design parameters of different types boilers.
				Understand the function of steam nozzle, Wilson line
				Understand the difference between impulse and reaction turbines, draw velocity diagrams and understand the Principle of operation of reaction turbine, features of Parsons reaction turbine and to draw the velocity diagrams for the same
				Understand the working principles of different condensers and understand the gas turbine power plants
				Understand the working principle of jet propulsion and rocket engines
				Understand the working of refrigeration and air conditioning
			1. Students will learn the mechanical design process / philosophy, the need for and use of standards as part of the same, the selection of materials for mechanical design.	Use different theories of failure for designing machine members subjected to steady loads and fatigue loads.

7B515	**DESIGN OF MACHINE MEMBERS – I**	1. Students will learn to design mechanical components subjected to static and variable loading, apply related theories of failure to design based on strength and rigidity; and apply the concepts thereof to design of various fundamental mechanical components.	Use different criteria of failure for designing machine members subjected to fatigue loads.
			Develop ability to analyze, design and select shafts, keys, couplings, cotter and knuckle joints.
			Able to analyze and design the helical coiled and leaf springs.
			Identify the applications where Temporary (threaded and bolted) joint and permanent (riveted) joints are used for various applications - with attention to design requirements.
			able to design and analyze various Welded joints
7B516	**METAL CUTTING & MACHINE TOOLS**	To teach students the fundamental concepts of Additive Manufacturing, techniques involved and their advantages and limitations and various applications of these technologies in relevant fields such as mechanical, Bio-medical, Aerospace, electronics etc.	Understand the basic metal cutting process and parameters, Forces in metal cutting ,various chips, tool materials, basic relations in metal cutting
			Understand the thermal aspects of metal cutting, tool wear, tool life, various cutting tool materials and economic analysis of machining
			Understand the principle and working of lathe, shaping, planning, slotting machines and Drilling machines and estimate the machining time
			Understand the principle and working of Milling machine and Broaching machine
			Understand the principle and working of Grinding machine, Lapping and Honing machine
			Understand the principle of Jigs & Fixtures and the principles of advanced machining processes
7B517	**DYNAMICS OF MACHINERY**	*The main objective of this course is intended to cover the field of engineering theory, analysis, design and practice that is generally described as dynamics of machinery.*	Understand the phenomenon of friction and in developing different applications like, brakes, clutches and dynamometers etc.
			Understand the effect of precession motion on the stability of moving vehicles.
			Understand and development of speed controlling devices like flywheel.
			Understand how to control speed in engines or turbines by governors.
			Understand how to balance different systems, machines and engines.
			Understand how to do analysis of different vibrating systems.
7ZC23	**ADVANCED ENTREPRENEURSHIP (Open Elective-II)**	The course is designed to impart the necessary managerial skills and tactics required for an emerging Entrepreneur for the Engineering students to enhance their prospects as an Entrepreneur	The Students' gain knowledge on the stages of Startup and the turbulence environment it undergoes and the stages related to growth of the Startup.
			The Students are exposed to the various business models and critically evaluating the effectiveness of the business models.
			The students understand the method of business traction and the need of customer relationship management.
			The students understand the various channels of revenue building and exploration of new revenue avenues.
			The students understand the need of sales planning and sales management and also financial modeling
			The students are exposed to the legal implications effecting the company's prospects and the issues related to intellectual property rights.
7ZC26	**BASICS OF POLITY AND ECOLOGY (Open Elective-II)**	To provide basic knowledge relating to the Indian Polity and Ecology, thus making the students appreciate the current aspects related to both polity and ecology.	Gain knowledge relating to the Indian Constitution and the Preamble to the Constitution.
			Gain knowledge relating to the fundamental rights and duties of the Indian citizens and the directive principles of state policy.
			Students will learn about the federal structure and judiciary of India.
			Comprehend knowledge relating to the conservation of the environment.
			Learn about bio-diversity and climatic changes occurring in the environment.
			Know about the international treaties, conventions and organizations active in the field of environmental protection.

7FC03	PYTHON PROGRAMMING (Open Elective-II)	Use Python interactively, execute a Python script at the shell prompt, use Python types, expressions, and None, use string literals and string type, use Python statements (if...elif..else, for, pass, continue, . . .),	Gains exposure towards Python versions and their specifications.
		understand the difference between expressions and statements,	Build programs using primitive data types.
		understand assignment semantics, write and call a simple function., utilize high-level data types such as lists and dictionaries,	Write applications that include functions, modules, packages along with respective exceptional handling mechanism.
		understand the difference between mutable and immutable types, write a simple class and access methods and attributes, import and utilize a module, read from and write to a text file.	Writes applications using OO features of Python
			Write applications using Files.
			Hands on exposure on NumPy/Tkinter/Plotpy modules.
7H518	QUANTITATIVE APTITUDE	**By learning Quantitative Aptitude, student learns the techniques to solve all the problems in his real life..It can improve the numerical ability. The quicker methods are useful to solve the problems within the time and it is helpful in his duties. Student can use Quantitative Aptitude in everyday life to figure out mathematically. Student can improve his mental capacity. It helps in sharpening their minds**	The questions given on testing divisibility, prime number and questions of HCF and LCM .
			The questions given on averages, percentage and profit and loss.
			The questions given on ratio and proportion.
			The questions given on simple and compound interest.
			The questions given on time and work, time and distance.
			The questions given on mensuration and data sufficiency.
7FC20	Cyber Security	To familiarize with network security, network security threats, security services, and countermeasures	The students will be able to understand cyber-attacks, types of cybercrimes.
		To be aware of computer security and Internet security.	Realize the importance of cyber security and various forms of cyber attacks and countermeasures.
		• To study the defensive techniques against these attacks.	Get familiar of cyber forensics.
		• To familiarize with cyber forensics.	Get familiar with obscenity and pornography in cyber space and understand the violation of Right of privacy on Internet.
		• To be aware of cyber crime related to mobile and laptop etc.	Cyber laws and also how to protect them self and ultimately the entire Internet community from such attacks.
		• To acquire knowledge relating to Cyberspace laws and Cyber crimes. • To understand ethical laws of computer for different countries, Offences under the Cyberspace and Internet in India.	Elucidate the various chapters of the IT Act 2008, power of Central and State Government to make rules under IT Act 2008.
7B567	APPLIED THERMODYNAMICS LAB	To integrate the concepts, laws and methodologies from the first course in thermodynamics into the analysis of cyclic process. to apply the thermodynamic concepts into various thermal application like I.C Engines, Steam turbines, compressors and Refrigeration and Air Conditioning systems	Performance test on air compressor will make the student to analyze the performance of the compressor
			Disassembly and assembly of I.C engine and Valve timing diagram will make the student understand the internal components and their functionality and study of boilers
			Heat balance test and performance of four stroke single cylinder diesel engine and will make the student understand have the energy supplied to the engine
			Vapour compression Refrigeration system and Air conditioning system will make the student understand the components and working of a refrigeration cycle
			computerized IC engine and variable compression ratio engine performance will make the student understand have the energy supplied to the engine in distributed in a cycle.
			Performance of four stroke petrol engine and Morse test will make the student understand have the energy supplied to the engine**.**
7B568	MACHINE TOOLS LAB	This course gives students the opportunity to obtain skills in machine shop operations under the supervision of qualified machine shop personnel. They also understand the safety aspects of handling machines and work effectively with others and conduct themselves ethically and responsibly in a machine shop context	Make simple products using lathe and covering various machining operations as per drawing
			Produce jobs as per drawing using shaper, Planer and Slotter machines

			Understand the principle and working of Drilling machine and conduct various machining operations as per drawing
			Work on Tool & Cutter Grinding, Milling machine and conduct various machining operations as per drawing
			Perform surface grinding operation and conduct alignment test on lathe and drilling machines
7B569	Kinematics & Dynamics of Machines Lab	To expose practical knowledge in kinematics and dynamics of planar mechanism and vibrations	Understand the concept of vibrations, able to calculate the acceleration due to gravity and stiffness of the spring.
			Understand concept of radius of gyration
			Draw the displacement diagram of cam and follower and study the characteristics of governor
			Understand the torsional vibrations
			Understand the gyroscopic effects and balancing of rotating masses
			Understand the pressure distribution in a journal bearing and critical speeds of shafts.
7B595	TECHNICAL SEMINAR-V		An ability to utilize technical resources
			An ability to write technical documents and give oral presentations related to the work completed.
7B618	HEAT TRANSFER	To understand the fundamentals of heat transfer mechanisms in fluids and solids and their applications in various heat transfer equipment in process industries.	To demonstrate basic knowledge of heat transfer by understanding: differences between conduction, convection and radiation; Students shall be able to formulate basic differential equations for heat transfer; Students must able to understand the importance of thermal conductivity of materials.
			To deal with problems like conduction through walls and composite walls; critical radius of insulation; heat transfer in fins; Transient heat transfer.
			To Calculate of heat transfer coefficient; overall heat transfer coefficient; log-mean temperature differences.
			To differentiate forced and natural convection problems correlations; and demonstrate the use of Biot, Nusselt, Reynolds, Grashof, Rayleigh and Prandtl numbers; basic radiative heat transfer, basic principles of mass transfer.
			To make the students capable of employing the heat transfer principles during phase change processes in heat exchangers; To bring in confidence to apply the principles in industrial appliances and machinery like Power Plants, Heat Exchangers, coolers etc
			To understand basic principles of radiation heat transfer and radiation heat exchange between surfaces.
7B619	DESIGN OF MACHINE MEMBERS-II	1. Students will understand the concepts associated with design of bearings, engine parts, gears, and cylindrical pressure vessels.	Design bearings and select appropriate bearings using bearing catalogs.
		2. Students will understand the significance and apply statistical methods to design simple machine members.	design parts of internal combustion engine
			derive design expression for spur and bevel gears
			design helical and worm gears
			gain skills to design various pressure vessels.
			Learn the application of statistical mathematics for machine design subject.
7B620	METROLOGY AND INSTRUMENTATION	**The objectives of the course are to** provide required knowledge for mechanical measurements The course exposes the students to the principles of measurement, gauges	Understand the concept limits,fits,and tolerances and their practical applications,different linear measurements and angular measuring instruments.
			Understand and design the limit gauges, evaluate surface roughness & its measurement
			Understand screw threads and gear metrology and application of interferometry to flatness measurement
			Understand the features of basic measurement system and various static and dynamic characteristics of instruments
			Understand the principle of various instruments to measure pressure and temperature
			Understand the principle of various instruments to measure the displacement, force, torque and vibrations
			Identify the importance of CAD/CAM in modern manufacturing systems and explain the hardware used for CAD/CAM systems.

7B621	CAD/CAM and FEA		Describe different geometric modelling techniques to represent the surface and solid models and transformation of geometric entities using transformation matrices
			Asses the difference between conventional and NC technologies and develop part programs for manufacturing simple components
			Formulate mechanical problems such as trusses and beams into finite elements
			Understand the basic terminologies of finite element method and able to derive finite element equilibrium equations for 1D finite element problems.
			Derive finite element equation for 2D and axi-symmetric, isoperimetric problems and structural dynamic problems in engineering applications.
7FC23	Data Base Systems (Open Elective - III)		Students will learn basics of databases and understand the architecture of database management systems.
			Students will learn about good database design techniques and database theories behind.
			Understand conceptual database designs, and functional dependencies and normalization.
			Students will understand the Mathematical foundation for relational databases.
			Student will be able to understand concept of Constraints, Views and will be able to create dynamic databases.
			Learn transaction management, concurrency controls.
7ZC24	Innovation and Design Thinking (Open Elective-III)		The students gain the knowledge on the inputs required for innovation and also gain familiarity on Entrepreneurship.
			The students will get exposure on creative methods of ideation and the importance of protecting the ideas.
			The students gain knowledge on design thinking and types of thinking.
			The students gain familiarity on emerging technologies like Internet of things (IOT).
			The students understand the process of building the startup.
			The students gain knowledge on various startup funding and also to branding building for the startup.
7ZC27	Indian History, Geography & Culture (Open Elective-III)		To appreciate and understand our Indian History, Culture and Indian heritage.
			To understand earth evolution and world climatic change.
			To understand India Oceanography.
			Able to enhance and understand Indian monsoons, Indian agriculture.
			To understand secularism of our country.
			To appreciate and understand the social reformers who brought revolutionary changes in Indian society.
7ZC15	FINANCIAL INSTITUTIONS, MARKETS AND SERVICES (Open Elective-III)		This unit enables the students to understand the financial structure and the financial sector reforms after 1991.
			The unit gives the exposure on the role of RBI and the Regulating and credit policies adopted by the RBI.
			The students get awareness on the role of Non-Banking financial institutions and the role of financial institutions in India.
			The unit educates the students to know the role of regulatory bodies like SEBI and also to know the capital and money market instruments
			The unit equips the students to understand about the asset fund based financial services
			The students will get exposure about the investment banking and merchant banking.
			Understand the principle of operation of different types of instruments viz., PMMC, moving iron type of instruments, the required characteristics of an instrument in general. The student demonstrates the ability to compensate for the errors in the instruments and to extend the range of the instruments.

7AC44	Fundamentals of Measurements and Instrumentation (Open Elective-III)		Demonstrates the knowledge of Potential and Current transformers; the errors in them and the effect of having an open/short in the secondary circuits; Understand the principle of operation of Dynamometer and Moving-iron type of Power factor meters.
			Comprehends the principle of operation of dynamometer type of Wattmeter and Induction type of Energy meter; use the wattmeter to measure the Active and Reactive power and demonstrates the ability to extend the range of them.
			Identify and use different techniques of measurement of Resistance, Inductance and Capacitance values.
			Understand the principle of operation of Different type of digital voltmeters, wave analyzers, spectrum analyzers and Cathode ray Oscilloscope.
			Demonstrates the ability in characterizing the different types of transducers and uses them to measure Strain, Gauge Sensitivity, Displacement, Velocity, Acceleration, Force, Torque and Temperature.
7DC55	Internet of things(IOT) (Open Elective-III)		Identify the implementation layers of an IoT application system
			Summarize the characteristics and challenges of designing SDN and NFV
			Describe the management of an IoT system using necessary protocols
			Design, Develop and Illustrate IoT applications using Raspberry PI platform and Python Scripting
			Implement web based services on IoT devices
			Design new projects using Raspberry PI
7H619	LOGICAL REASONING		The questions given on series completion and analogy.
			The questions given on odd one out in classification and coding and decoding.
			The questions given on blood relations.
			The questions given on directions and Arithmetical reasoning.
			The questions given on Venn diagrams, cubes and dice. .
			The questions given on clocks and calendar.
7EC22	ARTIFICIAL INTELLIGENCE (Mandatory Course)		Understand the concepts of state space representation and calculate time and space complexities of exhaustive search and heuristic search together.
			Apply AI techniques to solve problems of advanced searching techniques.
			Distinguish different knowledge representation techniques.
			Comprehend the applications of Probabilistic Reasoning and Bayesian Networks.
			Analyze different learning techniques and decision trees.
			Use techniques to represent domain knowledge of the expert systems.
7HC74	Soft Skills and Technical Communication		make a self-assessment
			enhance their soft skills and behavioral patterns
			equip themselveswith the required skillset for their career advancement
			develop interpersonal communication skills
			participate in group tasks and use effective language skills in interviews
			overcome stress and enhance employability quotient
7B671	CAD/CAM LAB		Draw computer Aided 2D drawings to solve design and manufacturing problems using CAD CAM principles.
			Acquire skills of developing geometric modeling of 3D components
			Developing assemblies different machine elements and import and export CAD models one software to anther software
			Learn skills of writing CNC part programming.
			Understand how to machine simple components on CNC lathe and CNC mill
			Understand how to simulate the articulated robot and Fabricate simple components on 3D printing machine

7B672	HEAT TRANSFER LAB		Compute the thermal conductivity of a given material rod and composite wall understand the physical significance of the thermal conductivity of the given material insulating powder. **(CO1)**
			To calculate thermal conductivity of lagged pipe and insulating powder under given conditions.
			To compute the forced ad free convection heat transfer coefficients under given conditions from fundamentals.
			Able to calculate LMTD for parallel flow and counter flow heat exchangers and overall heat transfer coefficient. and pinfin apparatus.
			should be able to calculate the emissivity of a given surface and to calculate Stefan-Boltzmann's constant experimentally.
			Understand the phenomena of pool boiling and to draw the boiling curve by showing different phases of boiling. and study the heat pipe
7B673	Metrology Lab		Student will become familiar with the different instruments that are available for linear, angular, roundness and roughness measurements
			they will be able to select and use the appropriate measuring instrument according to a specific requirement (in terms of accuracy, etc).
7B674	Group Project		Students use the concepts learned in the courses, so far, in conceptualizing, designing and executing the projects.
			Enables to apply modern tools and technologies for project works
			Inculcates an enthusiasm to use the creative ideas to execute projects to meet the current needs of the society.
			Enhances communicative skills and team work
			The students learn the ability to work as an individual with multidisciplinary approach
7B675	Comprehensive Viva-voce-II		Perform well in Technical interviews
			Apply knowledge in building their career in particular fields.
			Enhance their communication skills and interactive-ness.

6B729	METROLOGY and INSTRUMENTATION	The objectives of the course are to provide required knowledge for mechanical measurements The course exposes the students to the principles of measurement, gauges	Understand the concept limits,fits,and tolerances and their practical applications,different linear measurements and angular measuring instruments.
			Understand and design the limit gauges, evaluate surface roughness & its measurement
			Understand screw threads and gear metrology and application of interferometry to flatness measurement
			Understand the features of basic measurement system and various static and dynamic characteristics of instruments
			Understand the principle of various instruments to measure pressure and temperature
			Understand the principle of various instruments to measure the displacement, force, torque and vibrations

6B730	**FINITE ELEMENT METHOD**	To provide the fundamental concepts of the theory of the principles finite element method	Identify mathematical model for solution of common engineering problems related to 1D problem
		To enable the students to formulate the beam and 2D design problems into FEA.	Formulate mechanical problems such as trusses and beams into finite elements
		To introduce basic aspects of finite element technology in symmetric and axi symmetric solid design problems.	Derive Finite element matrix equation for 2D and ax symmetric problems by different methods by applying basic laws in mechanics to apply isoparametric formulation to engineering problems
		To introduce the basic aspects of finite element technology in higher order elements with natural coordinate system	Solve thermal problems using FEM
		To introduce the basic aspects of finite element technology in scalar field problems	Use professional-level finite element software to solve engineering problems related to structural dynamics and heat transfer problems.
		To introduce the application of generalized finite element software's in different design problems	He should also in a position to handle open end design related projects in multi disciplinary subjects.

6B732	**REFRIGERATION and AIR CONDITIONING (Professional Elective-II)**	To understand the principles of refrigeration and air conditioning	Understand air refrigeration and types of air refrigeration systems
		To calculate the cooling load for different applications.	Principle and working of VCR system and understand T-S and P-h diagrams of VCR cycles
		To select the right equipment for a particular application.	Principle and working of types of compressors , condensers, expansion devices and evaporators, and Types of refrigerants , and uses
		To design and implement refrigeration and air conditioning systems using standards.	Understand the working of VARS and difference between VARS and VCR; understand the working of LI-Br Absorption system, Steam jet Refrigeration System. Understand the working Thermo-electric refrigeration system, Vertex tube.
			Types of A.C Systems and related load calculation problems
			Understand the elements of A.C systems, Understand the different heat pump circuits

6B733	**Advanced Manufacturing Processes**	to impart basic principles and applications related to un - conventional machining and micro&Nano fabrication techniques.	1.Understand abrasive and electrical discharge machining processes.
			2.list the advances in casting
			3.learn principles and applications of electron beam, ion beam and laser hybrid welding processes.
			4. apply advanced forming processes to manufacture mechanical products
			5.Understand the advantageous of micro fabrication
			6. realize the importance of nano fabrication.

6B737	**RENEWABLE ENERGY SYSTEMS (Professional Elective-III)**	To enlighten students about different types of renewable energy resources available across globe and their technologies and limitations.	1. Recognize the ways of solar energy utilizations in terms of conversion to thermal and electrical energy.
			2. Describe the challenges and problems associated with the use of Bio mass as energy as an energy source.
			3. Discuss potential of technological implications in Biogas plants.
			4. List and describe wind energy plants as the primary renewable energy resources and technologies.
			5. Describe/illustrate basic concepts and system components of Geothermal, tidal, and wave energy
			6. Learn the methods of production of Hydrogen and utilization as an energy source.

6B740	**MECHATRONICS (Professional Elective-III)**	to model and analyze electrical and mechanical systems and their interconnection for engineering applications.	1. able to understands the significance of integration of mechanical, electronics, control and computer engineering and also focuses the role of sensors. 2. able to learn the complete theory of various sensors. 3. be able to get skill to select appropriate actuators for different applications. 4. become proficient in building linear models of mechatronics 5. become proficient in the programming of microcontrollers. 6.able to demonstrate PLCprogramming

6GC49	**INTELLECTUAL PROPERTY RIGHTS**	This course is intended to impart awareness on intellectual property rights and various regulatory issues related to IPR	Demonstrate a breadth of knowledge in Intellectual property
			Overview of Patents, Searching ,filling and drafting of Patents
			Overview of copyright & GI .
			Overview of Trade Mark & Trade Secret,
			Overview of Integrated Circuit and Industrial Design.
			Knowledge about different national and international : Conventions and Treaties Governing the IPRs

6ZC03	**MANAGEMENT SCIENCE**	The course is aimed at giving the basics of management, its principles, practices and latest concepts for increasing the performance of engineering graduates in their respective fields.	

6B842	**POWER PLANT ENGINEERING (Professional Elective-IV)**	To make the student to aware of components of power plants that run using conventional and nonconventionalmethods, factors affecting the site selection for a power plant and concept of base load plantand peak load plant To make the student	• Understand Concept of Steam power plant layout, Different sources of energy, Fuel handling equipments,
			• Understand Types of coals, coal handling, Coal storage, ash handling systems
			• Understand Concept of Diesel Power Plant, Gas turbine plant, with auxiliaries
			• Understand Concept of water power, hydrological cycle, Hydrographs, pumped storage plants and type dams and spill ways
			• Understand Concept of Solar collectors, solar energy, Fuel cells, thermo electric and thermo ionic, MHD generation,Nuclear fuel and reactors
			Understand Concept of Capital cost, Different types of costs used in power plants, different types of factors

6B847	**JET PROPULSION and ROCKET ENGINEERING (Professional Elective-V)**	To make the student aware of various propulsion devices and use of thrust equations.	• understand open, closed and semi closed cycle of gas turbines, thermal jet engines, classification of energy flow, trust power and propulsion efficiency
		To make the student to know the working of Ramjet engine in detail.	• understand essential components of turbo pro and turbo jet performance evaluation, thrust augmentation
		To make the student to understand the working of rocket engine and detail study on fuels used in rocket	• understand plant layout of Ramjet , principle of operation,

			• understand liquid propellant Rocket engines, compassion of propulsion systems.
			• understand flight mechanics, applications of trust profiles, rocket heat transfer and ablative to cooling
			• understand criogenics, advanced propulsion systems, elementary treatment of Electrical Nuclear and Plasma Arc propulsion.

SREENIDHI INSTITUTE OF SCIENCE AND TECHNOLOGY

DEPARTMENT OF CIVIL ENGINEERING

Course Outcomes of All the Subjects (AY 2020-21)

	Course	Course Outcomes *At the end of the respective course, the student will be able to:*
I-I	8HC04 -ENGINEERING CHEMISTRY	1. Understand and analyse microscopic chemistry in terms of atomic orbitals, molecular orbitals and intermolecular forces. 2. Identify and differentiate polymers, thermoplastic, thermosetting plastics and various lubricants. 3. Recognize and select the domestic and industrial problems caused by hard water and also learn about the municipal water treatment using various methods. 4. Understand and interpret the important fundamental concepts of electrochemistry and solve the problems related to batteries. 5. Differentiate the types of corrosion and methods used to prevent the corrosion. 6. Learn and implement surface coating techniques.
	8FC01-Problem Solving using C	1. To formulate simple algorithms for arithmetic, logical problems and to translate the algorithms to programs(in C language) 2. To test and execute the programs and correct syntax and logical errors, to implement conditional branching, iteration and recursion 3. To decompose a problem into functions and synthesize a complete program using divide and conquer approach. 4. To use arrays, pointers and structures to formulate algorithms and programs. 5. To apply programming to solve matrix addition and multiplication problems and searching and sorting problems. 6. To apply programming to solve simple numerical method problems, namely rot finding of function, differentiation of function and simple integration.
	8HC09-CALCULUS AND MATRIX METHODS	1. Verify the mean value theorems and also express the given function in series form using Taylor's theorem. 2. Solve the problems using special functions; evaluate surface areas and volumes of revolutions. 3. Determine the convergence, divergence or oscillating nature of a series and express the function as trigonometric series. 4. Compute the extreme values of a function defined with and without constraints. 5. Check the consistency or inconsistency of a linear system and ability to solve real time problems. 6. Calculate the Eigen values and Eigen vectors of a matrix and their application for orthogonal transformation.
	8HC08-INTRODUCTORY MATHEMATICS, ANALYSIS AND REASONING	Solve the questions given on testing divisibility, HCF and LCM,averages, percentage and profit and loss, ratio and proportion simple and compound interest, time and work, time and distance and etc. Also able to solve the questions given on series completion and analogy, odd one out and coding and decoding, blood relations, directions and Arithmetical reasoning, Venn diagrams,cubes and dice, clocks and calendar
	8HC01-Oral Communication Skills	enhance their oral communication skills develop their skill of speaking extemporaneously enrich their vocabulary and subsequently hone their verbal aptitude make formal presentations both online and offline. listen and comprehend well grasp the nuances of the art of group discussion
	WORKSHOP/MANUFACTURING PROCESSES (Theory)	1) To understand various basic tools to perform simple joints using metal and wood. 2) To understand the principle of various electrical and electronic appliances and their applications. 3) To understand the manufacturing process of welding, casting and tin smithy and their applications. 4) To understand the operation of basic as well as advanced machines used for fabrication of Metals, Plastics and Glass.

	8HC64 Engineering CHEMISTRY LABORATORY	1. Prepare Inorganic compounds 2. Determine surface tension of a liquid 3. Determine viscosity of lubricant 4. Determine acid value of an oil 5. Estimate hardness of water 6. Analyse the amount of chloride content 7. Determine cell constant and conductance of solutions 8. Determine redox potential and emf of solutions 9. Determine the rate constant of acid 10. Synthesize a polymer (Thiakol rubber / Urea-Farmaldehyde resin) 11. Synthesize a drug- Aspirin 12. Estimate Mn+7 by Colorimetry method
	8FC61-Problem Solving using C Lab	1. To formulate the algorithms for simple problems 2. To translate given algorithms to a working and correct program 3. To be able to correct syntax errors as reported by the compilers 4. To be able to identify and correct logical errors encountered at run time 5. To be able to write iterative as well as recursive programs 6. To be able to represent data in arrays, strings and structures and manipulate them through a program 7. To be able to declare pointers of different types and use them in defining self referential structures. 8. To be able to create, read and write to and from simple text files.
	WORKSHOP/MANUFACTURING PROCESSES LAB	CO-1: Use various types of conventional manufacturing Processes CO-2: Manufacture components from wood, MS flat, GI Sheet etc. – hands on experience CO-3: manufacturing of components by machining like shafts, holes & threaded holes, surface finishing of components etc. CO-4: Produce small devices / products /appliances by assembling different components
	8K191-TECHNICAL SEMINAR –I	1. Demonstrate public speaking with the aid of Power Point Presentations 2. Identify current general and specific technological topics of interest and prepare and present the content cogently. 3. Demonstrate communication skills and interview performance skills
I-II	8HC06-APPLIED PHYSICS (Theory)	1. Get the knowledge to classify the crystal structures, their parameters and draw the various crystal planes using Miller indices. 2. Understand and analyze the various crystal defects-its types, strain hardening. 3. Understand about the vibrations, periodic motion, radius of gyration, moment of inertia and apply the knowledge of ultrasonic, non destruction testing, Magnetostriction, Piezo-electricity. 4. Analyze the wave nature and its types, superposition principle, differentiation between interference, diffraction and their applications 5. Explain about emission, its types, laser principle, types, working and its applications and also to understand the radioactivity, fusion & fission, alpha, beta and gamma rays decay and its applications. 6. Summarize nano & bulk concepts, surface to volume ratio, quantum confinement, CNTs and preparation methods (physical & chemical), analysis the techniques like XRD, SEM, TEM
	8K201-Engineering Mechanics (For Civil Engineering)	1. To analyse the system of forces and draw free body diagrams to solve problems dealing with a system of forces in a plane 2. To understand the concept of friction and types of friction such as wedge friction; to analyse plane frames and solve it using either the method of joints or the method of sections 3. To understand concepts of Centroid and center of gravity and able to compute CG for simple and compound shapes; to understand the concept of Moment of Inertia, Mass moment of Inertia and able to compute MI for various regular and composite shapes and bodies 4. To understand the concept of virtual work and apply the concept for equilibrium condition. 5. To understand and perform analysis of motion under kinematics such as rectilinear and curvelinear translation of a particle or of a rigid body 6. To understand anlaysis of a body under dynamics such as work energy principle for translation and fixed axis rotation, understand inpulse and momentum concepts

8HC12-DIFFERENTIAL EQUATIONS & INTEGRAL CALCULUS	1. Find the solutions of first order first degree and not of first degree differential equations and their applications such as Newton's law of cooling, Natural growth and decay. 2. Identify and solve higher order ordinary differential equations with constant coefficients using some standard methods and also their applications in vibration of motion. 3. Solve first order partial differential equations. 4. Solve the problems of Heat and wave equations. 5. Evaluate multiple integrals 6. To solve problems of surface and volume integrals.
8EC01 - DATA STRUCTURES and C++	1. Explain Abstract data type, stack and Queues with their applications 2. Write programs on Singly linked lists, doubly linked lists, Circular list and explain their operations. 3. Explain concepts of Trees, AVL Trees and Graphs with examples and applications. 4. Describe and solve problems of searching and sorting and evaluate the time complexity of each algorithm. 5. Explain concepts of OOPs and implement programs using objects, classes, constructors and destructors. 6. Explain and apply concepts of oops, write programs implementing functions, operator overloading and inheritance.
8HC02-Written Communication Skills	1. upgrade their knowledge of basic writing skills, writing cohesive paragraphs and effective letters. 2. differentiate between confusing words, learn correct spellings and have a sound grip over the use of phrasal verbs. 3. master the techniques of reading passages and comprehending them. 4. understand the nuances of technical communication and apply it in their academic and professional career. 5. acquaint themselves with soft skills like having the right attitude towards life and boosting self-confidence. 6. learn the importance of building strong resume and the ways of building it.
8BC02-ENGINEERING GRAPHICS	1) Get familiar to use the instruments to solve the engineering problem and draw various type of curves used in engineering 2) Understand and Implement Orthographic projections and draw projections of simple drawing entities such as points Lines, and Planes 3) Draw projections of different types of regular solids in various positions wrt principal planes of projection 4) Draw Sections of various Solids including Cylinders, cones, prisms and pyramids and draw the developments of these solids and their sections. 5) Construct Isometric Scale, Isometric Projections and Views and convert 3D views to 2D orthographic views 6) Understand from basic sketching through 2D and 3-D solid modeling using computer aided design (CAD) software
8HC65 -APPLIED PHYSICS LAB	1. Understand and search to apply the fundamentals of magnetic induction, Ampere's law, Oersted's law and the Biot-Savart law. 2. Analyze the difference between normal diode, LED, forward bias, reverse bias, I-V characteristics, direct and indirect band gap semiconductors. 3. Analyze the LCR circuit combination, parallel, series electrical resonance, inductance, reactance, capacitance and electrical and electronic fundamentals. 4. Characterize the RC network, time constant, capacitor functioning and its application. 5. Analyze the concept and application parts of radius of gyration and periodic vibrations. 6. Summarize the fundamentals of modulus-types, stress, strain, elasticity, plasticity and Hook's law. 7. Know about the light properties-dispersion, prism, spectrometer and minimum deviation arrangement. 8. Understand the concepts of interference, conditions, formation of Newton's rings-reason. 9. Recognize the difference between the interference and diffraction, grating, laser characteristics. 10. Understand the concept of radiation, ionizing radiation, radiological protection and inverse square law. 11. Demonstrate the resonance phenomenon and verify the transverse laws of stretched strings by using Sonometer. 12. Describe the types of waves like longitudinal, transverse, stationary and progressive waves. Electromagnetic induction and its applications.

	8EC61 - DATA STRUCTURES (C/C++) LAB	1. Write programs to implement Stacks, Queues and circular queues. 2. Write programs using tree traversals. Inorder, preorder and post order. 3. Write Programs on searching, sorting and hashing operations. 4. Write programs on Binary trees 5. Write programs in C++ to implement classes and operator overloading.
	8K291-TECHNICAL SEMINAR –II	1. Demonstrate public speaking with the aid of Power Point Presentations 2. Identify current general and specific technological topics of interest and prepare and present the content cogently. 3. Demonstrate communication skills and interview performance skills
II-I	7BC04-ELEMENTS OF MECHANICAL ENGINEERING	1. To acquire the knowledge of basic concepts of thermodynamics and analyze the p-v & t-s diagrams of the different cycles. 2. To acquire the knowledge two and four stroke engines,the function of components used in the steam power plant 3. To identify & understand the function of components used in VCR & VAR system, & about the working of hydraulic pumps & hydraulic turbines. 4. To identify & understand properties of material and engineering application 5. To acquire the knowledge of various types of power transmission systems 6. To acquire the knowledge the different NC and CNC machine
	7HC12-Engineering Mathematics–III	1. Form partial differential equations and find the solution to first order linear and nonlinear partial differential equations. 2. Applications of PDE. 3. Learn basic concepts of probability and able to evaluate probability. 4. Will able to solve problems on discrete and continuous probability distributions. 5. Learn basic concepts of sampling distribution and able solve problems on estimation. 6. Learn basic concepts of test of hypothesis and able solve problems.
	7K301: Introduction to Solid Mechanics	1. To evaluate the strength of concept of the stress and strain for different materials 2. To evaluate the behavior of different beams for Shear Force and Bending Moment diagrams 3. To evaluate the behavior and strength of flexural stress, direct and bending stresses 4. To evaluate the deflection of beams subjected to various loads. 5. To determine the Principal Stresses and Strains in the members subjected to stresses 6. To evaluate the Shear Stresses and Theories of Failure
	7K302: SURVEYING AND GEOMATICS	1. Calculate angles, distances using chain and tape 2. Identify data collection methods using a compass and enhance knowledge of the various field applications of levelling 3. Apply the concepts of Trigonometric levelling 4. Set out curves on the field and overcome obstructions in curve ranging 5. To apply the concepts of Remote sensing and GIS/GPS to Civil Engineering problems 6. Read Aerial maps and perform necessary calculations
	7K303: BUILDING MATERIALS AND PLANNING	1. Identify the different materials and use them appropriately. 2. Test the various properties of cement and to use the appropriate admixtures. 3. Identify the various mortars and check for its suitability in various jobs. 4. To effectively use new building materials and appropriate paints for the various works undertaken. 5. Appropriately suggest the different roof and floor types for different construction practices. 6. Plan construction activities in adherence with the bye-laws.
	7ZC01: MANAGEMENT SCIENCE AND FINANCIAL ACCOUNTING (MSFA)	1. Outlines the significance of management, defines the basic concepts and applicability of management principles in changing paradigms. 2. Helps in understanding organization behavior, personality determinants and other key aspects 3. Infers the need to understand the importance of Strategic management and Business environment in particular 4. Enrich students with basic concepts of Financial Accounting.
	7K371: MECHANICS OF SOLIDS LABORATORY	1. Conduct tension test on Materials like steel etc. 2. Conduct compression tests on spring, wood and concrete 3. Conduct flexural and torsion test to determine elastic constants 4. Determine hardness of metals

	7K372: SURVEYING LABORATORY	1. Stake out/Lay out different types of curves in the field. 2. Use modern instruments such as Total Station and GPS for locating and plotting any/all ground features. 3. Develop contour maps for vast swathes of lands at ease and with minimum supervision
	7K373: COMPUTER AIDED DRAFTING OF BUILDINGS LABORATORY	1. Master the usage of AutoCAD commands for drawing 2D & 3D building drawings; 2. Get basic knowledge on Sketch up and 3ds Max for architectural work required for different civil engineering applications.
	7K391-TECHNICAL SEMINAR –III	1. Demonstrate public speaking with the aid of Power Point Presentations 2. Identify current general and specific technological topics of interest and prepare and present the content cogently. 3. Demonstrate communication skills and interview performance skills
II-II	7AC48: ELECTRICAL & ELECTRONICS ENGINEERING	1. Understand the fundamentals of electrical engineering and DC machines. 2. Understand the principles of AC circuits. 3. Understand the principle and operation of three phase induction motor and measuring instruments. 4. Understand the principle and operation of diode. 5. Understand the principle and operation of transistor. 6. Understand the principles of digital electronics
	7K404: Mechanics of Materials	1. Able to evaluate the deformation of structures. 2. Describe the stability of structures under certain loading conditions. 3. To assess the deformation for structures under load actions. 4. To evaluate the force-stress equilibrium relationship in Multiaxial load condition. 5. To evaluate the displacement-strain relationship in Multiaxial load condition. 6. To solve the stress behavior pattern in thin cylinder and sphere.
	7K405: Fluid Mechanics	1. Apply conservation laws to derive governing equations of fluid flows. 2. Compute hydrostatic and hydrodynamic forces. 3. Analyze and design simple pipe systems. 4. Apply principles of dimensional analysis to design experiments. 5. Compute drag and lift coefficients. 6. Apply boundary influences on a body moving within fluid
	7K406: CONSTRCUTION ENGINEERING AND MANAGEMENT	1. Apply construction planning to actual construction works; 2. Able to differentiate different construction methods and their suitability; 3. Understand conventional and mechanized construction methods. 4. Able to apply construction planning to construction projects; 5. Able to apply the knowledge of construction monitoring and control to construction projects; 6. Able to apply the knowledge of contracts management and cost management to construction projects.
	7K407: Hydrology and Water Resources Engineering	1. quantify precipitation; 2. estimate various abstractions of precipitation; 3. estimate runoffs from given data; 4. grasp and apply the knowledge of various water withdrawals and uses to practical problems; 5. able to apply design basic water distribution systems; 6. able to arrive at hydrologic design of spillways.
	7K408: ENGINEERING GEOLOGY	1. Describe different concepts and terms used in Engineering Geology 2. Identify and explain various types of minerals and rocks 3. Apply the various concepts of Engineering Geology to civil engineering field 4. Examine and select the sites related to dams, roads, tunnels and slopes 5. Identify the hazards prior and able to take the necessary precautions 6. Knowledgeable about geological hazards

	7AC95: Electrical and Electronic	1. Understand the performance of three phase induction motor. 2. Understand the different speed control methods of DC motor. 3. Understand the performance of DC motor with and without loading. 4. Understand the no-load characteristics of Dc shunt generator. 5. Understand the applications of superposition and reciprocity theorems in circuit analysis. 6. Understand the characteristics of PN-junction, Zener diodes, bipolar junction transistor and MOSFET. 7. Understand the applications of half wave and full wave rectifier. 8. Understand the applications of digital electronics.
	7K471: FLUID MECHANICS LABO	1. Determine coefficient of discharge for orifice and mouthpiece. 2. Calibrate notches, venturimeter, orifice meters 3. Determine major and miner losses in pipes
	GEOLOGY LABORATORY	Identify the various rocks and minerals depending on geological classifications
	7K491-TECHNICAL SEMINAR –IV	1. Demonstrate public speaking with the aid of Power Point Presentations 2. Identify current general and specific technological topics of interest and prepare and present the content cogently. 3. Demonstrate communication skills and interview performance skills
	7K488: COMPREHENSIVE VIVA VOCE –I	1. Comprehend the concepts in the core and elective courses. 2. Exhibit technical knowledge to face interviews. 3. Exhibit lifelong Learning skills for higher education and to pursue Professional practice.
III-I	7K510: HYDRAULIC ENGINEERING	1. Analyze laminar & turbulent flows and arrive at resistance / energy loss in these flows. 2. Analyze uniform flows through open channels and work out resistance to the flow and most economical sections. 3. Analyze gradually varied flows through open channels and able to classify different profiles and compute profile lengths. 4. Workout sequent depths and energy dissipation of hydraulic jumps open channels 5. Arrive at the force generated on vanes and work done by vanes due to impact of jet on the vanes. 6. Arrive at work done by the turbines and pumps and design the hydraulic working proportions of the turbines and pumps.
	7K511: GEOTECHNICAL ENGINEERING	1. Can depict the various phases and fabric of soil 2. Can able to determine the index properties and classify the soil 3. Is able to apply the concepts of water flow through soil in the context of design and construction of embankments, canals etc. 4. Is able to Apply stress distribution and effective stress in soil for designing the foundation. 5. Can compute the compressibility of different types of soil. 6. Is able to draw the Mohr's circle and find out shear strength parameters of soil
	7K512 :TRANSPORTATION ENGINEERING	1. Applies the Pavement design concepts to different types of pavements 2. Takes precautions required for the execution of construction of pavements and applies relevant IRC standards. 3. Analyze the collected field data and design suitable traffic management system 4. Is able to apply the design concepts of super elevation of railway curves. 5. Knows how to select a site for airport construction and have working knowledge of run way orientation methods, 6. Apply the corrections to the run way length and understands the circumstances in which they are to be applied.
	7KC51: REINFORCED CONCRETE DESIGN (PROFESSIONAL ELECTIVE – I)	1. Is able to use and suggest concrete for various practical applications. 2. Is able to interpret various specifications of relevant standards, to field problems and professional practices. 3. Is able to design beams in singly reinforced, doubly reinforced rectangular and flanged beams. 4. Is able to design slabs with different conditions and different supports. 5. Is able to design axial loading, Uni-axial and biaxial bending of columns and Design of isolated square, rectangular and circular footings. 6. Interprets and communicates the design and detailing of rc beams, slabs, columns, stair cases and footings, through appropriate structural drawings.

	7EC01: DATA STRUCTURES (Open elective-I)	1. Explain Abstract data type, stack and Queues with their applications 2. Write programs on Singly linked lists, Doubly linked lists, Circular list and explain their operations. 3. Explain concepts of Trees, AVL Trees and Graphs with examples and applications. 4. Describe and solve problems of searching and sorting and evaluate the time complexity of each algorithm. 5. Explain concepts of OOPs and implement programs using objects, classes, constructors and destructors. 6. Explain and apply concepts of oops , write programs implementing functions, operator overloading and inheritance.
	7ZC22 BASICS OF ENTREPRENEURSHIP (Open elective – I)	1. The students' will acquire basic knowledge on Skills of Entrepreneurship. 2. The students' will understand the techniques of selecting the customers through the process of customer segmentation and Targeting 3. Business Models and their validity are understood by the students'. 4. The basic cost structure, Revenue Streams and the pricing strategies are understood by the students'. 5. The students' will acquire knowledge about the project management and its techniques. 6. The students' get exposure on marketing strategies and business regulations for the Start up.
	7ZC05 BANKING, INSURANCE AND RISK MANAGEMENT (Open elective – I)	1. To provide the information about Indian Banking sector operations and services rendered by different banks. 2. To enlighten the students regarding various banking systems and banking sector regulations with focus on reforms in our country. 3. To make the students understand the importance of existence of insurance industry. 4. To understand the terminology used in the insurance sector and the regulations. 5. To know the types of risks associated to individuals and corporate and to know the managing skills of the same 6. To make the students understand the functioning of various financial, commodities and currency markets and its applications in risk management
	7K571: HYDRAULICS ENGINEERING LABORATORY	1. To compute the open channel viscosity coefficient in uniform flows and Froude number and energy losses in non- uniform flows. 2. To differentiate between uniform, non-uniform flows and flow in curved channel 3. To determine work done by fluid jet on vane, compute work done and draw performance characteristic curves for turbines and centrifugal pumps. 4. To find the discharge between stream lines and pressure variations around an air foil.
	7K572 :GEOTECHNICAL ENGINEERING LABORATORY	1. The method of determining basic engineering properties of soil 2. To classify the soil with the help of Atterberg's limits and Classification of soil. 3. To determine the cohesion and friction using direct shear test and tri-axial tests
	7K573 :TRANSPORTATION ENGINEERING LABORATORY	1. To apply methods for assessing various types of material to be used in the pavement construction. 2. To plan for the collection of field data, present the same for performing critical analysis and hence aid in taking decisions so as to enable smooth movement of traffic
	7H518: QUANTITATIVE APTITUDE	1. Answer questions given on testing divisibility, prime number and questions of HCF and LCM . 2. Answer questions given on averages, percentage and profit and loss. 3. Answer questions given on ratio and proportion. 4. Answer questions given on simple and compound interest. 5. Answer questions given on time and work, time and distance. 6. Answer questions given on mensuration and data sufficiency
	7K591 : TECHNICAL SEMINAR –V	1. Demonstrate public speaking with the aid of Power Point Presentations 2. Identify current general and specific technological topics of interest and prepare and present the content cogently. 3. Demonstrate communication skills and interview performance skills
III-II	7K613: GEOGRAPHIC INFORMATION SYSTEM	1. know the basic definition of GIS. 2. be able to generate various model from raw data. 3. be able to edit and rectify the topography data. 4. be capable to analyze and interpret the data generated. 5. be able to know the concept of application of GIS in Projects. 6. know the various spheres of application for Civil Engineers

7K614: ENVIRONMENTAL ENGINEERING	1. how to design the treatment units based on the population estimation 2. basics involved in a water supply network. 3. Collection of sewage and treatment of sewage water 4. To understand the basic phenomenon/ units involved in the treatment plants. 5. To understand the basic treatment processes involved in treating water 6. About solid waste management and low cost treatment technologies
7K615: CONCRETE TECHNOLOGY	1. Will be able to test cement and know cement applications. 2. Can appropriately assess aggregates and its properties. 3. Is able to assess fresh concrete and its behaviour on using admixtures. 4. Can evaluate and analyse behaviour of hardened concrete and testing of hardened concrete. 5. Is able to Mix-Design concrete using IS code books. 6. Is able to assess different types of concrete and its behaviour and applications
7KC61: DESIGN OF STEEL STRUCTURES (PROFESSIONAL ELECTIVE – II)	1. Attains fundamental knowledge of the design of various Steel Structures and connections and is able to interpret the specifications of relevant codes. 2. Gets adequate knowledge and skills to apply the design principles to field problems. 3. Is able to design principles to field problems of tension members. 4. Is able to draw, understand and interpret the detailing aspects of steel structural drawings. 5. Is able to investigate into the critical issues of steel structures, compare various options and chose the best solution for the problems in the area of steel structures. 6. Is able to design the end bearing Stiffness and intermediate stiffness
7FC03 :PYTHON PROGRAMMING (Open elective – II)	CO1: Gains exposure towards Python versions and their specifications. CO2: Build programs using primitive data types. CO3: Write applications that include functions, modules, packages along with respective exceptional handling mechanism. CO4: Writes applications using OO features of Python CO5: Write applications using Files. CO6: Hands on exposure on NumPy/Tkinter/Plotpy modules.
7ZC23: Advanced Entrepreneurship (Open elective – II)	1. The Students' gain knowledge on the stages of Startup and the turbulence environment it undergoes and the stages related to growth of the Startup. 2. The Students are exposed to the various business models and critically evaluating the effectiveness of the business models and products 3. The students understand the method of business traction, create roles and build their A- team 4. The students understand the various channels of revenue building and exploration of new revenue avenues. 5. The students understand the need of sales planning and people plan and also financial modeling 6. The students are exposed to the legal implications affecting the company's prospects and identifying right mentors and advisors to support startups
7ZC19:ENTREPRENEURSHIP, PROJECT MANAGEMENT AND STRUCTURED FINANCE (Open elective – II)	1. Students will understand the nature of Entrepreneurship andits importance 2. Will gain knowledge regarding project, its life cycle and organization 3. Will gain knowledge relating to project formulation and implementation 4. Comprehend the components of structured finance 5. Establish a framework of CMBS 6. Students will gain knowledge relating to the CRE Servicing
7K671: GEOGRAPHICAL INFORMATION SYSTEMS LABORATORY	1. The student will be able to extract various details from the topography survey map. 2. The student shall be able to convert the raw data into vector and raster forms. 3. The student shall be able to generate maps with various geographic features.
7K672: ENVIRONMENTAL ENGINEERING LABORATORY	1. to establish water and wastewater quality, and know which tests are appropriate for given environmental problems? 2. to Statistically analyse and interpret laboratory results. 3. to use the water and wastewater sampling procedures and sample preservations. 4. to Obtain the necessary background for subsequent courses in environmental engineering.
7K673: COMPUTER APPLICATIONS IN CIVIL ENGINEERING LABORATORY	1. Use Excel sheets for Civil Engineering applications. 2. Write computer programs for structures with various loading and support conditions using Civil Engineering related software such as STAAD Pro.

	7HC74: SOFT SKILLS AND TECHNICAL COMMUNICATION	1. make a self-assessment 2. enhance their soft skills and behavioral patterns 3. equip themselveswith the required skillset for their career advancement 4. develop interpersonal communication skills 5. participate in group tasks and use effective language skills in interviews 6. overcome stress and enhance employability quotient 7. practice technical communication with ease
	7H619: LOGICAL REASONING	1. The questions given on series completion and analogy. 2. The questions given on odd one out in classification and coding and decoding. 3. The questions given on blood relations. 4. The questions given on directions and Arithmetical reasoning. 5. The questions given on Venn diagrams, cubes and dice. . 6. The questions given on clocks and calendar.
	7K680: Group Project	1. Use the concepts learned in the courses, so far, in conceptualizing, designing and executing small conceptual projects. 2. Exhibit interest in learning the modern tools and technologies. 3. Inculcate an enthusiasm to use the creative ideas to build the innovative projects which are meeting the current needs to the marked and society as a whole. 4. Improve their communication skills and team work skills. 5. Work as in individual and in a team.
	7K689: COMPREHENSIVE VIVA VOCE –II	1. Assess the relevant courses they have undergone till the completion of that academic year. 2. Assessment is done in the relevant courses they have undergone till the completion of that academic year. 3. Comprehend the concepts in the core subjects and the elective subjects, to make them ready to face technical interviews which improve their employability skills. 4. They are asked to comprehend the concepts in the core subjects and the elective subjects, to make them ready to face technical interviews which improve their employability skills.
IV-I	Structural Engineering Design & Detailing (Concrete)	1. Achieve Knowledge of design and development of problem solving skills. 2. Understand the principles of Structural Design 3. Understands the design and detailing concepts of various structures. 4. Design and develop analytical skills. 5. Summarize the principles of Structural Design and detailing 6. Understands the structural performance
	Concrete Technology	1. Will be able to test cement and know cement applications. 2. Can appropriately assess aggregates and its properties. 3. Is able to assess fresh concrete and its behaviour on using admixtures. 4. Can evaluate and analyse behaviour of hardened concrete and testing of hardened concrete. 5. Is able to Mix-Design concrete using IS code books. 6. Is able to assess different types of concrete and its behaviour and applications.
	Estimation and Valuation	1. To prepare detailed estimates for different buildings. 2. To do the rate analysis for different items of works of buildings. 3. To prepare the rate analysis for different items of works. 4. To prepare the schedules for shuttering and bar bending. 5. To work out different types of contracts, prepare tenders, to suit the present day practices of tendering. 6. To valuate buildings as per norms.

	Finite Element Method for Civil Engineers	1. Understand the fundamental theory of the FEA method. 2. Acquire the ability to generate the governing FE equations for systems governed by partial differential equations. 3. Understand the use of the basic finite elements truss, beam, frame, and plane elements for structural applications. 4. Demonstrate the ability to evaluate and interpret FEA analysis results for design and evaluation purposes. 5. Develop a basic understanding of the limitations of the FE method and understand the possible error sources in its use. 6. Demonstrate the ability to create models and analysis of different structural elements using ANSYS general-purpose software
	Professional Elective_III(6KC75: Ground Improvement Techniques)	1. Learn the necessity of ground improvement and the factors which decide the method of ground improvement. 2. Understand mechanical modification of the ground by compaction and various methods of compaction. 3. Understand hydraulic modification of the ground by lowering of water table and other methods. 4. Understand the necessity of drainage of slopes, vertical drains sand drains etc., 5. Understand chemical modifications of the ground by lime stabilization and other methods. 6. Understand the method of grouting and other advanced methods.
	Professional Elective_IV(6KC82: Pre-stressed Concrete Structures)	1. Can assess basics of pre-stress and post-stress concrete structures. 2. Can assess losses in pre-stress and post-stress concrete structures 3. Is able to assess the flexural and shear behavior of Pre-stress elements and design Pre-stress elements. 4. Can assess behavior of stresses in pre-stress structures. 5. Is able to design composite and continuous beams. 6. Can predict short term and long term beam deflections.
	Concrete Technology Lab	1. Test Fineness, Specific Gravity, Setting Time, Soundness and Compressive Strength of Cement 2. Test Specific Gravity of Coarse Aggregate and Fine Aggregate, Bulking of Fine Aggregate. 3. Design Concrete Mix Proportioning by Using Indian Standard Method. 4. Test Workability of Fresh Concrete and Compressive strength, Split Tensile Strength of Hardened Concrete.
	Computer Applications in Civil Engineering Lab	1. Use Excel sheets for Civil Engineering applications. 2. Write computer programs for various problems faced by Civil Engineers using latest Civil Engineering related software such as Revit and STAAD Pro.
	Project Phase – I	1. Have a thorough review and outline various civil engineering problems that can be taken up as project work 2. Work in a team to select a problem for project work 3. Review and evaluate the available literature on the chosen problem 4. With the help of faculty advisor formulate a methodology to solve the identified problem 5. Apply the principles, tools and techniques to solve the problem 6. Prepare and present project report
	Intellectual Property Rights	Demonstrate a breadth of knowledge in Intellectual property Overview of Patents, Searching ,filling and drafting of Patents Overview of copyright & GI . Overview of Trade Mark & Trade Secret, Overview of Integrated Circuit and Industrial Design. Knowledge about different national and international : Conventions and Treaties Governing the IPRs
IV-II	Design and Detailing of Hydraulic Structures	1. design and detail Surplus weir; 2. design and detail Direct sluice ; 3. design and detail Glacis type canal drop; 4. design and detail Cross regulator; 5. Design of super passage. 6. design and detail and understand design concepts of syphon.

Professional Elective_V(6KC93: Disaster Mitigation and Management)	1. Ability to analyze and critically examine existing programs in disaster management regarding vulnerability, risk and capacity at local, national and international levels 2. Ability to choose the appropriate activities and tools and set up priorities to build a coherent and adapted disaster management plan. 3. Ability to understand various mechanisms and consequences of natural and human induced disasters for the participatory role of engineers in disaster management. 4. Develop an awareness regarding the chronological phases of disaster preparedness, response and relief operations for formulating effective disaster management plans. 5. Ability to understand various participatory approaches/strategies and their applications in disaster management 6. Ability to understand the concepts of remote sensing and geographical information systems for their effective application in disaster management
Technical Literature Review and Seminar	o Identify a topic from the current technologies of their choice in the Civil Engineering domain and the allied fields, after surveying in the internet resources, journals, and technical magazines in the library. o Arrange the contents of the presentation and also write the report of the research paper. o Present the technical topic in front of the panel and the fellow students, using the oratory skills and also submit the report of the research paper. o Interact through answering the questions and also can add some points to the seminar
Comprehensive Viva Voce	1. Assess the relevant courses they have undergone till the completion of that academic year. 2. Assessment is done in the relevant courses they have undergone till the completion of that academic year. 3. Comprehend the concepts in the core subjects and the elective subjects, to make them ready to face technical interviews which improve their employability skills. 4. They are asked to comprehend the concepts in the core subjects and the elective subjects, to make them ready to face technical interviews which improve their employability skills.
Project - Final phase	1. Have a thorough review and outline various civil engineering problems that can be taken up as project work 2. Work in a team to select a problem for project work 3. Review and evaluate the available literature on the chosen problem 4. With the help of faculty advisor formulate a methodology to solve the identified problem 5. Apply the principles, tools and techniques to solve the problem 6. Prepare and present project report

Department of CSE

Course Outcomes 2017 – 2021

	Course Codes	Course (Course Code) - Correlation
		B.TECH I YEAR I SEMESTER
CO No.	**C101**	**English-I (6H101)**
1	C101.1	Appraise their knowledge base in English
2	C101.2	Know the aspects of language skills - LSRW
3	C101.3	Acquire basic sentence construction skill
4	C101.4	Acquire the vocabulary and grammar skills
5	C101.5	Know the features of spoken language
6	C101.6	Acquire the basic correspondence ability by using the medium of letters
CO No.	**C102**	**Engineering Mathematics – I(6H111)**
1	C102.1	Represent function in series form using Maclaurin's series; evaluate limits, continuity & differentiability for two variable functions, also able to find maxima and minima of a function.
2	C102.2	Solve first order first degree ordinary differential equations.
3	C102.3	Solve higher order linear differential equation with constant coefficients.
4	C102.4	Evaluate iterated multiple integration and the technique of change of
5	C102.5	Solve the problems on gradient, curl and divergence of a vector field,
6	C102.6	Compute area and volume integrals using Gauss, Stoke's and Gauss divergence theorems
CO No.	**C103**	**Engineering Physics – I (6H121)**
1	C103.1	Describe application of Physical Optics using Interference, Diffraction.
2	C103.2	Describe characteristics , action significance Lasers and Applications of Lasers.Explain Fiber Optics Principle, Acceptance Angle , its types , other features and applications of optical Fiber in communication system, Fiber Optic Sensors and Medical Endoscopy.
3	C103.3	Explain concepts of Statistical mechanics such as Maxwell – Boltzmann Statistics, Bose – Einstein Statistics, Fermi – Dirac Statistics, Distribution function and Density of states.

4	C103.4	Explain Free electron theories of Metals and Electrical Conductivity from quantum free electron theory of metals.
5	C103.5	Describe principles of Quantum Mechanics and explain Heisenberg's Uncertainty Principle and Schroedinger's Time Independent Wave Equation – Physical Significance of the Wave Function.
6	C103.6	Describe Band Theory of Solids with Bloch Theorem, Kronig-Penny Model (Qualitative Treatment), E-K Curve,Formation in Solids and Classification of Materials into Conductors, Semi Conductors and Insulators.
CO No.	**C104**	**Engineering Chemistry (6H131)**
1	C104.1	Explain the domestic and industrial problems caused by hard water and understand the municipal water treatment.
2	C104.2	Discuss and express the important fundamental concepts used in electrochemistry and use electrochemical techniques/data analysis to obtain information on a redox system. Student also understands the practical importance of electrochemistry for solving challenges such as those faced in modern power sources.
3	C104.3	Apply the electrochemical process methods for consumer and industrial batteries, which are Ni-Cd, Lead Acid and Li-ion/polymer. It also includes the reusable alkaline for comparison.
4	C104.4	Comprehend the concepts and types of corrosion and how these can be anticipated and prevented. Student will able to apply concepts of corrosion on engineering materials.
5	C104.5	Explain the necessity of Protective coating for protection against corrosion and the methods to do the same.
6	C104.6	Student will get principles in separation of metals and material using the principle of Phase Rule student also use the preparation methods for alloys and applications of Alloys
CO No.	**C105**	**Computer Programming (6F101)**
1	C105.1	Explain basic fundamentals of Computer Systems , computing environments , Computer Languages – Machine Languages. Writing/ Drawing simple Algorithms and flowcharts.
2	C105.2	Describe C language Programs, Structure of a C Program, Comments, the greeting program, identifiers, constants, variables, types , expressions and keywords.

3	C105.3	Describe write programs using control structures such as Pre-test and post-test loops, while, do while, for, break and continue statements, comma expression . Write programs using functions . Write programs using
4	C105.4	Write programs implementing application on arrays.
5	C105.5	Write programs using Pointers and string handling functions.
6	C105.6	Write programs using Enumerated, Structure, Union types and files.
CO No.	**C106**	**Engineering Drawing – I (6B101)**
1	C106.1	Construct polygons , perform scaling and draw curves for constructions. Describe Projections or Views . Explain with examples Projections of Planes with regular Planes, traces, Oblique planes and Auxiliary plane, Explain Projections of Solids using Regular Solids, solids of revolution and Axis inclined to both planes. Explain Sections of Solids with Prism, Cylinder, Pyramid, Cone and Auxiliary views. Draw Intersection of Similar and Dis-similar Solids using Line, Cutting plane method , Intersection of Prism Vs Prism, Cylinders Vs Cylinder and Cylinder Vs Prism .
CO No.	**C107**	**English language Communication skills lab (6H171)**
1	C107.1	Pronounce the different phonemes of English language, using the right stress on word accent, intonation, and rhythm.. Get rid of stage fear and speak extempore without inhibitions. Use language effectively to face interviews, group discussions, public speaking. Get abreast with the latest mode of technical aspects of computer knowledge enabling them in resume preparation, report writing, format-making etc.. Communicate effectively
CO No.	**C108**	**Engineering Physics Lab-I (6H181)**
1	C108.1	Determine wave length of monochromatic source of light by using Newton's Rings and refractive index of a material prism by using spectrometer. Determine wave length of given laser source of light using Diffraction grating. Determine Dispersive power of a glass Prism and Cauchy's constant by using spectrometer. Experiment on R C Circuit and L C R series for calculating resonance and Planck's constant. Determine Numerical Aperture and Acceptance angle of a given optical fiber cable.
CO No.	**C109**	**Engineering Chemistry Lab (6H186)**

1	C109.1	Describe the principle and theory in determination of Hardness of a water sample. Experiment the method of preparation for organic compounds.Apply the knowledge to find the estimation of compounds. Determine the Viscosity of lubricants.
CO No.	**C110**	**C Programming Lab (6F171)**
1	C110.1	Write algorithms and flowcharts to convert temperature Celsius to its equivalent Fahrenheit, calculate roots and Fibonacci series. Write programs using control statements while, do-while, and for loops and solve mathematical series summations. Write programs in menu driven style . Write programs implementing functions , recursion with return values for example Fibonacci , GCD, LCMD , pascal triangle, large and smallest in a set of numbers. Write a program to implementing applications on arrays , matrices addition , multiplication and compute symmetric, lower triangular, upper triangular, diagonal, scalar, or unit of a matrix. Write programs on complex numbers and implement programs on student data or employees
CO No.	**C111**	**Engineering workshop-I (6B171)**
1	C111.1	Perform House wiring and install Tube light, connection of Calling Bell as per circuit diagram and connection of stair case as per circuit diagram. .Practice of disassembly and assembly of various home appliances such as Fans, Mixers, Air blower, Iron box and Rice cooker. Perform Welding as and when needed i.e Lap Joint, Butt Joint and welding of T-Joint
CO No.	C112	**IT Workshop – I (6F172)**
1	C112.1	1. Identify peripherals of a computer, describe types of Operating System, Install computer with dual boot operating systems . Assembling and Disassemble computer system. Install and Use Microsoft Windows 7 for programming and application development. Install Linux and Install Applications in Linux and Windows. Troubleshoot Software and hardware problems along with configurations setting for application and computer security for software development. Describe and practice Cyber ethics
CO No.	**C113**	**Seminar on current affairs /Technical Topic (6E191)**

1	C113.1	Identify current general, political and technology related topics. Arrange and present seminar in a effective manner. Collect, survey and organize content in presentable manner. Demonstrate oratory skills with the aid of Power Point Presentations. Exhibit interview facing skills and team leading
B.TECH I YEAR II SEMESTER		
CO No.	**C114**	**English – II (6H202)**
1	C114.1	Appraise their knowledge base in English
2	C114.2	Know the aspects of language skills -LSRW
3	C114.3	Acquire basic sentence construction skill
4	C114.4	Acquire the vocabulary and grammar skills
5	C114.5	Know the features of spoken language
6	C114.6	Acquire the basic correspondence ability by using the medium of letters
CO No.	**C115**	**Engineering Mathematics – II (6H213)**
1	C115.1	Evaluate the rank of matrix, and able to find the solution to a linear system.
2	C115.2	Find eigen values and eigen vectors and their applications to find higher powers and inverse of a matrix.
3	C115.3	Form partial differential equations and find the solution to first order linear and nonlinear partial differential equations.
4	C115.4	Solve the problems in evaluating Laplace and inverse Laplace transforms and its applications to solve ordinary differential equation with constant
5	C115.5	Solve problems on Z-transform and its application to solve difference equations.
6	C115.6	Find the Fourier series of a function; solve the problems in finding Fourier transformations and their applications.
CO No.	**C116**	**Engineering Physics – II (6H222)**
1	C116.1	Describe elements and features of Crystallography and Crystal Structures.
2	C116.2	Describe the defects in crystals and Structure analysis of Crystals using XRD.
3	C116.3	Explain Semiconductor fundamentals, its properties and Hall Effect in semiconductors with its applications.
4	C116.4	Explain fabrication of Semiconductor Devices with PN Junction and working of PN Junction and its I-V Characteristics.
5	C116.5	Describe Magnetic Properties , application of Ferro Magnetic materials, Super conductivity and its types and BCS theory of Superconductivity

6	C116.6	Discuss significance , features characteristics applications of Nanotechnology and Nano Materials.
CO No.	**C117**	**Data Structures (6E201)**
1	C117.1	Demonstrate the concepts of Abstract data type and also applications of stack and Queues
2	C117.2	Select the data structure that efficiently model the information in a problem
3	C117.3	Design programs using variety of data structures including Trees, AVL Trees and Graphs and their applications.
4	C117.4	Solve problems and also assess efficiency trade off among searching and sorting using time complexity of each algorithm and also the applications of hashing and hash tables.
5	C117.5	Describe the concepts of OOPs and implement programs using objects, classes, constructors and destructors.
6	C117.6	Apply concepts of OOPs to write program on over loading functions and concepts of inheritance.
CO No.	**C118**	**Engineering Drawing – II (6B202)**
1	C118.1	Draw the various types of scales for different applications and using various types of units. Approve the practical applications of development of various solids and draw their developments. Appraise the three dimensional representations of simple and complex objects through isometric projection principle given their orthographic ,representation. Convert pictorial (Isometric) views to orthographic views. Identify the applications and draw the perspective views of various drawing entities. Choose computer aided drafting technique and commands for generation of basic entities of drawing
CO No.	**C119**	**Environmental and Applied Chemistry (6H232)**
1	C119.1	Explain methodologies that facilitate greater control over product and as a consequence enable novel polymer architectures. Conductivity of polymers also helps in electro chemistry. If a company works with plastics, rubbers, resins, adhesives, composites, coatings, fibers or packaging, a good understanding of polymer chemistry will benefit
2	C119.2	Describe the concept, Structure and Function of Eco system in order to save the environment.

3	C119.3	Use the techniques in sustainable development with regard to Water Wasteland reclamation, Environmental management and green technology
4	C119.4	Identify the natural resources available and how to save the resources.
5	C119.5	Apply techniques in preparation and use of energy sources in industries.
6	C119.6	Apply the knowledge of control measures of Urban and Industrial waste to reduce the pollution.
CO No.	**C120**	**Elements of Mechanical Engg (6BC04)**
1	C120.1	Acquire and elaborate the knowledge of basic concepts of thermodynamics and analyze the p-v & t-s diagrams of the different cycles.
2	C120.2	Identify & analyze the function of components used in the steam power plant & gas power plant, & how the power generation takes place in steam and gas power plant.
3	C120.3	Acquire the knowledge about the working of hydraulic pumps and hydraulic turbines and identify and understand the functions of compnents used in VCR and VAR systems and their working princples
4	C120.4	Acquire the knowledge to iudentify the different casting methods and welding methods and their appplications
5	C120.5	Comprehend the various methods used in metal forming and press working
6	C120.6	Apply the knowledge to identify the different machine tools and their construction.
CO No.	**C121**	**Gender Sensitization, Values, Ethics and Yoga (6ZC03)**
1	C121.1	Develop students' sensibility with regards to issues of gender in contemporary India and to help the students appreciate the essential complimentarity between 'VALUES and 'SKILLS' to ensure sustained happiness and prosperity which are the core aspirations of all human beings.
2	C121.2	Provide a critical perspective on the socialization of men, women and transgenders, to acknowledge women's role at home and at work and to have a wider understanding of Ethics.
3	C121.3	Reflect the views critically on gender violence, understand engineering ethics and an engineer's responsibility for safety and risk.
4	C121.4	Perceive gender literacy and understand the importance of gender
5	C121.5	Describe rules and principles set by the society in a customary way.
6	C121.6	Describe and appreciate the importance of personality development through yoga for a holistic life.

CO No.	C122	Data structure Lab (C,C++) (6E271)
1	C122.1	Write programs to implement Stacks, Queues and circular queues, tree traversals. Inorder, preorder and post orde, searching and sorting operations. Write programs on Binary trees, C++ to implement classes and operator overloading.
		Level of Attainment
CO No.	C123	Engineering Physics Lab – II (6H282)
1	C123.1	Determine the Energy gap (Eg) of a semiconductor. Describe the characteristics of a Thermistor. Describe the Characteristics of a laser Diode. Determine the frequency of an electrically vibrating tuning fork - using Melde's apparatus. Describe and determine frequency of A.C signal generator – using Sonometer. Determine rigidity modulus of a given material wire – using Torsional pendulum and acceleration due to gravity and radius of gyration - using compound pendulum. Verify of laws of Transverse Vibration of a stretched string - using Sonometer. Describe the characteristics of LED and determine forward resistance of a given LED. Determine of magnetic induction flux density along the axis of a circular coil using Stewart and Gee's Experiment.
CO No.	C124	IT Workshop – II (6F273)
1	C124.1	Apply MS –Office features for documentation and formatting data. Create Project report document using formatting styles, tables, fonts footnotes spell check and Track changes. Create News letters and prepare Power Point Presentations. Describe and use Excel spread sheets and applying formulas for calculations. Use and Apply HTML Features for Formatting Tags, Linking of pages using Anchor Tags, Table tags.
CO No.	C125	Seminar on Science and its impact / Technical Topic (6E292)
1	C125.1	Deliver lecture on emerging technologies. Collect , survey and organize Content in presentable manner Demonstrate ability to lead and explain concepts and innovative ideas. Demonstrate team leading qualities. Demonstrate public speaking skills and exchange new information that would not have been available other wise. Develop debating and interview
		Level of Attainment
		II YEAR I SEMESTER

CO No.	C201	Functional Communicative English (6H373)
1	C201.1	Acquire higher competence in communicative English, the skill of presenting seminars, mastery in applying various sub-skills of reading, develop interpersonal communication skills, participate in group tasks using effective language and enhance written communication from the employability perspective
CO No.	**C202**	**Engineering Mathematics – III (6H316)**
1	C202.1	Find the roots of algebraic and transcendental equations and can solve problems of numerical integration.
2	C202.2	Find the Interpolating polynomial for the given tabular values.
3	C202.3	Find the numerical solution of ordinary differential equations of IVPs.
4	C202.4	Evaluate improper integrals using special functions; understand the basic concepts of Bessel's function and its properties.
5	C202.5	Analyze the complex functions with reference to their analyticity, integration using Cauchy's integral theorem and find the Taylor's and Laurent's series expansion of complex functions. Also evaluate the real integrals by using residue theorem
6	C202.6	Solve problems in conformal mapping.
CO No.	**C203**	**Elements of Electronics Engineering (6CC09)**
1	C203.1	Understand the operation of semiconductor diode and its application as rectifier.
2	C203.2	Understand the Fundamentals of BJT operation, Characteristics and different biasing circuits.
3	C203.3	Understand the Fundamentals of SCR, JFET operation and their Characteristics.
4	C203.4	Understand the Analysis and design of Amplifier and Oscillators.
5	C203.5	Understand the Basic regulator circuits and voltage multipliers.
6	C203.6	Explore the various number systems.
CO No.	**C204**	**Switching Theory and Logic Design (6CC02)**
1	C204.1	Demonstrate an ability to understand number systems and apply the rules of Boolean algebra to simplify Boolean expressions.
2	C204.2	Simplify of Boolean expressions using K-map.

3	C204.3	Demonstrate and ability to design MSI combinational circuits such as full adders, multiplexers, decoders, encoders. Code converters.
4	C204.4	An ability to design basic memory units (latches and flip-flops).
5	C204.5	Explain the functioning of the sequential circuits such as counters and
6	C204.6	Compare and simulate the digit an ability to design digital design using PLD's such as ROM's, PLA' s,PAL s. and design digital controllers using Algorithmic State Machine Charts
CO No.	**C205**	**Computer Organization and Microprocessor Interfacing (6D308)**
1	C205.1	Understand basic operational concepts of computer and data processing.
2	C205.2	Comprehend the use of instruction codes - registers and types for executing the programs at the machine level in a specified architecture
3	C205.3	Understand different control unit design and algorithms for various
4	C205.4	Summerize the basic architecture and internals of 8086 processor.
5	C205.5	write assembly language programming and debug to 8086.
6	C205.6	Interface various devices to 8086 processor like keyboard, LED display, Stepper Motor, ADC etc.
CO No.	**C206**	**Object Oriented Programming through Java (6E302)**
1	C206.1	Describe fundamentals of JAVA, its Classes, and Objects and write simple programs using constructors.
2	C206.2	Explain Write simple programs using inheritance, interface and packages.
3	C206.3	Explain and write programs using Packages, I/O Stream and collections.
4	C206.4	Describe and write programs to implement Exception handling and Multithreading.
5	C206.5	Describe and write programs using AWT, Swings and develop applications using event handling.
6	C206.6	Describe and develop applications using Applets and develop client server programs using networking concepts.
CO No.	**C207**	**Mathematical Foundations of Computer Science (6F302)**
1	C207.1	Study and explain the significance of truth tables
2	C207.2	Distinguish between Statement Logic and Predicate Logic..
3	C207.3	Design elementory deterministic and randomised algorithms to solve computational problems using relations, Lattices and Boolean Algebra Concepts

4	C207.4	Understand and assess the use of group concepts in the applications
5	C207.5	Explain and justify the uses of trees concepts
6	C207.6	Identify the role of graphs concepts in Engineering Applications
CO No.	**C208**	**Computer Organization and Microprocessor Interfacing Lab (6DC87)**
1	C208.1	Design memory units such as counters and registers. Design any type of VLSI, embedded systems, industrial and real time applications by knowing the concepts of Microprocessor and Digital Logic circuits.
CO No.	**C209**	**Electronics Engineering Lab (6CC76)**
1	C209.1	Identify, Specify and test R, L, C Components (Colour Codes), Potentiometers, Switches, Coils, Relays. Identify, Specify and test Active Devices, Diodes, BJTs, Low power JFETs, MOSFETs, Power Transistors, LEDs, LCDs, SCR, UJT. Describe operation of Multimeters, Function Generator and Regulated Power Supplies. Explain and use CRO for experiments. Explain and demonstrate working of PN Junction diode characteristics. plain and demonstrate working Half and Full wave Rectifier with and without filters. Demonstrate working and applications of FET, CE and RC Phase Shift Oscilltor.
CO No.	**C210**	**Object Oriented Programming through Java Lab (6E372)**
1	C210.1	Write programs to generate Prime numbers, Roots of quadratic equation and Fibonacci series. Write small application such as banking system. Write programs on operator , function overloading and dynamic method dispatch. Write programs to implement interface and packages. Explain and write programs to implement threads. Write prog rams to implement applets and event handling. Write an application to implement client and server scenario.
CO No.	**C211**	**Seminar on Technology and its Impact/Technical topic (6E393)**
1	C211.1	Deliver lecture on emerging technologies. Explain domain knowledge to resolve real time technical issues. Demonstrate ability to lead and explain concepts and innovative ideas. Demonstrate team leading qualities. Demonstrate public speaking skills. Exchange new information that would not have been available otherwise. Develop debating and interview skills.

B.TECH II YEAR II SEMESTER		
CO No.	**C212**	**Probability and Statistics (6HC18)**
1	C212.1	Able to find the probability of an event.
2	C212.2	Will able to solve problems on discrete and continuous probability distributions.
3	C212.3	Find the sampling distributions and estimate the population parameters.
4	C212.4	Solve the problems on correlation and regression.
5	C212.5	Test of hypothesis and are able solve problems.
6	C212.6	Know the fundamentals of Design of experiments and quality control.
CO No.	**C213**	**Managerial Economics and Financial Analysis (6ZC01)**
1	C213.1	Understand the basics of Business Economics at Micro level and Demand analysis in particular.
2	C213.2	Understand Production patterns and various Costs involved.
3	C213.3	Understand different types of Markets, Business organizations and Pricing strategies.
4	C213.4	Enrich students with basic concepts of Financial Accounting.
5	C213.5	Understand basic concepts of Depreciation and Final accounts.
6	C213.6	Increase Competence of Analyzing Financial Statements
CO No.	**C214**	**Elements of Electrical Engineering (6AC41)**
1	C214.1	Understand the principles of electrical engineering.
2	C214.2	Understand the principles of single and three phase AC circuits.
3	C214.3	Understand the principle and operation of DC machine along with its applications.
4	C214.4	Understand the principle and operation of single phase transformer along with its applications.
5	C214.5	Understand the principle and operation of three phase induction motor with its applications.
6	C214.6	Understand the principle and operation of different measuring instruments along with its applications.
CO No.	**C215**	**Design and Analysis of Algorithms (6FC04)**
1	C215.1	Analyze worst-case running times of algorithms using asymptotic analysis.

2	C215.2	Describe the divide-and-conquer paradigm and explain when an algorithmic design situation calls for it. Recite algorithms that employ this paradigm. Synthesize divide and-conquer algorithms. Derive and solve recurrences describing the performance of divide-and-conquer algorithms.
3	C215.3	Explain the dynamic-programming paradigm with the suitable applications. Recite algorithms that employ this paradigm. Synthesize dynamic programming algorithms, and analyze them.
4	C215.4	Comprehend the greedy paradigm and explain when an algorithmic design situation calls for it. Recite algorithms that employ this paradigm. Synthesize greedy algorithms, and analyze them.
5	C215.5	Explain what amortized running time is and what it is good for. Describe the different Methods of amortized analysis (aggregate analysis, accounting, potential method). Perform amortized analysis.
6	C215.6	Describe Backtracking, Branch and Bound algorithms and Concept of P and NP Problems
CO No.	**C216**	**Operating Systems (6EC03)**
1	C216.1	Describe the basic functionalities and structure of the Operating System
2	C216.2	Explain the concepts and implementations of: Processes, Process Scheduling. Describe, contrast and compare various types of Operating systems like Windows and Linux.
3	C216.3	Comprehend the concepts of Synchronization and Deadlocks in the Operating System
4	C216.4	Discuss the concepts of Memory Management(Physical and Virtual
5	C216.5	Explain the concepts of File System with regard to directory and disk management algorithms.
6	C216.6	Students understand the concepts of I/O systems, protection and security in a case study given
CO No.	**C217**	**Database Management Systems (6FC03)**
1	C217.1	Explain importance, significance, models, Database languages, architecture and design of Data Base Systems.

2	C217.2	Describe Relational Model's – Integrity Constraints, Querying fundamentals, Logical data base Design and Views of databases along with application of Relational Algebra.
3	C217.3	Apply queries in SQL Query using Nested Queries Set, Comparison Operators, Aggregative Operators, Logical connectivity's with Joins statements and develop applications.
4	C217.4	Describe and apply Schema refinement through all forms of Normalization to eliminate database redundancy.
5	C217.5	Describe Transaction Concept and apply Atomicity, Durability, Concurrent and integrity in order to ensure reliability and Recovery and Backup of databases.
6	C217.6	Describe External Storage Organization mechanisms and apply Indexing in databases for optimizing Query operation to enhance system performance.
CO No.	**C218**	**Operating Systems Lab (6E475)**
1	C218.1	Implement CPU Scheduling algorithms., Implement the file allocation strategies. Implement deadlock detection and avoidance algorithms. Implement page replacement algorithms.
CO No.	**C219**	**Electrical Engineering Lab (6AC91)**
1	C219.1	Understand the working of single phase transformer under different conditions. Understand the performance of three phase induction motor. Understand the different speed control methods of DC motor. Understand the performance of DC motor with and without loading. Understand the no-load characteristics of DC shunt generator. Understand the applications of Thevenin's Theorem in circuit analysis.
CO No.	**C220**	**Database Management Systems Lab (6F474)**

1	C220.1	Create tables for a database and apply Queries using ANY, ALL, IN, EXISTS, NOTEXISTS, UNION, INTERSET, Constraints., Write Queries using Aggregate functions such as [COUNT, SUM, AVG, MAX, MIN, GROUP BY, HAVING], Conversion functions and use string functions for a given application. Explain and write programs using PL/SQL programs using exceptions, COMMIT, ROLLBACK and SAVEPOINT in PL/SQL block. Develop programs using WHILE LOOPS, FOR LOOPS, nested loops using BUILT–IN Exceptions and write Procedures. Write Programs for stored functions invoke functions in SQL Statement and write Programs for packages specification. Describe and write programs using features of CURSORs and its variables and also implement Triggers.
CO No.	**C221**	**Comprehensive Viva Voce – I (6E473)**
1	C221.1	Comprehend the concepts in the core and elective courses. Exhibit technical knowlegde to face interviews. Exhibit life long Learning skills for higher education and to persue Professional practice
CO No.	**C222**	**Technical Seminar (6E494)**
1	C222.1	Deliver lecture on emerging technologies. Explain domain knowledge to resolve real time technical issues. Demonstrate ability to lead and explain concepts and innovative ideas. Demonstrate team leading qualities. Demonstrate public speaking and lifelong learning skills for higher studies and to pursue professional practice. Exchange new information that would not have bee n available otherwise. Develop debating and interview skills.
B.TECH III YEAR I SEMESTER		
CO No.	**C324**	**Summer Industry Internship (6E580)**
1	C324.1	Use the concepts learned in the courses, so far, in conceptualizing, designing and executing the modules of the projects, Exhibit the interest in learning the modern tools and technologies through the bridge courses arranged in the college, beyond the curriculum and hence developing the software.Inculcate an enthusiam to use the creative ideas to build the innovative projects and prototypes which are meeting the current needs of the market and society as a whole, Improve their communicative skills and team skills largely improve and to be work as an individual and in a team.

CO No.	C301	STATISTICAL COMPUTING METHODS FOR DATA SCIENCE (6HC17)
1	C301.1	Calculate mean, median, mode of frequency distribution and to make important decisions for few samples which are taken from a large data.
2	C301.2	Solve the problems on density estimations to perform regression analysis of various kinds of data.
3	C301.3	Solve cross validation on classification problems
4	C301.4	Solve problems of regression in high dimensions, interpreting results in high dimensions
5	C301.5	Solve the problems on time series analysis
6	C301.6	Use R Programming software to solve problems
	C301.7	
CO No.	**C302**	**Introduction to Data Science (6EC10)**
1	C302.1	Implement Data analysis techniques for solving practical problems.
2	C302.2	Perform Data analysis on variety of data using R
3	C302.3	Exercise appropriate manipulation techniques on lists and vectors using operators in R. Comprehend the significance and use the interative programming and functions in R
4	C302.4	Apply the suitable visualization techniques to output analytical results.
5	C302.5	Learn and describe the various Dimentionality Reduction techniques
6	C302.6	Apply regression analysis techniques to model the relationship between variable and interpret the results.
CO No.	**C303**	**Software Engineering and OOAD(6FC07)**
1	C303.1	Identify software process and software engineering practices to select and justify approaches for a given project and its constraints and distinguish lifecycles for developing software product.
2	C303.2	Discuss the importance and principles of Unified Modeling Language, its building blocks and to relate UML paradigm for problem solving.
3	C303.3	Define and design models for the requirements stated in the software project.
4	C303.4	Know what and how to gather the requirements for a project.
5	C303.5	Design class, object and interactive diagrams and know their significance.
6	C303.6	Design advanced behavioral and architectural modeling and work on case studies.
CO No.	**C304**	**Data Communications(6C448)**

1	C304.1	Discuss the basic concepts Internet protocols and Layers on OSI an TCP/IP protocol.
2	C304.2	Get Famialiarize with the physical layer and transmission modes.
3	C304.3	Explore the various types of transmission media
4	C304.4	Comprehend the purpose and use of Data Link layer in communication.
5	C304.5	Identify the concept of multiple access in Wireless LANs.
6	C304.6	Discuss the components used in LAN connections.
CO No.	**C305**	**Data Warehousing and Data Mining(6EC29)**
1	C305.1	Describe the fundamentals of Data Warehousing and issues of mining with respect to architectures, technologies such as OLAP, Data Cube.
2	C305.2	Identify the techniques used in the data preprocessing and the Data Mining Query language primitives.
3	C305.3	Learn the significance and methods used for Characterization and the comparison of different classes of mining.
4	C305.4	Apply the algorithms for mining Association rules in large databases.
5	C305.5	Discuss and apply the models of classification and use those models for prediction of the new samples.
6	C305.6	Apply various clustering techniques available for numerous applications. identify the optimal clustering technique for a particular application
PE -I	**C306**	**Python Programming (6FC08)**
1	C306.1	Get famialiarise with different Python versions and their specifications
2	C306.2	Build the fundamentals of python programming using primitive data types.
3	C306.3	Learn to write applications that include functions, modules, packages along with respective exceptional handling mechism
4	C306.4	Implement programs using advanced OO features of Python
5	C306.5	Develops web based applications to deal with data communcation between client and server modules and also process data that is stored in possible databases.
6	C306.6	Create applications using SciPy/Tkinter/Plotpy modules.
CO No.	**C307**	**Quantitative Aptitude (6H576)**

1	**C307.1**	The questions given on testing divisibility, prime number and questions of HCF and LCM . The questions given on averages, percentage and profit and loss. The questions given on ratio and proportion. The questions given on simple and compound interest. The questions given on time and work, time and distance. The questions given on mensuration and data sufficiency.
CO No.	**C308**	**Effective English Communication and soft skills (6HC74)**
1	C308.1	Students become skilled at identifying their strengths and weaknesses and realize the ways to overcome their weaknesses. Students become skilled at enhancing their soft skills and behavioral patterns. Students become skilled at solving problems and taking effective decisions. Students become skilled at managing the stress and conflicts. Students become skilled at facing interviews confidently and effectively. Students become skilled at cultivating appropriate etiquette and manners to deal with personal and professional life
CO No.	**C309**	**Group Project (6E575)**
1	C309.1	Implement the concepts learned in the courses, so far, in conceptualizing. Designing and executing the modules of the projects. Exhibit the interest in learning the modern tools and technologies through the bridge courses arranged in the college, beyond the curriculum, and hence developing the software. Inculcate an enthusiasm to use the creative ideas to build the innovative projects which are meeting the current needs of the market and society as a whole. Improve their communicate ve skills and team skills largely improve. Work as an individual and in a team.
CO No.	**C311**	**Data Warehousing and Data Mining Lab (6E579)**
1	C311.1	Ability to understand the various kinds of tools used fro ETL operations and Data mining. Demonstrate the classification, clustering and etc. in large data sets. Ability to add mining algorithms as a component to the exiting tools. Ability to apply mining techniques for realistic data.
CO No.	**C310**	**Object Oriented Analysis and Design and Python Programming Lab (6F589)**

1	C310.1	The student will be able to to relate Unified Modeling Language paradigm for problem solving. The student will be able to design Unified Modeling Language (UML) diagrams that represent number of modeling views. The student will be able to understand a case study and model it in different views i.e. Use case view, logical view, component view, Deployment and generate the documentation. The student will be able to write applications using OO features of Python. The student will be able to write applications that include functions, modules, and packages along with respective exceptional handling mechanism using Python. The student will be able to develop web based applications to deal with data communication between client and server modules and also process data that is stored in possible databases. The student will be able to acquire hands on exposure on numpy, Plotpy and Scipy modules.
CO No.	**C312**	**Technical literature Review and Seminar- I (6E595)**
1	C312.1	Identify a topic from the current technologies of their choice in the computer science domain and the allied fields, after surveying in the internet resources, journals and technical magazines in the library. Organize the contents of the presentation and also write the report of the research paper. Present the technical topic in front of the panel and the fellow students, using the oratory skills and also submit the report of the research paper. Interact through answering the questions and also can add some points to the seminar.
B.TECH III YEAR II SEMESTER		
CO No.	**C313**	**BIG DATA ANALYTICS (6EC12)**
1	C313.1	Discuss the importance of big data
2	C313.2	Interprert the challenges with big data ,Elaborate the knowledge about the technological developments in big data environment
3	C313.3	Assess about nosql data environment.
4	C313.4	Capability of understanding the usage of big data in context to cloud and other technologies
5	C313.5	Justify about map reduce work flows
6	C313.6	Implement data Analysis with Hadoop and related tools
		Professional Elective-IV
CO No.	**C314**	**MACHINE LEARNING(6EC13)**

1	C314.1	Formulate machine learning techniques corresponding to various
2	C314.2	Discuss the concepts of Classification and regression models and their applicability
3	C314.3	Learn the popular clustering algorithms and their parameters
4	C314.4	Describe basic computational Learning Theory using PAC lLearnability and Instance Based Learning
5	C314.5	Apply machine learning algorithms for solving problems of moderate complexity using Gradient Descent Algorithm, Random Forest Algorithm for Predictive Analytics
6	C314.6	Discuss the Explanation based Learning and Inductive analytical approach to learning.
		Open Elective-I
CO No.	**C315**	**Basics of Entrepreneurship (6ZC22)**
1	C315.1	The students' will acquire basic knowledge on Skills of Entrepreneurship.
2	C315.2	The students' will understand the techniques of selecting the customers through the process of customer segmentation.
3	C315.3	Identify different Business models and their validity
4	C315.4	Analyze basic cost structure and pricing policies.
5	C315.5	Acquire knowledge about the project management and its techniques.
6	C315.6	The students' get exposure on marketing strategies for the Start up.
CO No.	**C316**	**Web Technologies(6FC09)**
1	C316.1	Describe WWW features. Demonstrate use of HTML tags
2	C316.2	Develop dynamic programs involving Java scripts, popup windows in JavaScript along with Event Handling.
3	C316.3	Develop scripts using XML and XSLT and to read XML document using parsers, DOM parser and SAX parser.
4	C316.4	Use Web Servers and servers in a JAVA along with the Installation and testing of Software Development Kit, Tomcat Server and Tomcat. Develop servlets programs and describe security issues while using web applications
5	C316.5	Develop programs with JSP and MVC. Develop JSP Application.
6	C316.6	Write programs on JDBC, using JDBC API and Struts framework, Explain role of from bean, action and struts-config.xml in a struts application.
CO No.	**C317**	**Computer Networks (6EC06)**

1	C317.1	Identify the different types of network topologies and protocols useful for real time applications and transmission medias.
2	C317.2	Discuss design issues of data link layer and solve problems on Checksum and flow control.
3	C317.3	Describe Channel allocation issues, MAC protocols such as ALOHA, CSMA and CSMA/CD and MAC addresses with IEEE 802.X and wireless LAN.
4	C317.4	Comprehend network layer design issues, routing algorithms and Internetworking concepts.
5	C317.5	Identify network layer sub netting concepts, its protocols of control and congestion and QOS.
6	C317.6	Demonstrate concepts and services and protocols of transport, Application layers along with the network security issues.
CO No.	**C318**	**Theory of Computation (6E517)**
1	C318.1	Discuss principles of Finite state machine , finite automation models, and transition diagrams.
2	C318.2	Design NFA , DFA and FSM transition with suitable examples expressions which are useful in text editors.
3	C318.3	Describe regular languages, regular expressions , grammars and derivations of strings with suitable examples.
4	C318.4	Describe context free grammars, syntax analysis useful in designing
5	C318.5	Comprehend computational functions and type of Turing machine.
6	C318.6	Describe computational theory , Chomsky hierarchy, LR(0), Correspondence, reducibility and solve problems on NP problems.
CO No.	**C319**	**Logical Reasoning (6H677)**
1	C319.1	Questions given on series completion and analogy, odd one out in classification and coding and decoding, blood relations, directions and Arithmetical reasonin, Venn diagrams, cubes and dice, clocks and calendar.
CO No.	**C320**	**Web Technologies Lab (6FC82)**

1	C320.1	Describe WWW features and Demonstrate/ use of HTML tags. Develop dynamic programs involving Java scripts, popup windows in JavaScript along with Event Handling. Develop scripts using XML and XSLT and to read XML document using parsers, DOM parser and SAX parser. Develop Java servlets using Apache Tomcat Server for user authentications. Develop JDBC Application using JSP and ODBC Connectivity.
CO No.	**C321**	**Computer Networks Lab (6EC74)**
1	C321.1	Implement and analyze framing methods of data link layer. Implement and analyze framing methods of data link layer. Illustrate and implement error detection & correction techniques. Implement different Routing Algorithm.Demonstrate basic Network Commands, Demonstrate the use of Wireshark and NS-2 tools
CO No.	**C322**	**Comprehensive Viva Voce – II (6E677)**
1	C322.1	Assess the relevant courses they have undergone till the completion of that academic year. Comprehend the concepts in the core subjects and the elective subjects, to make them ready to face technical interviews which improve their employability skills.
CO No.	**C323**	**Technical Literature Review and Seminar – II (6E696)**
1	C323.1	Identify a topic from the current technologies of their choice in the computer science domain and the allied fields, after surveying in the internet resources, journals and technical magazines in the library. Organize the contents of the presentation and also write the report of the research paper. Present the technical topic in front of the panel and the fellow students, using the oratory skills and also submit the report of the research paper. Interact through answering the questions and also can add some points to the seminar
B.TECH IV YEAR I SEMESTER		
		Open Elective-II
CO No.	**C401**	**INNOVATION & DESIGN THINKING (6ZC24)**
1	C401.1	Identify the inputs required for innovation and also gain familiarity on Entrepreneurship.

2	C401.2	Develop creative methods of ideation and the importance of protecting the ideas.
3	C401.3	Compare and Categorize design thinking and types of thinking.
4	C401.4	Discover familiarity on emerging technologies like Internet of things (IOT).
5	C401.5	Discover the process of building the startup.
6	C401.6	Imagine and plan on various startup funding and also to branding building for the startup.
		Open Elective-III
CO No.	**C402**	**ADVANCED ENTREPRENEURSHIP (6ZC23)**
1	C402.1	Determine the stages of Startup and the turbulence environment it undergoes and the stages related to growth of the Startup.
2	C402.2	Compare the various business models and critically evaluating the effectiveness of the business models.
3	C402.3	Discover the method of business traction and the need of customer relationship management.
4	C402.4	Survey the various channels of revenue building and exploration of new revenue avenues.
5	C402.5	Examine the need of sales planning and sales management and also financial modeling
6	C402.6	Discover the legal implications effecting the company's prospects and the issues related to intellectual property rights.
CO No.	**C403**	**ARTIFICIAL INTELLIGENCE AND DEEP LEARNING (6EC15)**
1	C403.1	Classify the different types of AI agents
2	C403.2	Identify various AI search algorithms (uninformed, informed, heuristic, constraint satisfaction, genetic algorithms)
3	C403.3	Describe and interpret the fundamentals of knowledge representation (logic-based, frame-based, semantic nets), inference and theorem proving
4	C403.4	Justify how to build simple knowledge-based systems
5	C403.5	Apply concepts of convolutional networks in day to day applications.
6	C403.6	Build Reinforcement Learning-Markov Decision Processes (MDP) and the related concepts
CO No.	**C404**	**CLOUD COMPUTING (6FC14)**
1	C404.1	Describe the characteristics of cloud

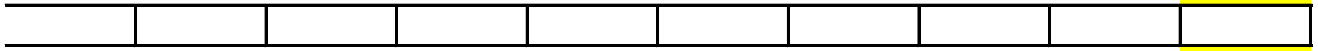
2	C404.2	Describe the cloud services.
3	C404.3	Classify different architectures for cloud applications, Creation and running of python programs, running amazon ec2 instance
4	C404.4	Compare Data Intensive applications and future trends of Internet Clouds supporting Mobile Computing, Ubiquitious Computing and Social
5	C404.5	Build mapreduce and image processing app on cloud.
6	C404.6	Apply cloud security architecture.
CO No.	**C405**	**Information Security (6FC11)**
1	C405.1	Explain various security attacks and security services.
2	C405.2	Describe encryption using cryptographic techniques and key elements of cryptographic principles for confidentiality of data.
3	C405.3	Explain and comprehend privacy to emails using PGP and S/MIME.
4	C405.4	Discuss IP security Architecture and its role in security framework.
5	C405.5	Discuss SSL and compare SSl with TLS, explain how to secure credit card details in online transactions.
6	C405.6	Describe design issues of Firewall and concepts of Intrusion Detection Systems
CO No.	**C406**	**Compiler Design (6EC07)**
1	C406.1	Explain Overview of compiler its Environment phases and features of Lexical Analyzer, LEX tool
2	C406.2	Describe and apply Context free grammar, Top down parsing technique, LMD, RMD, Recursive decent parsing with back tracking, Ambiguous grammar, Elimination of left recursion, Left factoring, unambiguous grammar, Predictive parsing, LL(1).
3	C406.3	Demonstrate and solve problems on SLR, CLR, LALR, operator precedence parser, LR (O), LR(1), LR(K) grammar and use YACC tool.
4	C406.4	Describe and use Semantic Analysis concepts to design compiler : and describe Intermediate code generation such as 3-address code form, DAG , polish notation.
5	C406.5	Explain Symbol tables , structure languages, hashing, tree structures representation, static, runtime stack and heap allocations, storage allocation for arrays and in strings and records.
6	C406.6	Explain data flow analysis , Code generation and apply generic code generation algorithm.

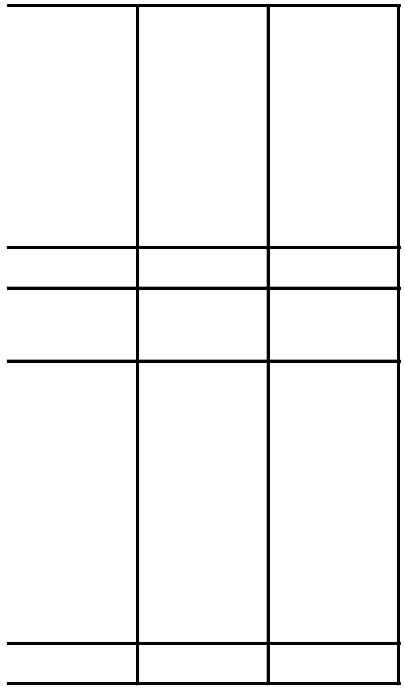
CO No.	C407	Software Automation and Testing (6EC11)
1	C407.1	Describe concepts of Software testing
2	C407.2	Describe and apply the concepts Flow graphs, Path testing and Data Flow Testing.
3	C407.3	Practice Software testing strategy and Environment with economics and apply Software Metrics useful in software development and maintenance.
4	C407.4	Software Testing Methodology, finding defects hard to find, Verification and validation, Functional and structural, Workbench concept, Eight Consideration of software testing methodology, checklist. Describe Agile computing with agile testing
5	C407.5	Demonstrate Software Testing Techniques such as JADs, Pareto Analysis , Regression Tasting, Structured walkthroughs, Thread testing , Performance testing and White box testing.
6	C407.6	Describe Graph matrices and applications, and practice and apply automated testing tools such load Runner, UFT and QTP.
CO No.	**C408**	**Intellectual Property Rights (6GC49)**
1	C408.1	Demonstrate a breadth of knowledge in Intellectual property
2	C408.2	Compare and describe overview of Patents, Searching ,filling and drafting of Patents
3	C408.3	Compare copyright & GI .
4	C408.4	Demonstrate Trade Mark & Trade Secret,
5	C408.5	Comprehend Integrated Circuit and Industrial Design.
6	C408.6	Demonstrate Knowledge about different national and international : Conventions and Treaties Governing the IPRs
CO No.	**C409**	**Industry Oriented Mini (6E781)Project**
1	C409.1	Use the concepts learned in the courses, so far, in conceptualizing, designing and executing the modules of the projects, Exhibit the interest in learning the modern tools and technologies through the bridge courses arranged in the college, beyond the curriculum, and hence developing the software, Inculcate an enthusiasm to use the creative ideas to build the innovative projects which are meeting the current needs of the market and society as a whole, Improve their communicative skills and team skills largely improve, Work as an individual and in a team.

CO No.	C410	Software Testing and Automation Lab (6EC75)
1	C410.1	Prepare Test Plan document and write Test Cases for Small scale Project (Like for their B.Tech IV Year Project or Post-Graduate Projects), they are learn how to Analyze SRS document in order to prepare Test Plan Document. Demonstrate skills to use modern software testing tools (EX: UFT, TestLink, Bugzilla, Selenium, Test Director and Quality Center) and test application (web, Window application) by using the tools. Demonstrate the ability to differentiate between different Testing tools present in the market (like functional testing tools, Test Management Tools, Bug Tracking Tools and Performance Testing Tools) and prepare Test Plan document and write Test Cases for Small scale Project (Like for their B.Tech IV Year Project or Post-Graduate Projects).
CO No.	**C411**	**Compiler Design and Information Security Lab (6EC76)**
1	C411.1	Implement the lexical analyzer using JLex, flex or lex or other lexical analyzer generating tools. Design top down parser for the given language. Design bottom up parser for the above language. Implement symmetric key encryption algorithms. Implement asymmetric key encryption algorithms. Implement hashing and key exchange algorithms.
CO No.	**C412**	**Project – I (6E780)**
1	C412.1	Develop plans with relevant people to achieve the project's goals. Break work down into tasks and determine handover procedures. Identify links and dependencies, and schedule to achieve deliverables. Estimate the human and physical resources required, and make plans to obtain the necessary resources. Allocate roles with clear lines of responsibility and accountability with team spirit.Design and develop the software or prototype to meet societal needs.
CO No.	**C413**	**Technical Literature Review and Seminar –III (6E797)**

1	C413.1	Identify a topic from the current technologies of their choice in the computer science domain and the allied fields, after surveying in the internet resources, journals and technical magazines in the library. Arrange the contents of the presentation and also write the report of the research paper. Present the technical topic in front of the panel and the fellow students, using the oratory skills and also submit the report of the research paper. Interact through answering the questions and also can add some points to the seminar
		IV YEAR II SEMESTER
CO No.	**C414**	**Mobile Computing (6EC14)**
1	C414.1	Identify vast application areas for mobile / wireless communication / computing. They also understand the working principle of GSM technology.
2	C414.2	Discuss various media access control methods that are meant for wireless communication along with SDMA, FDMA, TDMA and CDMA.
3	C414.3	Identify IP mobile primitives in Network layer in the wireless communication and recognize suitable solutions for the same.
4	C414.4	Explain the issues in the Transport layer in wireless communication and identifying suitable solutions for the same
5	C414.5	Discuss MANETs with examples and explain hoarding, client server computing along with the data delivery mechanisms.
6	C414.6	Discuss protocols and tools such as WAP, Blue Tooth and explain emerging mobile operating systems
CO No.	**C415**	**Management Science (6ZC02)**
1	C415.1	Outlines the significance of management, defines the basic concepts and applicability of management principles in changing paradigms.
2	C415.2	Demonstrates the procedures of the work study method and work measurement, Project management.
3	C415.3	Infers the need to understand the importance of materials management and quality control techniques.
4	C415.4	Relates the knowledge of two functional areas of business, human resource management and marketing management.
5	C415.5	Explains the different dimensions of behavior, personality, perception, attitudes overall to gain insights into organizational behavior.
6	C415.6	Distinguish some aspects related to strategic planning and strategic implementation to gain competitive advantage over competitors

CO No.	C416	Project – II (6E884)
1	C416.1	Develop plans with relevant people to achieve the project's goals. Break work down into tasks and determine handover procedures. Identify links and dependencies, and schedule to achieve deliverables. Estimate the human and physical resources required, and make plans to obtain the necessary resources. Allocate roles with clear lines of responsibility and accountability with team spirit.Design and develop the software or prototype to meet societal needs.
CO No.	**C417**	**Comprehensive Viva Voce - III (6E885)**
1	C417.1	Assess the relevant courses they have undergone till the completion of that academic year. Comprehend the concepts in the core subjects and the elective subjects, to make them ready to face technical interviews which improve their employability skills. They are asked to comprehend the concepts in the core subjects and the elective subjects, to make them ready to face technical interviews which improve their employability skills. Assessment is done in the relevant courses they have undergone till the completion of that academic year.
CO No.	**C418**	**Technical Literature Review and Seminar – IV (6E898)**
1	C418.1	1. Identify a topic from the current technologies of their choice in the computer science domain and the allied fields, after surveying in the internet resources, journals and technical magazines in the library. Arrange the contents of the presentation and also write the report of the research paper. Present the technical topic in front of the panel and the fellow students, using the oratory skills and also submit the report of the research paper. Interact through answering the questions and also can add some points to the





Course Outcomes Vs Program Specific Outcomes - Correlation - 2017 -21 Batch

	NBA Codes	Course (Course Code) - Correlation	PSO 1	PSO 2	PSO 3
B.TECH I YEAR I SEMESTER					
CO No.	**C105**	**Computer Programming (6F101)**	**M**		
1	C105.1	Explain basic fundamentals of Computer Systems , computing environments , Computer Languages – Machine Languages. Writing/ Drawing simple Algorithms and flowcharts.	**1**		
2	C105.2	Describe C language Programs, Structure of a C Program, Comments, the greeting program, identifiers, constants, variables, types , expressions and keywords.	**2**		
3	C105.3	Describe write programs using control structures such as Pre-test and post-test loops, while, do while, for, break and continue statements, comma expression . Write programs using functions . Write programs using recursion.	**2**		
4	C105.4	Write programs implementing application on arrays.	**2**		
5	C105.5	Write programs using Pointers and string handling functions.	**3**		
6	C105.6	Write programs using Enumerated, Structure, Union types and files.	**3**		
			2		
CO No.	**C110**	**C Programming Lab (6F171)**	**M**		

1	C110.1	Write algorithms and flowcharts to convert temperature Celsius to its equivalent Fahrenheit, calculate roots and Fibonacci series. Write programs using control statements while, do-while, and for loops and solve mathematical series summations. Write programs in menu driven style . Write programs implementing functions , recursion with return values for example Fibonacci , GCD, LCMD , pascal triangle, large and smallest in a set of numbers. Write a program to implementing applications on arrays , matrices addition , multiplication and compute symmetric, lower triangular, upper triangular, diagonal, scalar, or unit of a matrix. Write programs on complex numbers and implement programs on student data or employees	**2**		
			2		
	C112	**IT Workshop – I (6F172)**	**M**		
1	C112.1	1. Identify peripherals of a computer, describe types of Operating System, Install computer with dual boot operating systems . Assembling and Disassemble computer system. Install and Use Microsoft Windows 7 for programming and application development. Install Linux and Install Applications in Linux and Windows. Troubleshoot Software and hardware problems along with configurations setting for application and computer security for software development. Describe and practice Cyber ethics	**2**		
			2		
CO No.	**C113**	**Seminar on current affairs /Technical Topic (6E191)**			**L**
1	C113.1	Identify current general, political and technology related topics. Arrange and present seminar in a effective manner. Collect, survey and organize content in presentable manner. Demonstrate oratory skills with the aid of Power Point Presentations. Exhibit interview facing skills and team leading qualities			**1**
					1
B.TECH I YEAR II SEMESTER					
CO No.	**C117**	**Data Structures (6E201)**	**M**		

1	C117.1	Demonstrate the concepts of Abstract data type and also applications of stack and Queues	1		
2	C117.2	Select the data structure that efficiently model the information in a problem	2		
3	C117.3	Design programs using variety of data structures including Trees, AVL Trees and Graphs and their	2		
4	C117.4	Solve problems and also assess efficiency trade off among searching and sorting using time complexity of each algorithm and also the applications of hashing and hash tables.	3		
5	C117.5	Describe the concepts of OOPs and implement programs using objects, classes, constructors and	3		
6	C117.6	Apply concepts of OOPs to write program on over loading functions and concepts of inheritance.	2		
			2		
CO No.	**C122**	**Data structure Lab (C,C++) (6E271)**	**H**		**L**
1	C122.1	Write programs to implement Stacks, Queues and circular queues, tree traversals. Inorder, preorder and post orde, searching and sorting operations. Write programs on Binary trees, C++ to implement classes and operator overloading.	3		1
			3		1
CO No.	**C124**	**IT Workshop – II (6F273)**	**H**		
1	C124.1	Apply MS –Office features for documentation and formatting data. Create Project report document using formatting styles, tables, fonts footnotes spell check and Track changes. Create News letters and prepare Power Point Presentations. Describe and use Excel spread sheets and applying formulas for calculations. Use and Apply HTML Features for Formatting Tags, Linking of pages using Anchor Tags, Table tags.	3		
		Level of Attainment	3		
CO No.	**C125**	**Seminar on Science and its impact / Technical Topic (6E292)**			**L**

1	C125.1	Deliver lecture on emerging technologies. Collect , survey and organize Content in presentable manner Demonstrate ability to lead and explain concepts and innovative ideas. Demonstrate team leading qualities. Demonstrate public speaking skills and exchange new information that would not have been available other wise. Develop debating and interview skills.			1
					1
B.TECH II YEAR I SEMESTER					
CO No.	**C206**	**Object Oriented Programming through Java (6E302)**	**H**		
1	C206.1	Describe fundamentals of JAVA, its Classes, and Objects and write simple programs using constructors.	**2**		
2	C206.2	Explain Write simple programs using inheritance, interface and packages.	**3**		
3	C206.3	Explain and write programs using Packages, I/O Stream and collections.	**3**		
4	C206.4	Describe and write programs to implement Exception handling and Multithreading.	**3**		
5	C206.5	Describe and write programs using AWT, Swings and develop applications using event handling.	**3**		
6	C206.6	Describe and develop applications using Applets and develop client server programs using networking concepts.	**3**		
			3		
CO No.	**C207**	**Mathematical Foundations of Computer Science (6F302)**	**H**		
1	C207.1	Study and explain the significance of truth tables	**1**		
2	C207.2	Distinguish between Statement Logic and Predicate Logic..	**2**		
3	C207.3	Design elementory deterministic and randomised algorithms to solve computational problems using relations, Lattices and Boolean Algebra Concepts	**3**		
4	C207.4	Understand and assess the use of group concepts in the applications	**3**		
5	C207.5	Explain and justify the uses of trees concepts	**3**		
6	C207.6	Identify the role of graphs concepts in Engineering Applications	**3**		

			3		
CO No.	**C210**	**Object Oriented Programming through Java Lab (6E372)**	**H**		**L**
1	C210.1	Write programs to generate Prime numbers, Roots of quadratic equation and Fibonacci series. Write small application such as banking system. Write programs on operator , function overloading and dynamic method dispatch. Write programs to implement interface and packages. Explain and write programs to implement threads. Write prog rams to implement applets and event handling. Write an application to implement client and server scenario.	**3**		**1**
			3		1
CO No.	**C211**	**Seminar on Technology and its Impact/Technical topic (6E393)**			M
1	C211.1	Deliver lecture on emerging technologies. Explain domain knowledge to resolve real time technical issues. Demonstrate ability to lead and explain concepts and innovative ideas. Demonstrate team leading qualities. Demonstrate public speaking skills. Exchange new information that would not have been available otherwise. Develop debating and interview skills.			2
					2
B.TECH II YEAR II SEMESTER					
CO No.	**C215**	**Design and Analysis of Algorithms (6FC04)**	**H**		
1	C215.1	Analyze worst-case running times of algorithms using asymptotic analysis.	3		
2	C215.2	Describe the divide-and-conquer paradigm and explain when an algorithmic design situation calls for it. Recite algorithms that employ this paradigm. Synthesize divide and-conquer algorithms. Derive and solve recurrences describing the performance of divide-and-conquer algorithms.	3		
3	C215.3	Explain the dynamic-programming paradigm with the suitable applications. Recite algorithms that employ this paradigm. Synthesize dynamic programming algorithms, and analyze them.	3		

4	C215.4	Comprehend the greedy paradigm and explain when an algorithmic design situation calls for it. Recite algorithms that employ this paradigm. Synthesize greedy algorithms, and analyze them.	3		
5	C215.5	Explain what amortized running time is and what it is good for. Describe the different Methods of amortized analysis (aggregate analysis, accounting, potential method). Perform amortized analysis.	3		
6	C215.6	Describe Backtracking, Branch and Bound algorithms and Concept of P and NP Problems	3		
			3		
CO No.	**C216**	**Operating Systems (6EC03)**	H		
1	C216.1	Describe the basic functionalities and structure of the Operating System	2		
2	C216.2	Explain the concepts and implementations of: Processes, Process Scheduling. Describe, contrast and compare various types of Operating systems like Windows and Linux.	3		
3	C216.3	Comprehend the concepts of Synchronization and Deadlocks in the Operating System	3		
4	C216.4	Discuss the concepts of Memory Management(Physical and Virtual memory)	3		
5	C216.5	Explain the concepts of File System with regard to directory and disk management algorithms.	3		
6	C216.6	Students understand the concepts of I/O systems, protection and security in a case study given	3		
			3		
CO No.	**C217**	**Database Management Systems (6FC03)**	**H**		
1	C217.1	Explain importance, significance, models, Database languages, architecture and design of Data Base	1		
2	C217.2	Describe Relational Model's – Integrity Constraints, Querying fundamentals, Logical data base Design and Views of databases along with application of Relational Algebra.	2		

3	C217.3	Apply queries in SQL Query using Nested Queries Set, Comparison Operators, Aggregative Operators, Logical connectivity's with Joins statements and develop applications.	3		
4	C217.4	Describe and apply Schema refinement through all forms of Normalization to eliminate database	3		
5	C217.5	Describe Transaction Concept and apply Atomicity, Durability, Concurrent and integrity in order to ensure reliability and Recovery and Backup of databases.	3		
6	C217.6	Describe External Storage Organization mechanisms and apply Indexing in databases for optimizing Query operation to enhance system performance.	3		
			3		
CO No.	**C218**	**Operating Systems Lab (6E475)**	H		
1	C218.1	Implement CPU Scheduling algorithms., Implement the file allocation strategies. Implement deadlock detection and avoidance algorithms. Implement page replacement algorithms.	3		
			3		
CO No.	**C220**	**Database Management Systems Lab (6F474)**	H		M
1	C220.1	Create tables for a database and apply Queries using ANY, ALL, IN, EXISTS, NOTEXISTS, UNION, INTERSET, Constraints., Write Queries using Aggregate functions such as [COUNT, SUM, AVG, MAX, MIN, GROUP BY, HAVING], Conversion functions and use string functions for a given application. Explain and write programs using PL/SQL programs using exceptions, COMMIT, ROLLBACK and SAVEPOINT in PL/SQL block. Develop programs using WHILE LOOPS, FOR LOOPS, nested loops using BUILT–IN Exceptions and write Procedures. Write Programs for stored functions invoke functions in SQL Statement and write Programs for packages specification. Describe and write programs using features of CURSORs and its variables and also	3		2
			3		2

CO No.	C221	Comprehensive Viva Voce – I (6E473)	H		
1	C221.1	Comprehend the concepts in the core and elective courses. Exhibit technical knowlegde to face interviews. Exhibit life long Learning skills for higher education and to persue Professional practice	3		
			3		
CO No.	C222	Technical Seminar (6E494)			M
1	C222.1	Deliver lecture on emerging technologies. Explain domain knowledge to resolve real time technical issues. Demonstrate ability to lead and explain concepts and innovative ideas. Demonstrate team leading qualities. Demonstrate public speaking and lifelong learning skills for higher studies and to pursue professional practice. Exchange new information that would not have bee n available otherwise. Develop debating and interview skills.			3
					3
B.TECH III YEAR I SEMESTER					
CO No.	C324	Summer Industry Internship (6E580)	H	L	M
1	C324.1	Use the concepts learned in the courses, so far, in conceptualizing, designing and executing the modules of the projects, Exhibit the interest in learning the modern tools and technologies through the bridge courses arranged in the college, beyond the curriculum and hence developing the software.Inculcate an enthusiam to use the creative ideas to build the innovative projects and prototypes which are meeting the current needs of the market and society as a whole, Improve their communicative skills and team skills largely improve and to be work as an individual and in a	3	**1**	**2**
			3	1	2
CO No.	C301	STATISTICAL COMPUTING METHODS FOR DATA SCIENCE (6HC17)	M	M	
1	C301.1	Calculate mean, median, mode of frequency distribution and to make important decisions for few samples which are taken from a large data.		2	

2	C301.2	Solve the problems on density estimations to perform regression analysis of various kinds of data.		2	
3	C301.3	Solve cross validation on classification problems		2	
4	C301.4	Solve problems of regression in high dimensions, interpreting results in high dimensions		2	
5	C301.5	Solve the problems on time series analysis		2	
6	C301.6	Use R Programming software to solve problems	2	2	
			2	2	
CO No.	**C302**	**Introduction to Data Science (6EC10)**	**H**	**M**	
1	C302.1	Implement Data analysis techniques for solving practical problems.	2	2	
2	C302.2	Perform Data analysis on variety of data using R	3	2	
3	C302.3	Exercise appropriate manipulation techniques on lists and vectors using operators in R. Comprehend the significance and use the interative programming and functions in R	3	2	
4	C302.4	Apply the suitable visualization techniques to output analytical results.	3	2	
5	C302.5	Learn and describe the various Dimentionality Reduction techniques available	2	2	
6	C302.6	Apply regression analysis techniques to model the relationship between variable and interpret the results.	3	2	
			3	2	
CO No.	**C303**	**Software Engineering and OOAD(6FC07)**	**H**		
1	C303.1	Identify software process and software engineering practices to select and justify approaches for a given project and its constraints and distinguish lifecycles for developing software product.	2		
2	C303.2	Discuss the importance and principles of Unified Modeling Language, its building blocks and to relate UML paradigm for problem solving.	2		
3	C303.3	Define and design models for the requirements stated in the software project.	3		
4	C303.4	Know what and how to gather the requirements for a project.	3		
5	C303.5	Design class, object and interactive diagrams and know their significance.	3		

6	C303.6	Design advanced behavioral and architectural modeling and work on case studies.	3		
			3		
CO No.	**C305**	**Data Warehousing and Data Mining(6EC29)**	**H**		
1	C305.1	Describe the fundamentals of Data Warehousing and issues of mining with respect to architectures, technologies such as OLAP, Data Cube.	3		
2	C305.2	Identify the techniques used in the data preprocessing and the Data Mining Query language primitives.	3		
3	C305.3	Learn the significance and methods used for Characterization and the comparison of different classes of mining.	3		
4	C305.4	Apply the algorithms for mining Association rules in large databases.	3		
5	C305.5	Discuss and apply the models of classification and use those models for prediction of the new samples.	3		
6	C305.6	Apply various clustering techniques available for numerous applications. identify the optimal clustering technique for a particular application	3		
			3		
PE -I	**C306**	**Python Programming (6FC08)**	H	M	
1	C306.1	Get famialiarise with different Python versions and their specifications	1	1	
2	C306.2	Build the fundamentals of python programming using primitive data types.	2	2	
3	C306.3	Learn to write applications that include functions, modules, packages along with respective exceptional handling mechism	3	2	
4	C306.4	Implement programs using advanced OO features of Python	3	3	
5	C306.5	Develops web based applications to deal with data communcation between client and server modules and also process data that is stored in possible databases.	3	2	
6	C306.6	Create applications using SciPy/Tkinter/Plotpy modules.	3	3	
			3	2	
CO No.	**C309**	**Group Project (6E575)**	**M**	**L**	**M**

1	C309.1	Implement the concepts learned in the courses, so far, in conceptualizing. Designing and executing the modules of the projects. Exhibit the interest in learning the modern tools and technologies through the bridge courses arranged in the college, beyond the curriculum, and hence developing the software. Inculcate an enthusiasm to use the creative ideas to build the innovative projects which are meeting the current needs of the market and society as a whole. Improve their communicate ve skills and team skills largely improve. Work as an individual and in a team.	**2**	**1**	**2**
			2	**1**	2
CO No.	**C311**	**Data Warehousing and Data Mining Lab (6E579)**	**H**		**H**
1	C311.1	Ability to understand the various kinds of tools used fro ETL operations and Data mining. Demonstrate the classification, clustering and etc. in large data sets. Ability to add mining algorithms as a component to the exiting tools. Ability to apply mining techniques for	3		3
			3		3
CO No.	**C310**	**Object Oriented Analysis and Design and Python Programming Lab (6F589)**	H		M

1	C310.1	The student will be able to to relate Unified Modeling Language paradigm for problem solving. The student will be able to design Unified Modeling Language (UML) diagrams that represent number of modeling views. The student will be able to understand a case study and model it in different views i.e. Use case view, logical view, component view, Deployment and generate the documentation. The student will be able to write applications using OO features of Python. The student will be able to write applications that include functions, modules, and packages along with respective exceptional handling mechanism using Python. The student will be able to develop web based applications to deal with data communication between client and server modules and also process data that is stored in possible databases. The student will be able to acquire hands on exposure on numpy, Plotpy and Scipy	3		2
			3		2
CO No.	**C312**	**Technical literature Review and Seminar- I (6E595)**			**H**
1	C312.1	Identify a topic from the current technologies of their choice in the computer science domain and the allied fields, after surveying in the internet resources, journals and technical magazines in the library. Organize the contents of the presentation and also write the report of the research paper. Present the technical topic in front of the panel and the fellow students, using the oratory skills and also submit the report of the research paper. Interact through answering the questions and also can add some points to the seminar.			**3**
					3
B.TECH III YEAR II SEMESTER					
CO No.	**C313**	**BIG DATA ANALYTICS (6EC12)**	M	H	
1	C313.1	Discuss the importance of big data	1	3	
2	C313.2	Interprert the challenges with big data ,Elaborate the knowledge about the technological developments in big data environment	2	3	
3	C313.3	Assess about nosql data environment.	3	3	

4	C313.4	Capability of understanding the usage of big data in context to cloud and other technologies	3	3	
5	C313.5	Justify about map reduce work flows		3	
6	C313.6	Implement data Analysis with Hadoop and related tools		3	
			2	3	
		Professional Elective-IV			
CO No.	**C314**	**MACHINE LEARNING(6EC13)**	H	H	
1	C314.1	Formulate machine learning techniques corresponding to various applications.	3	3	
2	C314.2	Discuss the concepts of Classification and regression models and their applicability	3	3	
3	C314.3	Learn the popular clustering algorithms and their parameters		3	
4	C314.4	Describe basic computational Learning Theory using PAC lLearnability and Instance Based Learning		3	
5	C314.5	Apply machine learning algorithms for solving problems of moderate complexity using Gradient Descent Algorithm, Random Forest Algorithm for Predictive Analytics		3	
6	C314.6	Discuss the Explanation based Learning and Inductive analytical approach to learning.	3	3	
			3	3	
CO No.	**C316**	**Web Technologies(6FC09)**	**H**		
1	C316.1	Describe WWW features. Demonstrate use of HTML tags	2		
2	C316.2	Develop dynamic programs involving Java scripts, popup windows in JavaScript along with Event	3		
3	C316.3	Develop scripts using XML and XSLT and to read XML document using parsers, DOM parser and SAX	3		
4	C316.4	Use Web Servers and servers in a JAVA along with the Installation and testing of Software Development Kit, Tomcat Server and Tomcat. Develop servlets programs and describe security issues while using web	3		
5	C316.5	Develop programs with JSP and MVC. Develop JSP Application.	3		

6	C316.6	Write programs on JDBC, using JDBC API and Struts framework, Explain role of from bean, action and struts-config.xml in a struts application.	3		
			3		
CO No.	**C317**	**Computer Networks (6EC06)**	**H**		**L**
1	C317.1	Identify the different types of network topologies and protocols useful for real time applications and transmission medias.	2		1
2	C317.2	Discuss design issues of data link layer and solve problems on Checksum and flow control.	3		
3	C317.3	Describe Channel allocation issues, MAC protocols such as ALOHA, CSMA and CSMA/CD and MAC addresses with IEEE 802.X and wireless LAN.	3		
4	C317.4	Comprehend network layer design issues, routing algorithms and Internetworking concepts.	3		
5	C317.5	Identify network layer sub netting concepts, its protocols of control and congestion and QOS.	3		
6	C317.6	Demonstrate concepts and services and protocols of transport, Application layers along with the network security issues.	3		
			3		1
CO No.	**C318**	**Theory of Computation (6E517)**	**H**		
1	C318.1	Discuss principles of Finite state machine , finite automation models, and transition diagrams.	2		
2	C318.2	Design NFA , DFA and FSM transition with suitable examples expressions which are useful in text editors.	3		
3	C318.3	Describe regular languages, regular expressions , grammars and derivations of strings with suitable examples.	3		
4	C318.4	Describe context free grammars, syntax analysis useful in designing compilers.	3		
5	C318.5	Comprehend computational functions and type of Turing machine.	3		
6	C318.6	Describe computational theory , Chomsky hierarchy, LR(0), Correspondence, reducibility and solve problems on NP problems.	3		
			3		

CO No.	C320	Web Technologies Lab (6FC82)	H		M
1	C320.1	Describe WWW features and Demonstrate/ use of HTML tags. Develop dynamic programs involving Java scripts, popup windows in JavaScript along with Event Handling. Develop scripts using XML and XSLT and to read XML document using parsers, DOM parser and SAX parser. Develop Java servlets using Apache Tomcat Server for user authentications. Develop JDBC Application using JSP and ODBC Connectivity.	3		2
		Level of Attainment	3		2
CO No.	C321	Computer Networks Lab (6EC74)	H		M
1	C321.1	Implement and analyze framing methods of data link layer. Implement and analyze framing methods of data link layer. Illustrate and implement error detection & correction techniques. Implement different Routing Algorithm.Demonstrate basic Network Commands, Demonstrate the use of Wireshark and NS-2 tools	3		2
			3		2
CO No.	C322	Comprehensive Viva Voce – II (6E677)	H		
1	C322.1	Assess the relevant courses they have undergone till the completion of that academic year. Comprehend the concepts in the core subjects and the elective subjects, to make them ready to face technical interviews which improve their employability skills.	3		
			3		
CO No.	C323	Technical Literature Review and Seminar – II (6E696)			H

1	C323.1	Identify a topic from the current technologies of their choice in the computer science domain and the allied fields, after surveying in the internet resources, journals and technical magazines in the library. Organize the contents of the presentation and also write the report of the research paper. Present the technical topic in front of the panel and the fellow students, using the oratory skills and also submit the report of the research paper. Interact through answering the questions and also can add some points to the seminar			3
					3
B.TECH IV YEAR I SEMESTER					
CO No.	**C403**	**ARTIFICIAL INTELLIGENCE AND DEEP LEARNING (6EC15)**	M	H	
1	C403.1	Classify the different types of AI agents	2	3	
2	C403.2	Identify various AI search algorithms (uninformed, informed, heuristic, constraint satisfaction, genetic algorithms)	2	3	
3	C403.3	Describe and interpret the fundamentals of knowledge representation (logic-based, frame-based, semantic nets), inference and theorem proving	2	3	
4	C403.4	Justify how to build simple knowledge-based systems		3	
5	C403.5	Apply concepts of convolutional networks in day to day applications.	2	3	
6	C403.6	Build Reinforcement Learning-Markov Decision Processes (MDP) and the related concepts	2	3	
			2	3	
CO No.	**C404**	**CLOUD COMPUTING (6FC14)**		**H**	
1	C404.1	Describe the characteristics of cloud		2	
2	C404.2	Describe the cloud services.		3	
3	C404.3	Classify different architectures for cloud applications, Creation and running of python programs, running amazon ec2 instance		3	
4	C404.4	Compare Data Intensive applications and future trends of Internet Clouds supporting Mobile Computing, Ubiquitious Computing and Social Networking		3	
5	C404.5	Build mapreduce and image processing app on cloud.		3	
6	C404.6	Apply cloud security architecture.		3	

				3	
CO No.	**C405**	**Information Security (6FC11)**	H		
1	C405.1	Explain various security attacks and security services.	3		
2	C405.2	Describe encryption using cryptographic techniques and key elements of cryptographic principles for confidentiality of data.	3		
3	C405.3	Explain and comprehend privacy to emails using PGP and S/MIME.	3		
4	C405.4	Discuss IP security Architecture and its role in security framework.	3		
5	C405.5	Discuss SSL and compare SSl with TLS, explain how to secure credit card details in online transactions.	3		
6	C405.6	Describe design issues of Firewall and concepts of Intrusion Detection Systems	3		
			3		
CO No.	**C406**	**Compiler Design (6EC07)**	H		
1	C406.1	Explain Overview of compiler its Environment phases and features of Lexical Analyzer, LEX tool	2		
2	C406.2	Describe and apply Context free grammar, Top down parsing technique, LMD, RMD, Recursive decent parsing with back tracking, Ambiguous grammar, Elimination of left recursion, Left factoring, unambiguous grammar, Predictive parsing, LL(1).	3		
3	C406.3	Demonstrate and solve problems on SLR, CLR, LALR, operator precedence parser, LR (O), LR(1), LR(K) grammar and use YACC tool.	3		
4	C406.4	Describe and use Semantic Analysis concepts to design compiler : and describe Intermediate code generation such as 3-address code form, DAG , polish notation.	3		
5	C406.5	Explain Symbol tables , structure languages, hashing, tree structures representation, static, runtime stack and heap allocations, storage allocation for arrays and in strings and records.	3		
6	C406.6	Explain data flow analysis , Code generation and apply generic code generation algorithm.	3		
			3		

CO No.	C407	Software Automation and Testing (6EC11)	H		
1	C407.1	Describe concepts of Software testing	3		
2	C407.2	Describe and apply the concepts Flow graphs, Path testing and Data Flow Testing.	3		
3	C407.3	Practice Software testing strategy and Environment with economics and apply Software Metrics useful in software development and maintenance.	3		
4	C407.4	Software Testing Methodology, finding defects hard to find, Verification and validation, Functional and structural, Workbench concept, Eight Consideration of software testing methodology, checklist. Describe Agile computing with agile testing	3		
5	C407.5	Demonstrate Software Testing Techniques such as JADs, Pareto Analysis , Regression Tasting, Structured walkthroughs, Thread testing , Performance testing and White box testing.	3		
6	C407.6	Describe Graph matrices and applications, and practice and apply automated testing tools such load Runner, UFT and QTP.	3		
			3		
CO No.	**C409**	**Industry Oriented Mini (6E781)Project**	H	M	H
1	C409.1	Use the concepts learned in the courses, so far, in conceptualizing, designing and executing the modules of the projects, Exhibit the interest in learning the modern tools and technologies through the bridge courses arranged in the college, beyond the curriculum, and hence developing the software, Inculcate an enthusiasm to use the creative ideas to build the innovative projects which are meeting the current needs of the market and society as a whole, Improve their communicative skills and team skills largely improve, Work as an individual and in a team.	3	2	3
			3	2	3
CO No.	**C410**	**Software Testing and Automation Lab (6EC75)**	H		M

1	C410.1	Prepare Test Plan document and write Test Cases for Small scale Project (Like for their B.Tech IV Year Project or Post-Graduate Projects), they are learn how to Analyze SRS document in order to prepare Test Plan Document. Demonstrate skills to use modern software testing tools (EX: UFT, TestLink, Bugzilla, Selenium, Test Director and Quality Center) and test application (web, Window application) by using the tools. Demonstrate the ability to differentiate between different Testing tools present in the market (like functional testing tools, Test Management Tools, Bug Tracking Tools and Performance Testing Tools) and prepare Test Plan document and write Test Cases for Small scale Project (Like for their B.Tech IV Year Project or Post-Graduate Projects).	3		2
			3		2
CO No.	**C411**	**Compiler Design and Information Security Lab (6EC76)**	H		H
1	C411.1	Implement the lexical analyzer using JLex, flex or lex or other lexical analyzer generating tools. Design top down parser for the given language. Design bottom up parser for the above language. Implement symmetric key encryption algorithms. Implement asymmetric key encryption algorithms. Implement hashing and key exchange algorithms.	3		3
			3		3
CO No.	**C412**	**Project – I (6E780)**	H	L	H
1	C412.1	Develop plans with relevant people to achieve the project's goals. Break work down into tasks and determine handover procedures. Identify links and dependencies, and schedule to achieve deliverables. Estimate the human and physical resources required, and make plans to obtain the necessary resources. Allocate roles with clear lines of responsibility and accountability with team spirit.Design and develop the software or prototype to meet societal needs.	3	1	3

			3	1	3
CO No.	**C413**	**Technical Literature Review and Seminar –III (6E797)**			H
1	C413.1	Identify a topic from the current technologies of their choice in the computer science domain and the allied fields, after surveying in the internet resources, journals and technical magazines in the library. Arrange the contents of the presentation and also write the report of the research paper. Present the technical topic in front of the panel and the fellow students, using the oratory skills and also submit the report of the research paper. Interact through answering the questions and also can add some points to the seminar			3
					3
B.TECH IV YEAR II SEMESTER					
CO No.	**C414**	**Mobile Computing (6EC14)**	H		
1	C414.1	Identify vast application areas for mobile / wireless communication / computing. They also understand the working principle of GSM technology.	2		
2	C414.2	Discuss various media access control methods that are meant for wireless communication along with SDMA, FDMA, TDMA and CDMA.	3		
3	C414.3	Identify IP mobile primitives in Network layer in the wireless communication and recognize suitable solutions for the same.	3		
4	C414.4	Explain the issues in the Transport layer in wireless communication and identifying suitable solutions for the same	3		
5	C414.5	Discuss MANETs with examples and explain hoarding, client server computing along with the data delivery mechanisms.	3		
6	C414.6	Discuss protocols and tools such as WAP, Blue Tooth and explain emerging mobile operating systems	3		
			3		
CO No.	**C416**	**Project – II (6E884)**	M	M	H

1	C416.1	Develop plans with relevant people to achieve the project's goals. Break work down into tasks and determine handover procedures. Identify links and dependencies, and schedule to achieve deliverables. Estimate the human and physical resources required, and make plans to obtain the necessary resources. Allocate roles with clear lines of responsibility and accountability with team spirit.Design and develop the software or prototype to meet societal needs.	2	2	3
			2	2	3
CO No.	**C417**	**Comprehensive Viva Voce - III (6E885)**	**H**		
1	C417.1	Assess the relevant courses they have undergone till the completion of that academic year. Comprehend the concepts in the core subjects and the elective subjects, to make them ready to face technical interviews which improve their employability skills. They are asked to comprehend the concepts in the core subjects and the elective subjects, to make them ready to face technical interviews which improve their employability skills. Assessment is done in the relevant courses they have undergone till the completion of that academic year.	3		
			3		
CO No.	**C418**	**Technical Literature Review and Seminar – IV (6E898)**			**H**
1	C418.1	1. Identify a topic from the current technologies of their choice in the computer science domain and the allied fields, after surveying in the internet resources, journals and technical magazines in the library. Arrange the contents of the presentation and also write the report of the research paper. Present the technical topic in front of the panel and the fellow students, using the oratory skills and also submit the report of the research paper. Interact through answering the questions and also can add some points to the seminar			3
					3

SNo.	Level of Attainments of all POs from course attainments
1	>=70%
2	>=60% and <70%
3	>=50% and <60%
4	<50%

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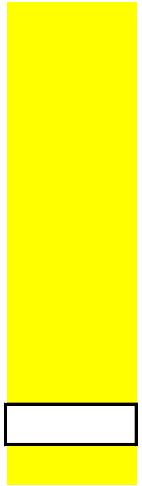

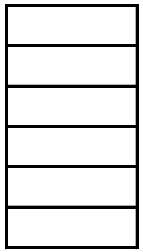

SREENIDHI INSTITUTE OF SCIENCE AND TECHNOLOGY

Yamnampet, Ghatkesar, Medchal Dist – 501301

Department of Electronics and Communication Engineering

UG Course Outcomes

	I-I
	English-I (6H101)
1	Assess their knowledge base on English , punctuation and components of Functional English
2	Narrate Short Story on A Devoted Son by Anita Desai and speak on newspaper articles.
3	Narrate Evolution of Indomitable Spirit in Youth by A. P. J. Abdul Kalam and practice sentence construction skill
4	Write Letters Official and Personal
5	Narrate Swami Vivekananda's address: World Parliament of Religions and practice sub-skills of listening
6	Narrate A Tea Party by Ruth Prawar Jhabwala and deliver Oral Presentations
	Engineering Mathamatics-I (6H111)
1	Represent function in series form using Maclaurin's series and also able to find maxima and minima of a function
2	Solve first order first degree ordinary differential equations.
3	Solve higher order linear differential equation with constant coefficients.
4	Evaluate iterated multiple integration and the technique of change of variables.
5	Solve the problems on gradient, curl and divergence of a vector field,
6	Compute area and volume integrals using Gauss, Stoke's and Gauss divergence theorems.
	Engineering Physics-I (6H121)
1	Describe principles of Quantum Mechanics and explain Heisenberg's Uncertainty Principle and Schroedinger's Time Independent Wave Equation – Physical Significance of the Wave Function.
2	Explain Free electron theories of Metals and Electrical Conductivity from quantum free electron theory of metals.
3	Describe Band Theory of Solids with Bloch Theorem, Kronig-Penny Model (Qualitative Treatment), E-K Curve,Formation in Solids and Classification of Materials into Conductors, Semi Conductors and Insulators
4	Explain concepts of Statistical mechanics such as Maxwell – Boltzmann Statistics, Bose – Einstein Statistics, Fermi – Dirac Statistics, Distribution function and Density of states.
5	Describe application of Physical Optics using Interference, Diffraction and Polarization.
6	Describe Magnetic Properties , application of Ferro Magnetic materials, Super conductivity and its types and BCS theory of Superconductivity
	Engineering Chemistry (6H131)
1	Describe Water quality issues (temporary and permanent) , Industrial Use and treatment of Water methods for consumption and other societal / engineering purposes.
2	Explain applications of Electro Ionics , feateatures , Kohlrausch's law and applications and properties of Electrodics with applications .
3	Describe Cell and batteries types and the application of batteries in Engineering applications
4	Explain concept of Corrosion, its Types and Factors affecting the rate of Corrosion.

5	Describe role and significance Cathodic protection using tinning and galvanizing, Al Cladding ,copper plating and electroless plating (Nickel plating and concepts of Organic coatings- Paints.
6	Explain Phase rule and properties of alloys, significance with its in Engineering applications.
	Computer Programming (6F101)
1	Explain basic fundamentals of Computer Systems, computing environments, Computer Languages – Machine Languages. Writing/ Drawing simple Algorithms and flowcharts.
2	Describe C language Programs, Structure of a C Program, Comments, the greeting program, identifiers, constants, variables, types , expressions and keywords.
3	Describe write programs using control structures such as Pre-test and post-test loops, while, do while, for, break and continue statements, comma expression. Write programs using functions . Write programs using recursion.
4	Write programs implementing application on arrays.
5	Write programs using Pointers and string handling functions.
6	Write programs using Enumerated, Structure, Union types and files.
	Engineering Drawing – I (6B101)
1	Construct polygons , perform scaling and draw curves for constructions
2	Learning and drwaing the principles of projections lines points inclined planes and traces
3	Projecting the regular planes trace, / Oblique and Auxiliary planes
4	Learning the projection of regular polyhydra and solids of revolution
5	Constructing the sectional view of regular solids
6	Learning the cutting methods intersection of plane prism Cylinder under dissimilar category and Similar category
	English language Communication Skills lab (6H171)
1	Describe and use Phonetics and Speech Chain.
2	Describe and use Speech Sounds, Monophthongs and Diphthongs in conversations.
3	Apply and use Consonants , Consonant Sounds and apply Stress or accent in conversation. Practice Situational
4	Dialogues, Role Play and participate in 'Just A Minute' Sessions
5	Describe Objects/ Situations/People and practice Telephone Etiquette
6	Review of a story , film or a novel.
	Engineering Physics Lab-I (6H181)
1	Demonstrate the wave length of monochromatic source of light by using Newton's Rings
2	Analyze refractive index of a material prism and Dispersive power of a glass Prism by using spectrometer
3	Determine the wave length of spectral light and laser Source of light by using Diffraction Grating
4	Design and Analyze RC Circuits
5	Analyze RLC Series circuit and parallel circuit
	Investigate magnetic Circuits
	Engineering Chemistry Lab (6H186)
1	Describe Water quality issues (temporary and permanent) , Industrial Use and treatment of Water methods for consumption and other societal / engineering purposes
	C Programming Lab (6F171)
1	Explain basic fundamentals of Computer Systems, computing environments, Computer Languages – Machine Languages. Writing/ Drawing simple Algorithms and flowcharts.

	Engineering workshop-I (6B171)
1	Introduction & Description of Tools, processes and procedures for House wiring (Tube light, Calling Bell and stair case as per circuit diagram), Practice of disassembly and assembly of various home appliances (Fans, Mixers, Air blower, Iron box and Rice cooker) Welding (Lap Joint, Butt Joint and T-Joint).
	IT Workshop – I (6F172)
1	Explain basic fundamentals of Computer peripherals, Assembling and Disassembling Practicals, types of OS in different platform (Windows and Linux installtion and working) and Cyber Ethics
	Seminar on current affairs/ Technical Topic (6C191)
1	Identify a topic from the current technologies of their choice in the electronics and communication Engineering domain and the allied fields, after surveying in the internet resources, journals and technical magazines in the library
2	Arrange the contents of the presentation and also write the report of the research paper.
3	Present the technical topic in front of the panel and the fellow students, using the oratory skills and also submit the report of the research paper.
4	Interact through answering the questions and also can add some points to the seminar
	B.Tech I-II
	English-II (6H202)
1	Acquire reasonable proficiency in Communicative English
2	Take part in group activities like sharing information, narrating experience etc
3	Attain language proficiency (with the help of training in study skills)
4	Acquire advanced level ability in Functional English
5	Understand the difference between Technical and General writing
6	Develop the ability to prepare executive summary
	Engineering Mathamatics-II (6H213)
1	Evaluate the rank of matrix, and able to find the solution to a linear system.
2	Find eigen values and eigen vectors and their applications to find higher powers and inverse of a matrix.
3	Form partial differential equations and find the solution to first order linear and nonlinear partial differential equations.
4	Solve the problems in evaluating Laplace and inverse Laplace transforms and its applications to solve ordinary differential equation with constant coefficients.
5	Solve problems on Z-transform and its application to solve difference equations.
6	6. Find the Fourier series of a function; solve the problems in finding Fourier transformations and their applications.
	Applied Physics-I (6H223)
1	Describe elements and features of Crystallography and Crystal Structures.
2	Explain Semiconductor fundamentals , its properties and Hall Effect in semiconductors with its applications.
3	Explain fabrication of Semiconductor Devices with PN Junction and working of PN Junction and its I-V Characteristics.
4	Describe characteristics , action significance Lasers and Applications of Lasers.
5	Explain Fiber Optics Principle, Acceptance Angle , its types , other features and applications of optical Fiber in communication system, Fiber Optic Sensors and Medical Endoscopy.
6	6. Discuss significance , features characteristics applications of Nanotechnology and Nano Materials.
	Data Structures (6E201)

1	Explain Abstract data type, stack and Queues with their applications
2	Write programs on Singly linked lists, Doubly linked lists, Circular list and explain their operations.
3	Explain concepts of Trees, AVL Trees and Graphs with examples and applications.
4	Describe object oriented programming approach and its elements
5	Write and explain programs on searching , sorting and hashing operations
6	Explain and apply concepts of oops , write programs implementing function and operator overloading. Writing programs with inheritance.
	Engineering Drawing – II (6B202)
1	To draw the various types of scales for different applications and using various types of units.
2	To understand the practical applications of development of various solids and draw their developments
3	Understand the concept of three dimensional representations of simple and complex objects through isometric projection principle given their orthographic representation
4	To convert pictorial (Isometric) views to orthographic views.
5	To understand the applications and draw the perspective views of various drawing entities
6	To understand the computer aided drafting technique and commands for generation of basic entities of drawing
	Environmental and Applied Chemistry (6H232)
1	Describe air pollution , control , global warming and elements of Environmental Technology . Discuss about Sea water equilibrium.
2	Describe Ecosystem , Bio Diversity , threat to bio diversity and Conservation strategies such as Insitu and Exsitu conservation.
3	Explain concepts , classification and problems relating to natural resources . Describe environmental effects of extracting and using mineral resources.
4	Explain Concept of sustainable development, Strategies for sustainable development. Describe Green Technology and its applications. Explain Toxicology and Biochemical effects of As, Cd, Pb, Hg, CO, NO2 ,SO2, CN-, O3 ,PAN and Pestisides.
5	Describe elements , features, classification and applications of polymers, Plastics , rubber and conducting polymers. Explain need for Environmental protection from Pollution.
6	Describe classification , features, usage and application of solid, liquid , gaseous Fuel . And Engineering applications of fuels Influence of Fuels on Environment.
	Network Analysis (6A242)
1	Understand the principle of different methods of electrical circuit reduction. .
2	Understand the principle graph theory along with its applications
3	Understand the principle of single phase A.C circuits.
4	Understand the principles of network theorems along with its applications.
5	Understand the principle two port networks and filters along with its applications.
6	Understand the principle of transients with both DC and AC excitation.
	Gender Sensitization, Values, Ethics and Yoga (6Z233)
1	To develop students' sensibility with regards to issues of gender in contemporary India and to help the students appreciate the essential complimentarity between 'VALUES and 'SKILLS' to ensure sustained happiness and prosperity which are the core aspirations of all human beings.
2	To provide a critical perspective on the socialization of men and women and to have a wider understanding of Ethics
3	To acknowledge women's role at home and at work. To help students reflect critically on gender violence, understand engineering ethics and an engineer's responsibility for safety

	and risk.
4	Perceive gender literacy and understand the importance of gender perspective
5	Understand rules and principles set by the society in a customary way
6	Understand and appreciate the importance of personality development through yoga for a holistic life
	Data structure Lab (C,C++) (6E271)
1	Write programs to implement Stacks, Queues and circular queues, tree traversals. Inorder, preorder and post order, earching and sorting operations, Binary trees, C++ to implement classes and operator overloading
	Engineering Physics Lab-II (6H282)
1	Determine the Energy gap (Eg) of a semiconductor. Describe the characteristics of a Thermistor. Describe the Characteristics of a laser Diode.Determine Numerical aperture of an optical fiber. Determine the frequency of an electrically vibrating tuning fork - using Melde's apparatus. Describe and determinefrequency of A.C signal generator – using Sonometer. Determine rigidity modulus of a given material wire – using Torsional pendulum and acceleration due to gravity and radius of gyration - using compound pendulum. Verify of laws of Transverse Vibration of a stretched string - using Sonometer. Describe the characteristics of LED and determine forward resistance of a given LED.
	Engineering workshop-III (6B272)
1	To understand the various tools used for filing and perform fitting on simple joints.
2	To fabricate components made up of tin sheets.
3	To make simple wooden joints using carpentry tools
	Seminar on science and its impact/ Technical Topic (6C292)
1	Identify a topic from the current technologies of their choice in the electronics and communication Engineering domain and the allied fields, after surveying in the internet resources, journals and technical magazines in the library
2	Arrange the contents of the presentation and also write the report of the research paper.
3	Present the technical topic in front of the panel and the fellow students, using the oratory skills and also submit the report of the research paper.
4	Interact through answering the questions and also can add some points to the seminar
	B.Tech II-I
	Functional Communicative English (6H373)
1	Practice proactive good written communication skills. Apply Etymology and apply one word Substitutes. Write General and Technical Communications. Write Reports ,E-mail and Résumés using electronic communication
	Engineering Mathamatics-III (6H315)
1	Find the roots of algebraic and transcendental equations and can solve problems of numerical integration.
2	Solve problems using finite differences.
3	Find the numerical solution of ordinary differential equations.
4	Evaluate integrals using special functions; understand the basic concepts of Bessel's function, properties.
5	Evaluate the limits, test the continuity and differentiability of a function. Also the student can express the function in series form using Taylor's and Laurent series methods.
6	Solve problems in conformal mapping. .
	Electronic Devices and circuits (6C301)
1	Understand the Principle of operation and applications of CRO.
2	Understand the operation of diode and its application as rectifier.

3	Understand the Fundamentals of BJT operation, Characteristics and different biasing circuits.
4	Understand the Fundamentals of JFET operation, Characteristics and importance of MOSFETs.
5	Understand the Small signal Model of BJT and Amplifier Analysis under CB, CE and CC configurations.
6	Understand the Basic regulator circuits and voltage multipliers.
	Switching Theory and logic design (6C302)
1	An ability to understand number systems and apply the rules of Boolean algebra to simplify Boolean expressions.
2	An ability to simplify of Boolean expressions using K-map.
3	An ability to design MSI combinational circuits such as fullaadders, multiplexers, decoders, encoders. codeconverters.
4	An ability to design basic memory units (latches and flip-flops) and sequential circuits such as counters and registers
5	An ability to design digital design using PLD's such as ROM's, PLA' s,PAL s.
6	An ability to design digital controllers using Algorithmic State Machine Charts .
	Probabilty theory and Stochastic process (6C303)
1	Understand the concepts of Probability, Probability of Random Events, Bayes Theorem, Joint, Marginal, Conditional, Total Probability.
2	Understand concepts of Discrete Random Variables, Continuous Random Variables and Transformations of Random Variables
3	Understand concepts of multiple random variables, independent random variable, transformation of multiple random variables
4	Understand concepts of the. Mean. Auto-correlation, Auto-covariance and Auto-correlation Coefficient, Cross-correlation Function. Cross-covariance Function. Cross-correlation Coefficient.
5	Understand the concepts of Power Spectral Density Function of Random Process, Time Averaging and Ergodicity.
6	Understand the concepts of Random Signal Response of Linear Systems, Thermal Noise and Shot noise
	Signals and Systems (6CC04)
	Understand the concepts of signals, comparison of signals, orthogonal signal space and the concepts of impulse, step and signum functions.
	Apply the orthogonality properties to understand the Fourier methods of signal analysis-Fouries series and Fourier Transforms.
	Understand the concepts of systems, their characterization in the Time as well as Transformed domains.
	Understand and apply the mathematical tools, such as Convolution, Correlation and the Laplace transform, to analyze signals and systems.
	Determine the sampling frequency for any low pass and band pass signals applying the sampling theorem.
	Distinguish between continuous and Discrete time signals and systems. Apply the concepts of Z-Transforms in the analysis of DT signals and systems.
	Java Programming (6EC41)
1	Describe fundamentals of JAVA, as well as the purpose and usage principles of inheritance, identify classes and objects
2	Understand and implement the concepts of polymorphysim, encapsulation and method overloading
3	Explain and write programs using Packages, I/O Stream and collections.
4	Describe and write programs to implement Exception handling and Multithreading.

5	Describe and write programs using GUI, Swings and develop applications using event handling.
6	Describe and develop applications using Applets and develop client server programs using networking concepts.
	Electronic Devices and circuits Lab (6C371)
1	Understand the identification of basic components, calculation of their respective values , connection of breadboards ,measurement Procedure, calculating unknown frequency by using CRO
2	Understand the calculation of forward and reverse resistance with the help of PN diode characteristics and the calculation of Percentage of regulation and the breakdown voltage with zener diode characteristics
3	Study the comparison of CE , CB , CS configurations utilizing their Input , output and Transfer characteristics
4	Under stand the effect of Load Resistance on the filters of HWR and FWR by calculating the Ripple factor and Efficiency
5	Designing and Analyzing the Frequency response of CE, CC and CS amplifier and calculating the gain , input resistance and output resistance.
6	Understand the Designing Procedure of oscillators for a frequency given using RC components
	Basic Simulation Lab (6C372)
1	Perform basic operations on Matrices, 1D signals and sequences
2	Understand convolution correlation of signals and sequences in time and frequency domains
3	compute the response of LTI system for unit impulse and step
4	verify the sampling theorem and Gibbs Phenomenon
	Java Programming Lab (6EC74)
1	After completion of this course student will be able to write basic as well as to develop GUI for various applications
	Seminor on Technology and its impact/Technical Topic (6C393)
1	Identify a topic from the current technologies of their choice in the electronics and communication Engineering domain and the allied fields, after surveying in the internet resources, journals and technical magazines in the library
2	Arrange the contents of the presentation and also write the report of the research paper.
3	Present the technical topic in front of the panel and the fellow students, using the oratory skills and also submit the report of the research paper.
4	Interact through answering the questions and also can add some points to the seminar
	B.Tech II-II
	Pulse and Digital Circuits (6CC05)
1	Understand the responses and applications of RC and RL circuits
2	Understand basic operations of clippers, Clampers and their applications
3	Understand and Design the switch using transistor
4	Understand different types multivibrators, their analysis, designing and applications
5	Understand different sweep generators and comparisons
6	Understand types of Logic gates and Sampling gates.
	Analog Communications (6CC06)
1	Understand need for modulation, Types of analog modulation such as AM and their generation and detection
2	Understand Types of analog modulation such as DSBSC, SSBSC, VSB , their generation and detection and commercial applications of all types of analog modulations

3	Understand the types of angle modulation such as FM, PM, their generation and detection methods, comparison and applications
4	Understand types of Noise, analysis and calculation of noise in AM,DSBSC and SSB
5	Understand the circuits for transmitters and receivers for AM and FM and receiver characteristics
6	Understand types of Pulse Modulations such as PAM, PPM, PWM, generation, detection, and applications
	Electronic Circuit Analysis (6C407)
1	Understand the responses and analysis of Single stage and multistage amplifier.
2	Understand the biasing, analysis of JFET and MOSFET amplifiers
3	Understand different types of Feedback Amplifier, Oscillators and their analysis.
4	Understand different types of Power amplifiers, various types of distortions and calculations.
5	Understand single tuned, double tuned, stagger tuned and wide band amplifier.
6	Understand Basic 723 regulator, IC regulator, DC to DC converter, Voltage multipliers, UPS & SMPS
	Electromagnetic Theory and Transmission Lines (6C408)
1	Apply the Maxwell's equations in propagation of EM waves
2	Demonstrate the behavior of EM waves in different media.
3	Understand the property of EM energy at different boundary conditions.
4	Understand the impossibility of TEM waves in rectangular wave guides.
5	Design different transmission lines.
6	Understand the concepts of high frequency dissipation less and open & short circuited lines
	Elements of Mechanical Engineering (6BC06)
1	To acquire the knowledge of basic concepts of thermodynamics and analyze the p-v and t-s diagrams of the different cycles.
2	To identify and understand the function of components used in the steam power plant and gas power plant, and how the power generation takes place in steam and gas power plant.
3	To identify and understand the function of components used in VCR and VAR system, and working principle of VCR and VAR.
4	To acquire the knowledge about the working of hydraulic pumps and hydraulic turbines.
5	To acquire the knowledge to identify the different casting methods and welding methods and their applications.
6	To acquire the knowledge to identify the different machine tools and their construction.
	Managerial Economics and Finance analysis (6ZC01)
1	Understand the basics of Business Economics at Micro level and Demand analysis in particular.
2	Understand Production patterns and various Costs involved.
3	Understand different types of Markets, Business organizations and Pricing strategies.
4	Enrich students with basic concepts of Financial Accounting.
5	Understand basic concepts of Depreciation and Final accounts.
6	Increase Competence of Analyzing Financial Statements.
	Pulse and Digital Circuits Lab (6CC73)
1	Obtain response of Linear and Nonlinear waveshaping circuits
2	Understand Logic and Sampling Gates
3	Observe the response of multivibrators and applications
4	To design and simulate Amplifiers

5	To design and simulate Power Amplifiers
6	To design and simulate Oscillators and Regulators
	Electronic Circuit Analysis Lab (6CC74)
1	Obtain the Transient analysis and frequency response of Single and Multistage BJT and FET Amplifier.
2	Study of operation of Oscillators and Waveform generators like Multivibrators and Schmitt trigger.
3	. Study of frequency response of Tuned and Feedback Amplifier.
4	Apply simulation tools (PSPICE or Multisim) to understand the circuit characteristics
	Analog Communications Lab (6CC75)
1	Ability to generate and detect AM Schemes i.e.,AM,DSBSC,SSBSC
2	Ability to generate FM and detect FM using PLL.
3	Ability to study Spectrum Analyzer for AM,FM spectral characteristics
4	Ability to study and analyze receiver characteristics,AGC,Mixer charateristics
5	Ability to study and analyse multiplexing scheme I.e., FDM
6	Ability to analyse pulse analog Modulation
	Technical Seminar (6C494)
1	Identify a topic from the current technologies of their choice in the electronics and communication Engineering domain and the allied fields, after surveying in the internet resources, journals and technical magazines in the library
2	Arrange the contents of the presentation and also write the report of the research paper.
3	Present the technical topic in front of the panel and the fellow students, using the oratory skills and also submit the report of the research paper.
4	Interact through answering the questions and also can add some points to the seminar
	Comprehensive Viva Voce-I (6C489)
	Assess the relevant courses they have undergone till the completion of that academic year. Comprehend the concepts in the core subjects and the elective subjects, to make them ready to face technical interviews which improve their employability skills. They are asked to comprehend the concepts in the core subjects and the elective subjects, to make them ready to face technical interviews which improve their employability skills. Assessment is done in the relevant courses they have undergone till the completion of that academic year.
	B.Tech III-I
	Digital Signal Processing (6C509)
1	Distinguish between CT and DT signals and systems and understand the growing need of DSP and study the concepts of discrete time signals and systems.
2	Represent periodic DT signals as a Fourier series; non-periodic DT signals as a Fourier Transform and use a powerful mathematical tool called DFT
3	Compute the Fourier Transform of DT signals using the FFT algorithms.
4	Realize a digital filter in several forms and structures for a given transfer function H(z).
5	Distinguish IIR and FIR filters; Design each type by several methods once the desired specifications are given.
6	Understand the need and implement the multirate sampling techniques.
	Advanced Microprocessors and Microcontrollers (6C510)
1	Understands the Architecture of 8086.
2	Able to write the Assembly Language Programs using 8086 instruction set and DOS interrupts.

3	understand the concept of interface and can write interface programs
4	Understands the Architecture of 8051
5	Able to write the Programs using 8051 instructions and SFRs
6	Understand the interface programs using 8051
	Digital Communications (6C511)
1	Demonstrate the principle of converting analog signal to digital by using PCM, DM, ADM systems.
2	Explore baseband transmission and optimal reception of digital signals using different filters and M-ary Error Probabilities.
3	Design and compare ASK, PSK, FSK, DPSK, QPSK modulators and demodulators.
4	Demonstrate the concepts of information theory, source coding techniques, channel capacity and can find
5	channel capacity and coding efficiency.
6	Demonstrate encoding and decoding techniques of different channel coding techniques like block codes, cyclic codes, convolutional codes.
	Antennas and Wave Propagation (6CC12)
1	Explain electromagnetics and antenna characteristics
2	Explain wire antennas and antenna arrays
3	Evaluate knowledge on Horn, Parabolic and Lens antennas
4	Recall knowledge on Horizontal Polarized antennas, Helical antennas , Patch antennas etc
5	Discuss ground wave and space wave propagation and space wave concepts
6	Analyse concepts of sky wave propagation
	Database systems(6FC32)-OE-1
1	Students wil learn the basics of database and understand the architecture of database managemet systems
2	To learn Good database design techniques and database theorems behind
3	To Understand theconceptual database designs and functional dependencies and normalization
4	To understand the mathematical foundation for relational databases
5	To understand concept of Constraints, views and will be able to create dynamic databases
6	To leran transaction management, concurrency controls
	Product and services (6ZC20)-OE-2
1	The students will be introduced to basic concepts of product .
2	Will enlighten the students with the process of new product development and stages in the process.
3	Will help the students understand the concept of product testing, product planning and the preparatory groundwork for launching a new product
4	Will help the students to understand the nature of services, its differences with the goods and the application of marketing principles for services
5	Will enlighten the students to understand the attributes of a good service design and the tools for producing and distributing the services.
6	To make the students understand about the importance of quality of services and also introduce some measurement scales to evaluate the service quality.
	Basics of Indian Economy (6ZC25)-OE-3
1	Gain knowledge relating to Economics, various sectors and its growth

2	Will gain knowledge relating to various concepts of National income and related aggregates
3	Students will learn about Indian Industrial policy and benefits of LPG to India
4	Comprehend knowledge relating to Fiscal policy & Taxation system in India
5	Learn about inflation & business cycles.
6	Know about the BoP and its influence on economy.
	Programmable Logic Device (6C517)-PE-1
1	Design combinational circuits with PLDS
2	Understand the concepts of sequential circuits
3	Analyse and Synthesise Synchronous sequential circuits
4	Analyse and Synthesise Asynchronous sequential circuits
5	Design sequential circuits with PLDS
6	Apply computer-aided design tools for logic design
	Embedded C Programming (6C518)-PE-1
1	Understand the concept of embedded Systems.
2	Understand the architecture of 8051 Micro-controller
3	Understand the concept of Hello World program
4	Able to write the Structural Programs using ECP
5	Understands the concept of Hardware/Software Timers
6	Understand the Intruder Program
	Management Science (6ZC02)
1	Outlines the significance of management, defines the basic concepts and applicability of management principles in changing paradigms.
2	Demonstrates the procedures of the work study method and work measurement, Project management
3	Infers the need to understand the importance of materials management and quality control techniques
4	Relates the knowledge of two functional areas of business, human resource management and marketing management
5	Explains the different dimensions of behavior, personality, perception, attitudes overall to gain insights into organizational behavior.
6	Distinguish some aspects related to strategic planning and strategic implementation to gain competitive advantage over competitors.
	Telecommunication and switching network (6C520)-PE-2
1	Explain the basics of switching systems and telecommunication fundamentals.
2	Describe traffic measurement parameters like delay, Erlangs, Queue capacity & their applications.
3	Classify different time division switching techniques and design of switching networks.
4	Identify different things involved in the control of switching systems.
5	Discuss the signaling concepts of switching systems.
6	Explain principle and operation of packet switching and different digital networks.
	Effective English Communication and Soft(6HC74)
1	to analyze themselves and to practice the ways to overpower their weaknesses
2	to enhance their soft skills and behavioral patterns
3	To equip themselves with the skill of solving problems and taking effective decisions
4	to build up conflicts and stress management skills
5	to face interviews confidently and effectively

	Quantitative Aptitude (6HC518)
1	Solve problems related to number systems
2	Find averages of numbers and groups
3	Solve problems related to ratio and proportion
4	Find simple ineterest, solve time work and distance problems
5	Solve menstruation problems
6	Interpret the various kind of data and find the relation between them
	Microprocessors and Microcontrollers Lab (6DC71)
1	Explore to write the Assembly Language Programs using Arithmetic instructions of 8086
2	Explore to write the Assembly Language Programs using String instructions of 8086
3	Explore to write the Assembly Language Programs for I/O interface with 8086
4	Explore to write the Assembly Language Programs using Arithmetic instructions of 8051
5	Explore to write the Assembly Language Programs using Timers and interrupts of 8051
	Digital Signal Processing Lab (6C577)
1	Design of FIR filters (Low pass/High Pass/Band Pass) using windowing techniques
2	Design of Buuterworth and chebyshev approximations and converting them to IIR filters
3	Transforming an analog filter to its digital equivalent
4	Sampling rate conversion Interpolation and decimation
5	An ability to use TMS320c6713 for different algorithms
	Group Project (6C561)
1	Use the concepts, in conceptualizing, designing and executing the modules of the projects
2	Exhibit the interest in learning the modern tools and technologies.
3	Inculcate an enthusiasm to use the creative ideas to build the innovative projects
4	Improve communicative skills and team working skills
	Summer Internship Evaluation (6C562)
1	Select the real-time problem in the industry
2	Analyze the requirements with respect to the problem statement
3	Design the optimal solution for the problem.
4	Implement the solution using the apropriate modern tools
5	Present and submit the report
	Technical Literature Review and Seminar –I (6C595)
1	Identify a topic from the current technologies of their choice in the electronics and communication Engineering domain and the allied fields, after surveying in the internet resources, journals and technical magazines in the library.
2	Explain the domain knowledge to resolve real time technical issues and exchange new information
3	Arrange the contents of the presentation and also write the report of the research paper
4	Present the technical topic in front of the panel and the fellow students, using the oratory skills and also submit the report of the research paper
5	Interact through answering the questions and also can add some points to the seminar
6	Develop debating and interview skills and lifelong learning skills for higher studies to pursue professional practice
	B.Tech III-II

	Microwave and Optical Communications (6C613)
1	Distinguish microwave frequencies and analyze Rectangular and circular wave guides.
2	Formulate various passive components with the help of scattering matrix
3	Explore different linear beam tubes
4	Analyze Cross field tubes and slow wave structures
5	Analyze the propagation of light in optical fibers and to characterize various optical sources
6	Understand the principle of various Losses, Dispersion and to characterize various Optical Detectors.
	Linear and Digital IC Applications (6CC14)
1	Demonstrate the concepts of Differential Amplifier and Operational Amplifier and their characteristics.
2	Design the basic circuits using Operational Amplifiers.
3	Explore, design and analyze Filters, Timers, Voltage Controlled Oscillator and Phase Locked Loop.
4	Demonstrate the design and analyze Oscillators, D/A Converters and A/D Converters.
5	Classify and characterize the various Logic Families.
6	Explore the combinational and sequential logic ICs in design of various digital systems.
	Cellular and Mobile Communication (6CC15)
1	Understand limitations of conventional mobile telephone systems, basics of cellular mobile systems, generations of cellular wireless systems.
2	Analyze techniques for improving coverage and capacity in cellular systems using Cell Splitting, Sectoring, Micro zone concept
3	Design antenna system to minimize Co channel interference and also to understand the concepts of diversity and non co channel interference
4	Analyze various mobile radio propagation models and antennas for cell site and mobile.
5	Interpret different channel assignment strategies and handoffs.
6	Discuss the technical features of emerging cellular communication systems.
	Electrical Technology (6AC43)
1	Understand the principle and operation of DC generator along with its applications
2	Understand the principle and operation of DC motor along with its applications
3	Understand the principle and operation of Transformer along with its applications
4	Understand the principle and operation of three phase induction motor along with its applications
5	Understand the principle and operation of synchronous machine along with its applications
6	Understand the principle and operation of single phase motors along with its applications
	Intellectual Property Rights (6GC49)-OE-2
1	Demonstrate a breadth of knowledge in Intellectual property
2	Overview of Patents, Searching ,filling and drafting of Patents
3	Overview of copyright & GI .
4	Overview of Trade Mark & Trade Secret,
5	Overview of Integrated Circuit and Industrial Design
6	Knowledge about different national and international : Conventions and Treaties Governing the IPRs
	Operating System Concepts (6EC67) -OE-2

1	Describe the basic functionalities and structure of the Operating System
2	Explain the concepts and implementations of: Processes, Process Scheduling. Describe, contrast and compare various types of Operating systems like Windows and Linux.
3	Comprehend the concepts of Synchronization and Deadlocks in the Operating System
4	Discuss the concepts of Memory Management(Physical and Virtual memory
5	Explain the concepts of File System with regard to directory and disk management algorithms
6	Students understand the concepts of I/O systems, protection and security in a case study given
	Basics of Polity and Ecology (6ZC26)-OE-2
1	Gain knowledge relating to the Indian Constitution and the Preamble to the Constitution.
2	Gain knowledge relating to the fundamental rights and duties of the Indian citizens and the directive principles of state policy.
3	Students will learn about the federal structure and judiciary of India.
4	Comprehend knowledge relating to the conservation of the environment.
5	Learn about bio-diversity and climatic changes occurring in the environment.
6	Know about the international treaties, conventions and organizations active in the field of environmental protection.
	Innovation and Design Thinking (6ZC24)-OE-2
1	The students gain the knowledge on the inputs required for innovation and also gain familiarity on Entrepreneurship.
2	The students will get exposure on creative methods of ideation and the importance of protecting the ideas.
3	The students gain knowledge on design thinking and types of thinking.
4	The students gain familiarity on emerging technologies like Internet of things (IOT).
5	The students understand the process of building the startup.
6	The students gain knowledge on various startup funding and also to branding building for the startup.
	General Management and Entrepreneurship (6ZC21)-OE-3
1	Describe the necessary managerial skills and tactics required for an emerging Entrepreneur.
2	Distinguish various methods for business process and product development
3	Demonstrate the skills required for the project planning, implementing and controlling
4	Outline the legal aspects and applying for Intellectual Property Rights
5	Illustrate the various sources of finance for venturing a business project.
6	Designing production plant and quality management system.
	Indian History Culture and Geography (6ZC27)-OE-3
1	To appreciate and understand our Indian History, Culture and Indian heritage.
2	To understand secularism of our country.
3	To appreciate and understand the social reformers who brought revolutionary changes in Indian society.
4	To understand earth evolution and world climatic change.
5	To understand India Oceanography,
6	Able to enhance and understand Indian monsoons, Indian agriculture.
	Data Analytics (6FC17)-OE-3
1	Obtain, clean/process and transform data.
2	2. Analyze and interpret data using an ethically responsible approach.

3	Use appropriate models of analysis, assess the quality of input, derive insight from results, and investigate potential issues.
4	Apply computing theory, languages and algorithms, as well as mathematical and statistical models, and the principles of optimization to appropriately formulate and use data analyses.
5	Formulate and use appropriate models of data analysis to solve hidden solutions to business-related challenges.
6	Perform well in a group. Interpret data findings effectively to any audience, orally, visually and in written formats.
	Software Defined Radio (6C625)-PE-3
1	An ability to make system-level decisions for software-defined radio technology and products
2	An ability to implement smart antenna algorithms
3	Knowledge of digital hardware architectures and understanding of development methods
4	An understanding of middleware in SDR
5	Understanding of analog RF components
6	Understand the basic principles of Cognitive Radio
	Structured Digital System Design (6C622)-PE-3
1	Able to select the appropriate design method to a particular design
2	Able to design basic and simple sequential logic circuits.
3	Able to design complex sequential logic circuits.
4	Able to design basic sequential logic circuits.
5	Multi-Input System controller design can be implemented.
6	Can get awareness on System Controllers, PLD usage.
	Developing Embedded IOT Applications-PE-4 (6DC57)
1	Terminology, technology and applications of IoT
2	Sensors and Actuators required to build an IoT system
3	Necessary Wireless Networks and protocols
4	Python Scripting Language for developing an IoT applications
5	Raspberry PI3 as a hardware platform for IoT sensor interfacing
6	Various IoT application as case studies
	Logical Reasoning (6H619)
1	Generate number and alphabet series
2	Apply concept of analogy and solve related problems
3	Classify and figure out odd one
4	Realize the various techniques for coding and decoding
5	Solve the relations puzzles
6	Solve the problem related to number, ranking and arithmetic reasoning
	Digital Communications Lab (6C678)
1	Understand the practical concepts of converting analog signal to digital signal by using PCM, DM, ADM circuits of modulator and demodulator.
2	Design and analyze ASK, FSK, PSK, DPSK, QPSK modulators and demodulators.
3	Design and evaluate the performances of Linear Block Codes.
4	Understand the practical concepts of Digital modulation techniques DPSK and QPSK
5	Design of modulator and demodulator circuits using MAT Lab Simulation Tool.

6	Design and implementation of Compander and Data Scrambler/Descrambler using Matlab.
	Linear and Digital IC Application Lab (6CC79)
1	An ability to explore the applications of IC 741 OP-AMP.
2	An ability to design Active filters and its applications
3	An ability to understand and implement generate square and Triangular waveforms using 555 Timers
4	An ability to design D to A converters and its applications
5	An ability to implement combinational designs using TTL Ics.
6	An ability to understand and implement sequential designs using TTL Ics
	Electrical Technology Lab* (6AC94)
1	Verify superposition and thevinin's theorems
2	Perform OC and SC tests on single-phase trasformer (predetermination of efficiency and regulation at given power factors)
3	Analyze performance characterictics of 3-phase Induction motor
4	Speed control of DC shunt motor
	Comprehensive Viva Voce-II (6C663)
1	Assess the relevant courses they have undergone till the completion of that academic year. Comprehend the concepts in the core subjects and the elective subjects, to make them ready to face technical interviews which improve their employability skills. They are asked to comprehend the concepts in the core subjects and the elective subjects, to make them ready to face technical interviews which improve their employability skills. Assessment is done in the relevant courses they have undergone till the completion of that academic year.
	Technical Literature Review and Seminar –II (6C696)
1	Identify a topic from the current technologies of their choice in the electronics and communication Engineering domain and the allied fields, after surveying in the internet resources, journals and technical magazines in the library.
2	Explain the domain knowledge to resolve real time technical issues and exchange new information
3	Arrange the contents of the presentation and also write the report of the research paper
4	Present the technical topic in front of the panel and the fellow students, using the oratory skills and also submit the report of the research paper
5	Interact through answering the questions and also can add some points to the seminar
6	Develop debating and interview skills and lifelong learning skills for higher studies to pursue professional practice
	B.Tech IV-I
	VLSI Technology and Design (6C716)
1	Understand the existing device technologies and IC fabrication process
2	Explore and analyze the electrical properties of the devices of CMOS device.
3	Design basic logic gates, combinational and sequential circuits using CMOS logic.
4	Analyze the effects of parasitic on IC power and performance.
5	Design memory cells and basic data path units.
6	Explore the need for testing and design verification of VLSI circuits.
	Computer Networks (6EC06)
1	Identify the different types of network topologies and protocols useful for real time applications and transmission medias.
2	Discuss design issues of data link layer and solve problems on Checksum and flow control.

3	Describe Channel allocation issues, MAC protocols such as ALOHA, CSMA and CSMA.CD and MAC addresses with IEEE 802.X and wireless lans.
4	Discuss network layer design issues , routing algorithms and Internetworking concepts
5	Discuss network layer sub netting concepts, its protocols of control and congestion and QOS
6	Describe concepts and services and protocols of transport, Application layers along with the network security issues and block ciphers.
	Control Systems (6AC07)
1	Learn basic concepts of control systems.
2	Study about time response analysis.
3	Learn basic concepts of stability and root locus method.
4	Study about frequency response analysis.
5	Learn basic concepts stability analysis in frequency domain.
6	Learn fundamentals of state space analysis.
	Digital Design Through Verilog (6C727)-PE-3
1	Understand levels of design description, concurrency, simulation and synthesis.
2	Apply language constructs, data types, operators available in verilog HDL.
3	Design combinational logic and sequential logic in gate level modeling.
4	Explain Gate and Switch level modeling.
5	Use system tasks, functions and UDPs.
6	Demonstrate SM charts and realize digital design using SM charts.
	Satellite communications (6C730)-PE3
1	Demonstrate the orbital mechanics.
2	Design the satellite subsystem
3	Estimate the C/N and able to measure the relevant values
4	Evaluate the satellite link.
5	Recall Multiple access concepts and discuss earth station technology
6	Apply the knowledge of GPS in real time applications
	Python Programming (6C728)-PE3
1	Gain exposure towards Python versions and their specifications
2	Build programs using primitive data types
3	Write applications that include functions, modules, and packages along with respective exceptional handling mechanism.
4	Writes applications using functions and packages.
5	Develop applications using Object Oriented features of Python
6	Make use of Standard Python Library in and Testing.
	Embedded Real Time Systems (6C738)-PE-4
1	Understand embedded systems and various options and challenges in building them.
2	Understand the Real Time Systems and various parameters of tasks and models.
3	Understand various scheduling policies.
4	Understand the constructs used for inter-process communication.
5	Understand various services provided RTOS and Micro C/O.S.-II.
6	Understand Vx WORKS O.S. and some case studies

	MIMO OFDM (6C736)-PE-4
1	OFDM's transceiver architecture
2	The problem of PAPR and how to reduce the PAPR.
3	To understand how the OFDM receiver performs synchronization
4	Channel modeling and propagation
5	MIMO Capacity, space-time coding
6	Massive MIMO and mmWave MIMO technologies for 5G
	FPGA Architecture and Applications (6C732)-PE4
1	Understand the classification of PLDs and Architectures of AMD and Altera Flex-10K series CPLD.
2	Understand the basic architecture of Spartan-3 FPGA architecture, Artix-7 series FPGA
3	Understand the basic design flow of FPGA using EDA Tools: Xilinx ISE project navigator, Xilinx Vivado System Design.
4	Design the Combinational logic designs with various examples.
5	Design the Sequential logic designs with various examples. Understand and explore the FSM and FSMD designs of digital systems using available EDA tools.
6	Understand and analyze the front-end designs and case studies of digital system designs using EDA tools.
	Introduction to Systems Engineering (6C837)-PE5
1	Examine systems from many perspectives (such as software, hardware, product, etc.)
2	Identify how the assumptions and constraints of each subsystem affect other subsystems
3	Plan and manage the systems engineering process
4	Identify and evaluate analysis and design methods
5	Predict and assess the impact of usability issues in system operation
6	Document designs at appropriate levels of detail & Validate system requirements, concept, and design
	System on-Chip Architecture(6C843)-PE-5
1	Understand the abstraction in the hardware design. Learning the processor design and trade offs
2	Explore the architecture of ARM processor, execution of instructions
3	Develop programmes using ARM instructions and high level language constructs supported by ARM
4	Demonstrate the Memory and cache memory concepts and their interface
5	Expore the structural support for the System Management
6	Explore the architectural support of ARM processor for Operating systems
	Wireless Communications and Networks(6C840)-PE-5
1	Understand evolution of mobile radio communications, some examples of wireless communication systems and Modern wireless communication systems
2	Understand different Multiple Access Techniques for Wireless communication.
3	Understand Difference between wireless and fixed telephone networks and Wireless networking
4	Understand two important protocols of Wireless communication
5	Understand history, evolution, technologies and layers of Wireless LAN.
6	Understand in brief Wireless WAN.
	Micro Wave and Optical Communications Lab (6C780)
1	Analyze the characteristics of RKO and GUNN diode

2	Understand the principles governing attenuation and working of Directional coupler
3	Measure the K, S, Z and f at microwave frequencies.
4	Analyse the design principles of circulator and magic Tee
5	Understand the basic characteristics of LED and LASER
6	Measure the DR, Numerical aperture and Losses for Digital and Analog Links
	VLSI TD Lab (6C781)
1	An ability to use Xilinx Vivado System Design SW and Cadence SW tools
2	Able to design combinational and sequential logic circuits.
3	Able to verify the RTL Designs by writing test benches.
4	Able to monitor and analyze the synthesis and implementation reports.
5	Prototype verification can be done by using FPGA development boards.
	Industry Oriented Mini Project (6C764)
1	Use the concepts learned in the courses, so far, in conceptualizing, designing and executing the modules of the projects.
2	Exhibit the interest in learning the modern tools and technologies through the bridge courses arranged in the college, beyond the curriculum, and hence developing the software.
3	Inculcate an enthusiasm to use the creative ideas to build the innovative projects which are meeting the current needs of the market and society as a whole.
4	Improve their communicative skills and team skills largely improve.
5	Work as an individual and in a team.
6	Demonstrate the professional ethics and responsibilities in the broadest context of technological change.
	Project –I (6C765)
1	Demonstrate a sound technical knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to their selected project topic.
2	Conduct a survey of several available literature in the preferred field of study and undertake the problem identification useful to the engineer and society , environmental contexts,need for sustainable development.
3	Design engineering solutions to complex problems utilizing a systematic approach to apply appropriate techniques, resources, and modern engineering and IT tools
4	Compare and contrast the several existing solutions for research challenge to accomplish an engineering project in the multidisciplinary environments.
5	Communicate with engineers and the community at large in written an oral forms.
6	Demonstrate the professional ethics and responsibilities in the broadest context of technological change.
	Technical Literature Review and Seminar –III (6C797)
1	Identify a topic from the current technologies of their choice in the electronics and communication Engineering domain and the allied fields, after surveying in the internet resources, journals and technical magazines in the library.
2	Explain the domain knowledge to resolve real time technical issues and exchange new information
3	Arrange the contents of the presentation and also write the report of the research paper
4	Present the technical topic in front of the panel and the fellow students, using the oratory skills and also submit the report of the research paper
5	Interact through answering the questions and also can add some points to the seminar
6	Develop debating and interview skills and lifelong learning skills for higher studies to pursue professional practice

	Project –II (6C866)
1	Demonstrate a sound technical knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to their selected project topic.
2	Conduct a survey of several available literature in the preferred field of study and undertake the problem identification useful to the engineer and society , environmental contexts,need for sustainable development.
3	Design engineering solutions to complex problems utilizing a systematic approach to apply appropriate techniques, resources, and modern engineering and IT tools
4	Compare and contrast the several existing solutions for research challenge to accomplish an engineering project in the multidisciplinary environments.
5	Communicate with engineers and the community at large in written an oral forms.
6	Demonstrate the professional ethics and responsibilities in the broadest context of technological change.
1	**Comprehensive Viva Voce-III (6C867)**
	Assess the relevant courses they have undergone till the completion of that academic year. Comprehend the concepts in the core subjects and the elective subjects, to make them ready to face technical interviews which improve their employability skills. They are asked to comprehend the concepts in the core subjects and the elective subjects, to make them ready to face technical interviews which improve their employability skills. Assessment is done in the relevant courses they have undergone till the completion of that academic year.
	Technical Literature Review and Seminar –IV (6C898)
1	Identify a topic from the current technologies of their choice in the electronics and communication Engineering domain and the allied fields, after surveying in the internet resources, journals and technical magazines in the library.
2	Explain the domain knowledge to resolve real time technical issues and exchange new information
3	Arrange the contents of the presentation and also write the report of the research paper
4	Present the technical topic in front of the panel and the fellow students, using the oratory skills and also submit the report of the research paper
5	Interact through answering the questions and also can add some points to the seminar
6	Develop debating and interview skills and lifelong learning skills for higher studies to pursue professional practice

Attainment of Course Outcomes (2017-21 batch)

S.No	Year-Sem	Subject	NBA Code	Final Course Outcome - CO (80%(Exams)+20%(CES))					
1	I-I	English-I (6H101)	C101	CO1	CO2	CO3	CO4	CO5	CO6
2	I-I	Engineering Mathamatics-I (6H111)	C102	66	80	73	82	57	77
3	I-I	Engineering Physics-I (6H121)	C103	58	60	57	57	76	55
4	I-I	Engineering Chemistry (6H131)	C104	66	66	57	62	83	51
5	I-I	Computer Programming (6F101)	C105	59	59	55	61	77	64
6	I-I	Engineering Drawing – I (6B101)	C106	73	74	67	70	56	67
7	I-I	English language Communication Skills lab (6H171)	C107	64	64	64	64	64	64
8	I-I	Engineering Physics Lab-I (6H181)	C108	95	94	94	93	94	94
9	I-I	Engineering Chemistry Lab (6H186)	C109	92	96	94	96	94	95
10	I-I	C Programming Lab (6F171)	C110	95	94	94	96	91	94
11	I-I	Engineering workshop-I (6B171)	C111	84	82	84	82	83	84
12	I-I	IT Workshop – I (6F172)	C112	94	94	95	95	95	95

13	I-I	Seminar on current affairs/ Technical Topic (6C191)	C113	94	94	94	94	94	94
14	I-II	English-II (6H202)	C114	95	95	95	94	95	94
15	I-II	Engineering Mathamatics-II (6H213)	C115	89	90	87	91	92	90
16	I-II	Applied Physics-I (6H223)	C116	75	72	68	70	71	70
17	I-II	Data Structures (6E201)	C117	78	73	80	73	75	76
18	I-II	Engineering Drawing – II (6B202)	C118	72	67	69	67	71	71
19	I-II	Environmental and Applied Chemistry (6H232)	C119	78	79	78	80	80	80
20	I-II	Network Analysis (6A242)	C120	71	72	71	71	69	72
21	I-II	Gender Sensitization, Values, Ethics and Yoga (6Z233)	C121	62	59	63	59	60	61
22	I-II	Data structure Lab (C,C++) (6E271)	C122	65	65	63	62	60	60
23	I-II	Engineering Physics Lab-II (6H282)	C123	79	79	79	79	79	79
24	I-II	Engineering workshop-III (6B272)	C124	94	93	94	93	93	94
25	I-II	Seminar on science and its impact/ Technical Topic (6C292)	C125	94	94	94	94	94	94
26	II-I	Functional Communicative English (6H373)	C201	94	94	95	94	95	94
27	II-I	Engineering Mathamatics-III (6H315)	C202	78	78	77	88	89	89
28	II-I	Electronic Devices and circuits (6C301)	C203	81	75	72	63	56	59
29	II-I	Switching Theory and logic design (6C302)	C204	60	57	70	68	64	65
30	II-I	Probabilty theory and Stochastic process (6C303)	C205	68	66	71	66	60	56
31	II-I	Signals and Systems (6CC04)	C206	49	52	54	45	55	50
32	II-I	Java Programming (6EC41)	C207	58	59	55	58	65	67
33	II-I	Electronic Devices and circuits Lab (6C371)	C208	70	74	65	69	58	55
34	II-I	Basic Simulation Lab (6C372)	C209	82	83	83	83	82	82
35	II-I	Java Programming Lab (6EC74)	C210	92	92	92	92	92	92
36	II-I	Seminor on Technology and its impact/Technical Topic (6C393)	C211	89	89	89	88	88	88
37	II-II	Pulse and Digital Circuits (6CC05)	C212	91	91	91	91	91	91
38	II-II	Analog Communications (6CC06)	C213	74	71	52	61	69	68
39	II-II	Electronic Circuit Analysis (6C407)	C214	75	71	66	59	66	71
40	II-II	Electromagnetic Theory and Transmission Lines (6C408)	C215	65	58	57	69	67	69
41	II-II	Elements of Mechanical Engineering (6BC06)	C216	63	55	70	62	58	69
42	II-II	Managerial Economics and Finance analysis (6ZC01)	C217	82	79	79	78	68	74
43	II-II	Pulse and Digital Circuits Lab (6CC73)	C218	80	78	72	71	62	43
44	II-II	Electronic Circuit Analysis Lab (6CC74)	C219	87	87	87	87	86	86
45	II-II	Analog Communications Lab (6CC75)	C220	84	84	84	84	84	84
46	II-II	Technical Seminar (6C494)	C221	87	87	87	87	87	87
47	II-II	Comprehensive Viva Voce-I (6C489)	C222	77	77	77	77	77	78
48	III-I	Digital Signal Processing (6C509)	C301	94	94	94	94	94	94
49	III-I	Advanced Microprocessors and Microcontrollers (6C510)	C302	75	78	75	72	61	72

50	III-I	Digital Communications (6C511)	C303	71	70	71	70	69	61
51	III-I	Antennas and Wave Propagation (6CC12)	C304	73	59	65	57	49	64
52	III-I	Database systems(6FC32)-OE-1	C305	65	55	61	64	72	77
53	III-I	Product and services (6ZC20)-OE-1	C306	70	75	61	69	70	58
54	III-I	Basics of Indian Economy (6ZC25)-OE-1	C307	77	77	73	66	68	68
55	III-I	Programmable Logic Device (6C517)-PE-1	C308	80	81	75	72	82	74
56	III-I	Embedded C Programming (6C518)-PE-1	C309	73	77	70	67	78	78
57	III-I	Management Science (6ZC02)	C310	80	74	69	69	66	66
58	III-I	Telecommunication and switching network (6C520)-PE-1	C311	69	85	84	85	87	84
59	III-I	Effective English Communication and Soft(6HC74)	C312	69	76	71	62	60	66
60	III-I	Quantitative Aptitude (6HC518)	C313	95	94	95	94	94	95
61	III-I	Microprocessors and Microcontrollers Lab (6DC71)	C314	53	52	52	53	52	52
62	III-I	Digital Signal Processing Lab (6C577)	C315	89	89	89	89	89	89
63	III-I	Group Project (6C561)	C316	88	88	88	88	88	88
64	III-I	Summer Internship Evaluation (6C562)	C317	95	95	95	95	95	95
65	III-I	Technical Literature Review and Seminar –I (6C595)	C318	95	95	95	95	95	95
66	III-II	Microwave and Optical Communications (6C613)	C319	96	96	96	96	96	96
67	III-II	Linear and Digital IC Applications (6CC14)	C320	61	63	59	79	79	77
68	III-II	Cellular and Mobile Communication (6CC15)	C321	76	72	52	80	68	63
69	III-II	Electrical Technology (6AC43)	C322	86	78	68	70	76	80
70	III-II	Intellectual Property Rights (6GC49)	C323	69	73	69	80	82	81
71	III-II	Operating System Concepts (6EC67) - OE-2	C324	92	91	87	85	72	70
72	III-II	Basics of Polity and Ecology (6ZC26)-OE-2	C325	61	62	59	79	81	77
73	III-II	Innovation and Design Thinking (6ZC24)-OE-2	C326	89	86	81	83	80	75
74	III-II	General Management and Entrepreneurship (6ZC21)-OE-3	C327	81	72	77	74	77	59
75	III-II	Indian History Culture and Geography (6ZC27)-OE-3	C328	76	72	69	73	75	87
76	III-II	Data Analytics (6FC17)-OE-3	C329	71	72	67	88	89	87
77	III-II	Software Defined Radio (6C625)-PE-2	C330	65	68	63	85	83	83
78	III-II	Structured Digital System Design (6C622)-PE-2	C331	75	74	65	88	85	86
79	III-II	6DC57 Developing Embedded IOT Applications-PE-3	C332	69	62	62	86	83	79
80	III-II	Logical Reasoning (6H619)	C333	84	71	65	55	80	81
81	III-II	Digital Communications Lab (6C678)	C334	91	90	91	91	90	91
82	III-II	Linear and Digital IC Application Lab (6CC79)	C335	95	95	95	95	95	95
83	III-II	Electrical Technology Lab* (6AC94)	C336	94	94	94	94	94	94

84	III-II	Comprehensive Viva Voce-II (6C663)	C337	96	96	96	96	96	96
85	III-II	Technical Literature Review and Seminar –II (6C696)	C338	96	96	96	96	96	96
86	IV-I	VLSI Technology and Design (6C716)	C401	96	96	96	96	96	96
87	IV-I	Computer Networks (6EC06)	C402	68	64	61	82	81	83
88	IV-I	Control Systems (6AC07)	C403	90	76	80	84	78	65
89	IV-I	Digital Design Through Verilog (6C727)-PE-3	C404	57	55	55	74	76	74
90	IV-I	Satellite communications (6C730)-PE3	C405	81	69	73	68	62	57
91	IV-I	Python Programming (6C728)-PE2	C406	81	63	73	74	80	66
92	IV-I	Embedded Real Time Systems (6C738)-PE-4	C407	83	84	78	82	85	58
93	IV-I	MIMO OFDM (6C736)-PE-4	C408	65	67	61	81	81	74
94	IV-I	FPGA Architecture and Applications (6C732)-PE4	C409	72	75	66	89	88	84
95	IV-I	Introduction to Systems Engineering (6C837)-PE5	C410	69	75	69	86	85	82
96	IV-I	System on-Chip Architecture(6C843)-PE-5	C411	68	54	54	82	82	80
97	IV-I	Wireless Communications and Networks(6C840)-PE-5	C412	68	69	67	82	81	87
98	IV-I	Micro Wave and Optical Communications Lab (6C780)	C413	77	78	76	86	87	88
99	IV-I	VLSI TD Lab (6C781)	C414	96	96	96	95	95	95
100	IV-I	Industry Oriented Mini Project (6C764)	C415	95	95	95	95	95	95
101	IV-I	Project –I (6C765)	C416	95	96	96	96	96	95
102	IV-I	Technical Literature Review and Seminar –III (6C797)	C417	96	96	96	96	96	96
103	IV-II	Project –II (6C866)	C418	96	96	96	96	96	96
104	IV-II	Comprehensive Viva Voce-III (6C867)	C419	96	95	95	95	95	96
105	IV-II	Technical Literature Review and Seminar –IV (6C898)	C420	94	94	94	94	94	94

Name of the Programme: ECM

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)

1. Graduates will have strong foundation in fundamentals of mathematics, Engineering sciences and technology with abilities to design & develop an optimal solution using modern tools which help them to be employable.

2. Graduates will have successful professional career by demonstrating good scientific and engineering breadth to comprehend the problems, conduct experiments, analyze the results and design novel products and solutions to the real life problems, promote entrepreneurship and skills in project and finance management.

3. Graduates will be motivated to achieve academic excellence and pursue research to develop life – long learning in a world of constantly evolving technology

4. Graduates will be trained in human values, Professional ethics and Intellectual Property related issues in broader social context and sustainable development, communication skills, team work skills, leadership and multidisciplinary approach

Program outcomes (POs)

1. **Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. **Problem analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3. **Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
4. **Conduct investigations of complex problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
5. **Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
6. **The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
7. **Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
8. **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

9. **Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10. **Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
11. **Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
12. **Life-long learning:** Recognize the need for, and have the preparation and ability to engage in Independent and life-long learning in the broadest context of technological change.

Program Specific Outcomes (PSOs)

1. **System Development and Research Activity:**

   Ability to identify, formulate and solve engineering problems using computation and appropriate algorithms in one or more fields of electronics and computer engineering, such as Internet Of Things, embedded systems, computer vision, machine learning, artificial intelligence, and signal processing

2. **Problem Analysis and Design**

   Ability to use contemporary engineering tools and techniques and adapt to the industry needs for solving multi-disciplinary problems

3. **Successful Career:**

   Ability to design a system or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, safety, and sustainability.

COURSE OBJECTIVES & OUTCOMES

Sl. No.	Course Code & Title	Course Objectives	Course Outcomes
1.	6H101 ENGLISH – I	Know the aspects of language skills - LSRW	Get motivated to become aware of the existing problems in the country and realize their contribution in making India a developed nation. Be able to share their thoughts and feelings with their parents.
		Acquire basic sentence construction skill	
		Acquire the vocabulary and grammar skills	Be able to realize the need for individual commitment and responsibility at workplace.
		Know the features of spoken language	
		Acquire the basic correspondence ability by using the medium of letters	Be able to make appropriate correspondence. Learn to empathize with people around them by being well-mannered.
		Appraise their knowledge base in English	
		Know the aspects of language skills - LSRW	be able to gain confidence through education by overcoming their inhibitions be able to use vocabulary, grammar and LSRW skills effectively
		Acquire basic sentence construction skill	
2.	6H111 ENGINEERING MATHEMATICS – I	To learn mean value theorems and their applications, the basic concepts of functions of several variables, various methods to find solutions to first order and higher order differential equations and applications, evaluation of double and triple integrals and their applications, concepts of rector differential calculus such as gradient, divergence and curl, evaluation of line, surface and value integrals and related theorems for verification.	Represent function in series form using Maclaurin's series; evaluate limits, continuity & differentiability for two variable functions, also able to find maxima and minima of a function.
			Solve first order first degree ordinary differential equations.
			Solve higher order linear differential equation with constant coefficients.
			Evaluate iterated multiple integration and the technique of change of variables.
			Solve the problems on gradient, curl and divergence of a vector field,
		To understand basic concepts of interference and diffraction phenomenon and their applications for the characterization of optical components.	Describe application of Physical Optics using Interference, Diffraction.
		To learn and understand the basics of lasers, fiber optics and their applications in the field of communication, medical and science & engineering.	Describe characteristics, action significance Lasers and Applications of Lasers.

3.	6H121 ENGINEERING PHYSICS – I	To learn the concepts of statistical mechanics, distribution function with the variation of temperature, free electron theory of metals, and their electrical conductivity.	Explain Fiber Optics Principle, Acceptance Angle , its types , other features and applications of optical Fiber in communication system, Fiber Optic Sensors and Medical Endoscopy.
		To understand the basic concepts of quantum mechanics, significance of wave function, and its applications to calculate Eigen functions and Eigen values of a particle in one dimensional potential well, basic theories of band formation in solids and classification of conductors, semiconductors, and insulators on the basis of band theory.	Explain concepts of Statistical mechanics such as Maxwell – Boltzmann Statistics, Bose – Einstein Statistics, Fermi – Dirac Statistics, Distribution function and Density of states.
			Explain Free electron theories of Metals and Electrical Conductivity from quantum free electron theory of metals.
			Describe principles of Quantum Mechanics and explain Heisenberg's Uncertainty Principle and Schroedinger's
			Time Independent Wave Equation – Physical Significance of the Wave Function.
			Describe Band Theory of Solids with Bloch Theorem, Kronig-Penny Model (Qualitative Treatment), E-K Curve,Formation in Solids and Classification of Materials into Conductors, Semi Conductors and Insulators.
4.	6H131 ENGINEERING CHEMISTRY	Learn the industrial problems caused by water and municipal water treatment. Acquire knowledge about different types of batteries and their working mechanism. Develop the concepts and types of corrosion and the factors influence corrosion. Understand the control methods and protective coatings for metals and the preparation application of alloys.	Understand the domestic and industrial problems caused by hard water and understand the municipal water treatment.
			Understand and express the important fundamental concepts used in electrochemistry and use electrochemical techniques/data analysis to obtain information on a redox system. Student also understands the practical importance of electrochemistry for solving challenges those faced in modern power sources.
			Apply the electrochemical process methods for consumer and industrial batteries, which are Ni-Cd, Lead Acid and Li-ion/polymer. It also includes the

			reusable alkaline for comparison.
			Understand and express the concepts and types of corrosion and how these can be anticipated and prevented. Student will able to apply concepts of corrosion on engineering materials.
			Understand the necessity of Protective coating for protection against corrosion and the methods to do the same.
			Student will get principles in separation of metals and material using the principle of Phase Rule student also use the preparation methods for alloys and applications of Alloys
5.	6F101 COMPUTER PROGRAMMING	Understand the basic fundamentals of computing environnent and programming. Comprehend elements of C program structure. Understand control statements and use them in applications. Understand concepts of pointers and file.	Explain basic fundamentals of Computer Systems, computing environments, Computer Languages – Machine Languages. Writing/ Drawing simple Algorithms and flowcharts.
			Describe C language Programs, Structure of a C Program, Comments, the greeting program, identifiers, constants, variables, types , expressions and keywords.
			Describe write programs using control structures such as Pre-test and post-test loops, while, do while, for, break and continue statements, comma expression . Write programs using functions. Write programs using recursion.
			Write programs implementing application on arrays.

			Write programs using Pointers and string handling functions.
			Write programs using Enumerated, Structure, Union types and files.
6.	6B101 ENGINEERING DRAWING - I	To provide basic concepts in engineering drawing. To impart knowledge about standard principles of orthographic projection of objects. To draw sectional views and pictorial views of solids.	Construct polygons , perform scaling and draw curves for constructions
			Describe Projections or Views .
			Explain with examples Projections of Planes with regular Planes, traces, Oblique planes and Auxiliary plane
			Explain Projections of Solids using Regular Solids, solids of revolution and Axis inclined to both planes.
			Explain Sections of Solids with Prism, Cylinder, Pyramid, Cone and Auxiliary views.
			Draw Intersection of Similar and Dis- similar Solids using Line, Cutting plane method, Intersection of Prism Vs Prism, Cylinders Vs Cylinder and Cylinder Vs Prism.
7.	6H181 ENGINEERING PHYSICS LAB – I	To understand and calculate the wavelength of a given source, refractive index, dispersive power of a given material of prism, time constant of R-C components, resonance frequency, quality factor of LCR series/parallel combinations, Numerical aperture of an optical fiber.	Determine wave length of monochromatic source of light by using Newton's Rings and refractive index of a material prism by using spectrometer. Determine wave length of given laser source of light using Diffraction grating.
			Determine Dispersive power of a glass Prism and Cauchy's constant by using spectrometer
			Experiment on R C Circuit and L C R series for calculating resonance and Planck's constant.
			Determine Numerical Aperture and Acceptance angle of a given optical fiber cable.
8.	6H186 ENGINEERING CHEMISTRY LAB	The objective of the Laboratory practicals is to make the student to acquire the basic Knowledge used for engineering applications.	Understand the principle and theory in determination of Hardness of a water sample.
			2. Understand the method of preparation for organic compounds.

			3 learn and understand the methods for estimation of compounds.
			4. Learn the process to determine Viscosity of lubricants.
9.	6H171 C PROGRAMMING LAB	Write simple programs using control statements of 'C' Language	Write algorithms and flowcharts to convert temperature Celsius to its equivalent Fahrenheit, calculate roots and Fibonacci series
		Understand simple and recursive functions	Write programs using control statements while, do-while, and for loops and solve mathematical series summations.
		Learn application development for solving problems	Write programs in menu driven style .
		Learn role and usage of files for data storage	Write programs implementing functions ,
			recursion with return values for example Fibonacci , GCD, LCMD , pascal triangle, large and smallest in a set of numbers.
			Write a program to implementing applications on arrays, matrices addition , multiplication and compute symmetric, lower triangular, upper triangular, diagonal, scalar, or unit of a matrix.
			Write programs on complex numbers and structures with suitable examples such as student or employees information.
10.	6B171 ENGINEERING WORKSHOP – I	To Study of different domestic appliance and their demonstration.	Perform House wiring and install Tube light, connection of Calling Bell as per circuit diagram and connection of stair case as per circuit diagram .
		To provide hands on experience about use of different engineering materials, tools, equipments and processes those are common in the engineering field.	Practice of disassembly and assembly of various home appliances such as Fans, Mixers, Air blower, Iron box and Rice cooker .
		To develop a right attitude, team working, precision and safety at work place.	Perform Welding as and when needed i.e Lap Joint, Butt Joint and welding of T-Joint
		To have practical exposure to various welding and joining processes.	
11.	6F172 IT WORKSHOP – I	The IT Workshop for engineers is a training lab course. The modules include training on PC Hardware,	Identify peripherals of a computer, describe types of Operating System,

		Internet & World Wide Web, Installation of Operating systems (windows 7 and Linux) and Cyber Ethics	Install computer with dual boot operating systems .
			Assembling and Disassemble system.
			Install and Use Microsoft Windows 7 for programming and application development .
			Install linux and install applications in Linux and windows.
			Trouble Software and hardware problems along with setting configurations for computer security settings and application software of the system.
			Describe Cyber ethics.
12.	6D191 SEMINAR ON CURRENT AFFAIRS / TECHNICAL TOPIC	Develop ability to be a public speaker. Learn the importance of delivering seminars for demonstrating oratory and interview facing skills	Identify current general, political and technology related topics.
			Arrange and present seminar in a effective manner
			Collect, survey and organize content in presentable manner
			Demonstrate oratory skills with the aid of Power Point Presentations
			Exhibit interview facing skills and team leading qualities
13.	6H202 ENGLISH – II	Appraise their knowledge base in English Know the aspects of language skills - LSRW Acquire basic sentence construction skill Acquire the vocabulary and grammar skills Know the features of spoken language	➢ Appreciate the stories and cultivate good principles to become better humans ➢ Know the aspects of language skills -LSRW ➢ Acquire basic sentence construction skill ➢ Acquire the vocabulary and grammar skills ➢ Know the features of spoken language ➢ Acquire the basic correspondence ability by using the medium of letters
		To learn basic concepts of linear algebra to find solutions to linear	Evaluate the rank of matrix, and able to find the solution to a linear system.
			Find eigen values and eigen vectors and their applications to find higher powers and inverse of a matrix.

14.	6H213 ENGINEERING MATHEMATICS-II	systems, eigen values and eigen rectors and their properties, formation of partial differential equation and finding solution to linear and non-linear first order partial differential equations, various kinds of integral transforms methods such as Laplace transforms, Z-Transforms, Fourier Analysis and their applications	Form partial differential equations and find the solution to first order linear and nonlinear partial differential equations.
			Solve the problems in evaluating Laplace and inverse Laplace transforms and its applications to solve ordinary differential equation with constant coefficients.
			Solve problems on Z-transform and its application to solve difference equations.
			Find the Fourier series of a function; solve the problems in finding Fourier transformations and their applications.
15.	6H223 APPLIED PHYSICS– I	To understand the features of crystallography	Describe elements and features of magnates.
		To learn and understand the fundamentals of semiconductors	Describe the dielectric properties.
		To understand the basic concepts in magnetism	Explain Semiconductor fundamentals, its properties and Hall Effect in semiconductors with its applications.
		To understand the basics of nano materials	Explain fabrication of Semiconductor Devices with PN Junction and working of PN Junction and its I-V Characteristics.
			Describe Magnetic Properties , application of Ferro Magnetic materials, Super conductivity and its types and BCS theory of Superconductivity
			Discuss significance, features characteristics applications of Nanotechnology and Nano Materials.
16.	6E201 DATA STRUCTURES	Understand the concepts of Abstract data Type, linear data structures such as stacks, queues and lists and their applications.	Explain Abstract data type, stack and Queues with their applications
		Comprehend different non linear data structures such as trees and graphs and analyze their time complexities.	Write programs on Singly linked lists, Doubly linked lists, Circular list and explain their operations.
		Understand object oriented programming and advanced C++	Explain concepts of Trees, AVL Trees and Graphs with examples and applications.

		concepts and be able to write programs with C++ features such as composition of objects, operator overloads, dynamic memory allocation, inheritance and polymorphism, Templates etc	Describe and solve problems of searching and sorting and evaluate the time complexity of each algorithm.
			Explain concepts of OOPs and implement programs using objects, classes,
			constructors and destructors.
			Explain and apply concepts of oops , write programs implementing functions , operator overloading and inheritance.
17.	6B202 ENGINEERING DRAWING – II	To provide basic concepts in engineering drawing.	To draw the various types of scales for different applications and using various types of units.
		To impart knowledge about standard principles of isometric projection of objects.	To understand the practical applications of development of various solids and draw their developments
		To draw perspective views of solids.	To understand the concept of three dimensional representations of simple and complex objects through isometric projection principle given their orthographic representation
			Tto convert pictorial (Isometric) views to orthographic views.
			To understand the applications and draw the perspective views of various drawing entities
			To understand the computer aided drafting technique and commands for generation of basic entities of drawing
18.	6H232 ENVIRONMENTAL AND APPLIED CHEMISTRY	To learn the preparation methods and applications of commercial and conducting polymers, to understand the Ecosystems and Bio diversity, sustainable development and green technology, the natural resources available and over exploitation of resources. To develop the concepts and preparation methods of fuels and to have idea about pollution and to	Explain methodologies that facilitate greater control over product and as a consequence enable novel polymer architectures. Conductivity of polymers also helps in electro chemistry. If a company works with plastics, rubbers, resins, adhesives, composites, coatings, fibers or packaging, a good understanding of polymer chemistry will benefit
			Understand the concept, Structure and Function of Eco system in order to save the environment.

		learn the control methods for pollution.	Use the techniques in sustainable development with regard to Water, Wasteland reclamation, Environmental management and green technology
			Identify the natural resources available and how to save the resources.
			Apply techniques in preparation and use of energy sources in industries
			Apply Control measures of Urban and Industrial waste to reduce the pollution
19.	6AC42 NETWORK ANALYSIS	To make the students capable of analyzing any given electrical network.	Understand the principle of different methods of electrical circuit reduction.
		To make the students learn how to synthesize an electrical network from a given impedance/admittance function.	Understand the principle of single phase A.C circuits.
			Understand the principle of magnetic circuits.
			Understand the principles of network theorems along with its applications.
			Understand the principle two port networks along with its applications.
			Understand the principle of transients with both DC and AC excitation.
20.	6ZC03 GENDER SENSITIZATION, VALUES, ETHICS AND YOGA	To develop students' sensibility with regard to issues of gender in contemporary India, provide a critical perspective on the socialization of men and women, introduce students to information about some key biological aspects of genders, expose the students to debates on the politics and economics of work and help students reflect critically on gender violence. Identify the core values that shape the ethical behavior of an engineer, to create an awareness on professional ethics and Human Values and to appreciate the rights of others.	To develop students' sensibility with regards to issues of gender in contemporary India and to help the students appreciate the essential complimentarity between 'VALUES and 'SKILLS' to ensure sustained happiness and prosperity which are the core aspirations of all human beings.
			To provide a critical perspective on the socialization of men, women and transgenders, to acknowledge women's role at home and at work and to have a wider understanding of Ethics.
			To help students reflect critically on gender violence, understand engineering ethics and an engineer's responsibility for safety and risk.
			Perceive gender literacy and understand the importance of gender perspective.
			Understand rules and principles set by the society in a customary

			way.
			Understand and appreciate the importance of personality development through yoga for a holistic life
21.	6E271 DATA STRUCTURES LAB (C, C++)	Understand the data structures: simple and complex and use them to write the programs for implementing searching, sorting, expression evaluations.	Write programs to implement Stacks, Queues and circular queues.
		Understand the applications that use the particular data structure and its significance in the development of operating systems and the softwares . Understand the object oriented programming concepts of C++.	Write programs using tree traversals. In order, preorder and post order.
			Write Programs on searching and sorting operations.
			Write programs on Binary trees.
			Write programs in C++ to implement classes and operator overloading.
22.	6B272 ENGINEERING WORKSHOP – II	To gain a good basic working knowledge required for the production of various engineering products.	to understand the various tools used for filing and perform fitting on simple joints.
		To provide hands on experience about use of different engineering materials, tools, equipments and processes those are common in the engineering field.	to fabricate components made up of tin sheets.
		To develop a right attitude, team working, precision and safety at work place.	to make simple wooden joints using carpentry tools
		It explains the construction, function, use and application of different working tools, equipment and machines.	
		To study commonly used carpentry joints.	
		Identify and use marking out tools, hand tools, measuring equipment and to work to prescribed tolerances.	
23.	6D292 SEMINAR ON	Develop an ability to understand and present the latest scientific developments. Identify one	Deliver lecture on emerging technologies.
			Collect, survey and organize Content in

	SCIENCE AND ITS IMPACT/TECHNICA L TOPIC	of many scientific developments, understand its impact on the event/method/society as a whole and present the seminar on the same which enhances oratory and interview facing skills	presentable manner
			Demonstrate ability to lead and explain concepts and innovative ideas.
			Demonstrate team leading qualities.
			Demonstrate public speaking skills.
			Exchange new information that would not have been available otherwise.
24.	6H373 FUNCTIONAL AND COMMUNICATIVE ENGLISH	Acquire higher competence in communicative English	Acquire higher competence in communicative English
		Acquire the skill of presenting seminars	Acquire the skill of understanding the word origin and its derivatives
		Acquire mastery in applying various sub-skills of reading	Acquire mastery in applying various sub- skills of reading
		Develop interpersonal communication skills	Develop interpersonal communication skills
		Participate in group tasks using effective language	Acquire the skill of presenting seminars
		Enhance written communication from the employability perspective	Participate in group tasks using effective language and etiquette
25.	6H316 ENGINEERING MATHEMATICS-III	Understand and learn to solve Algebraic and Transcendental equations, Numerical Integration, interpolation, and integrals using Residue theorem and Bilinear Transformation and their applications.	Find the roots of algebraic and transcendental equations and can solve problems of numerical integration.
			Find the Interpolating polynomial for the given tabular values.
			Find the numerical solution of ordinary differential equations of IVPs.
			Evaluate improper integrals using special functions; understand the basic concepts of Bessel's function and its properties.
			Analyze the complex functions with reference to their analyticity, integration using Cauchy's integral theorem and find the Taylor's and Laurent's series expansion of complex functions. Also evaluate the real integrals by using residue theorem
			Solve problems in conformal mapping
26.	6C303 PROBABILITY THEORY AND	To study the concepts of Random variables and Random process and random signal response of linear systems	Understand the concepts of Probability
			Understand concepts of Discrete Random Variables
			Understand concepts of multiple random variables
			Understand concepts of the. Mean. Auto-correlation

	STOCHASTIC PROCESS		Understand the concepts of Power Spectral Density Function of Random Process
			Understand the concepts of Random Signal Response of Linear Systems
27.	6E302 OBJECT ORIENTED PROGRAMMING THROUGH JAVA	Understand the concepts of Object oriented programming principles of Java. Write the programs and execute using OOP principles such as garbage collection, overloading methods, constructors, recursion, string handling, String Tokenizer, inheritance and its	Describe fundamentals of JAVA, its Classes, and Objects and write simple programs using constructors.
			Explain Write simple programs using inheritance, interface and packages.
			Explain and write programs using
		types, packages, multithreading and threads.	Packages, I/O Stream and collections.
			Describe and write programs to implement Exception handling and Multithreading.
			Describe and write programs using AWT, Swings and develop applications using event handling.
			Describe and develop applications using Applets and develop client server programs using networking concepts.
28.	6DC04 DATA COMMUNICATION AND COMPUTER NETWORKS	Data Communications & Networks in Network models	Identify & summarize the functionalities of each layer in the OSI model.
		The OSI model & functionalities of each layer in detail	Implement Error detection & Error correction techniques.
			Develop Network layer routing algorithms.
			Design a mechanism which can detect, prevent or recover from a security attack.
29.	6C301 ELECTRONIC DEVICES AND CIRCUITS	To learn the basic principle and their applications of semiconductors, diodes, transistors, amplifiers and voltage regulators	Understand the operation of semiconductor diode and its application as rectifier.
			Understand the Fundamentals of BJT operation, Characteristics and different biasing circuits.
			Understand the Fundamentals of SCR, JFET operation and their Characteristics.
			Understand the Analysis and design of Amplifier and Oscillators.
			Understand the Basic regulator circuits and voltage multipliers.
			Explore the various number systems
	6D301	Statements and their truth value and constructing truth tables	Apply Discrete Mathematics concepts for Computer Science applications.
		The use of Universal and Existential quantifiers to describe predicates	Develop effective algorithms for computing systems.
		Different algebraic structures and their use in	

30.	DISCRETE STRUCTURES AND GRAPH THEORY	mathematics.	
		To solve problems by permutations and combinations. Study of pigeonhole principle and inclusion exclusion principles.	
		To solve various recurrence relations by using different techniques.	
		The basics of graph theory, different ways of traversing the graph and different types of graphs and circuits	
31.	6E372 OBJECT ORIENTED PROGRAMMING THROUGH JAVA LAB	Understand, design an execute the programs involving the concepts of Java and Object oriented programming principles	Write programs to generate Prime numbers, Roots of quadratic equation and Fibonacci series.
			Write small application such as banking system.
			Write programs on operator, function overloading and dynamic method dispatch.
			Write programs to implement interface and packages.
			Explain and write programs to implement threads.
			Write programs to implement applets and event handling.
			Write an application to implement client and server scenario.
32.	6C371 ELECTRONIC DEVICES AND CIRCUITS LAB	Understand the nature and scope of modern electronics, describe physical models of basic components, design and construct simple electronic circuits to accomplish a specific function, e.g., designing amplifiers, oscillators etc. and understand their capabilities and limitations and make decisions regarding their best utilization in a specific situation	Identify, Specify and test R, L, C Components (Colour Codes), Potentiometers, Switches, Coils, Relays.
			Identify, Specify and test Active Devices, Diodes, BJTs, Low power JFETs, MOSFETs, Power Transistors, LEDs, LCDs, SCR, UJT.
			Describe operation of Multimeters, Function Generator and Regulated Power Supplies.
			Explain and use CRO for experiments.
			Explain and demonstrate working of PN Junction diode characteristics.
			Explain and demonstrate working Half and Full wave Rectifier with and without filters.
			Demonstrate working and applications of FET, CE and RC Phase Shift Oscilltor.

33.	6D393 SEMINAR ON TECHNOLOGY AND ITS IMPACT/TECHNICA L TOPIC	Develop an ability to understand and present the latest technological developments in computer science. Identify one of them, understand its impact on the event/method/society as a whole and present the seminar on the same which enhances oratory and interview facing skills	Deliver lecture on emerging technologies.
			Explain domain knowledge to resolve real time technical issues
			Demonstrate ability to lead and explain concepts and innovative ideas.
			Demonstrate team leading qualities.
			Demonstrate public speaking skills.
			Exchange new information that would not have been available otherwise.
			Develop debating and interview skills.
34.	6CC04 SIGNALS AND SYSTEMS	To study the concepts of signals and systems their characterization in the Time as well as frequency domains	Understand the concepts of signals, comparison of signals, orthogonal signal space and the concepts of impulse, step and signum functions.
			Apply the orthogonality properties to understand the Fourier methods of signal analysis- Fouries series and Fourier Transforms.
			Understand the concepts of systems, their characterization in the Time as well as Transformed domains.
			Understand and apply the mathematical tools, such as Convolution, Correlation and the Laplace transform, to analyze signals and systems.
			Determine the sampling frequency for any low pass and band pass signals applying the sampling theorem.
			Distinguish between continuous and Discrete time signals and systems. Apply the concepts of Z-Transforms in the analysis of DT signals and systems
35.	6ZC01 MANAGERIAL	To make the students understand the concepts and principles of Business Economics at micro	Understand the basics of Business Economics at Micro level and Demand

	ECONOMICS AND FINANCIAL ANALYSIS	level and basic principles of Financial Accounting and Analysis, which facilitate them in making better planning and decisions	analysis in particular. Understand Production patterns and various Costs involved. Understand different types of Markets, Business organizations and Pricing strategies. Enrich students with basic concepts of Financial Accounting. Understand basic concepts of Depreciation and Final accounts. Increase Competence of Analyzing Financial Statements
36.	6C407 ELECTRONIC CIRCUIT ANALYSIS	To understand the basic functioning and applications of various devices such asd amplifiers and oscillators.	Analyse and Design of BJT Single stage, multistage amplifiers at low and high frequencies. Analyse and Design JFET and MOSFET amplifiers Design different types of Feedback Amplifier, Oscillators and their analysis. Analyse and Design power amplifiers. Understand distortions Analyse and Design tuned and RF amplifiers such as single tuned, double tuned, stagger tuned and wide band amplifier. Understand the stability of oscillators and tuned amplifiers
37.	6FC03 DATABASE MANAGEMENT SYSTEMS	Understand the working of the database management systems. Design the optimal queries using relational algebra, structured and unstructured query languages like SQl and PL/SQL. Also understand the data structures for database storage for effective retrieval	Explain importance, significance, models, Database languages, architecture and design of Data Base Systems. Describe Relational Model's – Integrity Constraints, Querying fundamentals, Logical data base Design and Views of databases along with application of Relational Algebra. Apply queries in SQL Query using Nested Queries Set, Comparison Operators, Aggregative Operators, Logical connectivity's with Joins statements and develop applications. Describe and apply Schema refinement through all forms of Normalization to eliminate database redundancy.

			Describe Transaction Concept and apply Atomicity, Durability, Concurrent and integrity in order to ensure reliability and Recovery and Backup of databases.
			Describe External Storage Organization mechanisms and apply Indexing in databases for optimizing Query operation to enhance system performance.
38.	6D420 DIGITAL LOGIC AND PULSE CIRCUITS	To learn basic techniques for the design of digital circuits and fundamental conceptsused in the design of digital systems.	Be able to manipulate numeric information in different forms, e.g. different bases, signed integers, various codes such as BCD.
		To understand common forms of number representation in digital electronic circuits and to be able to convert between different representations.	Be able to manipulate simple Boolean expressions using the theorems and postulates of Boolean algebra and to minimize combinational functions.
		To implement simple logical operations using combinational logic circuits	Be able to design and analyze small combinational circuits and to use standard combinational functions/building blocks to build larger more complex circuits.
		To design combinationallogic circuits, sequential logic circuits.	Be able to design and analyze small sequential circuits and devices and to use standard sequential functions/building blocks to build larger more complex circuits.
		To explain the complete response of R-C and R-L-C transient circuits.	Understand the applications of diode as integrator, differentiator, clippers, and clamper circuits.
		To explain clippers, clampers, switching characteristics of transistors and sampling gates.	Learn various switching devices such as diode, transistor, SCR. Difference between logic gates and sampling gates
		To construct various multivibrators using transistors, and design of sweep circuits.	Design Mutivibrators for various applications, synchronization techniques and sweep circuits.
39.	6D414 SOFTWARE ENGINEERING	The concepts of Software Engineering, various process and system models.	Apply process models in real world software products. Classify software requirement specification document. Design system models and user interface. Evaluate test strategies for various softwares
		Software requirements in an engineering perspective.	
		Approaches to software testing strategies.	

40.	6D476 ELECTRONIC CIRCUITS PULSE CIRCUITS LAB	This course is designed to provide students with fundamental concepts of Electronic Circuits and applications serving various analog and digital building blocks.	Obtain the Transient analysis and frequency response of Single and Multistage BJT and FET Amplifier.
			Study of operation of Oscillators and Waveform generators like Multivibrators and Schmitt trigger.
			Study of frequency response of Tuned and Feedback Amplifier.
			Apply simulation tools (PSPICE or Multisim) to understand the circuit characteristics.
			Demonstrate Linear Wave shaping of RC, RL, RLC circuits.
			Design clipping, clamping, pulse generators circuit such as multi-vibrators, time base generators.
41.	6F474 DATABASE MANAGEMENT SYSTEMS LAB	Design the optimal queries using structured and unstructured query languages like SQl and PL/SQL by making use of control structures, cursors, triggers and functions/procedures	Create tables for a database and apply Queries using ANY, ALL, IN, EXISTS, NOTEXISTS, UNION, INTERSET, Constraints.
			Write Queries using Aggregate functions such as [COUNT, SUM, AVG, MAX, MIN, GROUP BY, HAVING], Conversion functions and use string functions for a
			given application.
			Explain and write programs using PL/SQL programs using exceptions, COMMIT, ROLLBACK and SAVEPOINT in PL/SQL block.
			Develop programs using WHILE LOOPS, FOR LOOPS, nested loops using BUILT– IN Exceptions and write Procedures.
			Write Programs for stored functions invoke functions in SQL Statement and write Programs for packages specification.
			Describe and write programs using features of CURSORs and its variables and also implement Triggers.
		Understanding the fundamental characteristics of signals and systems.	Understand the concepts of Signals

42.	6D485 SIGNALS AND SYSTEMS LAB	Understanding signals and systems in terms of both the time and transform domains, taking advantage of the complementary insights and tools that these different perspectives provide.	Understand the concepts of Fourier series. Properties of Fourier series
		Development of the mathematical skills to solve problems involving convolution, filtering, modulation and sampling	Understand the concepts of Systems
			Understand the Concept of Convolution in Time Domain and Frequency Domain
			Understand the concept of Sampling Theorem
43.	6D481 COMPREHENSIVE VIVA VOCE – I	Evaluate, comprehend and assess of the concepts and the knowledge gained in the core courses of the first and the second year	Comprehend the concepts in the core and elective courses.
			Exhibit technical knowledge to face interviews.
			Exhibit life long Learning skills for higher education and to persue Professional practice
44.	6D494 TECHNICAL SEMINAR	Develop an ability to understand and present the latest technological developments in computer science. Identify one of them, understand its impact on the event/method/society as a whole and present the seminar on the same which enhances oratory and interview facing skills.	Deliver lecture on emerging technologies.
			Explain domain knowledge to resolve real time technical issues
			Demonstrate ability to lead and explain concepts and innovative ideas.
			Demonstrate team leading qualities.
			Demonstrate public speaking and lifelong learning skills for higher studies and to pursue professional practice.
			Exchange new information that would not have been available otherwise.
			Develop debating and interview skills.
45.	5ZC01 MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS	To make the students understand the concepts and principles of Business Economics at micro level and basic principles of Financial Accounting and Analysis, which facilitate them in making better planning and decisions.	Understand the basics of Business Economics at Micro level and Demand analysis in particular.
			Understand Production patterns and various Costs involved.
			Understand different types of Markets, Business organizations and Pricing strategies.

			Enrich students with basic concepts of Financial Accounting.
			Understand basic concepts of Depreciation and Final accounts.
			Increase Competence of Analyzing Financial Statements.
46.	(5EC03) OPERATING SYSTEMS	Learn basics of operating Systems	Describe the basic functionalities and structure of the Operating System
		Understand process management and synchronization.	Explain the concepts and implementations of: Processes, Process Scheduling. Describe, contrast and compare various types of Operating systems like Windows and Linux.
		Learn principles of memory, I/O and file management in a secured environment	Comprehend the concepts of Synchronization and Deadlocks in the Operating System
			Discuss the concepts of Memory Management(Physical and Virtual memory)
			Explain the concepts of File System with regard to directory and disk management algorithms.
			Students understand the concepts of I/O systems, protection and security in a case study given
47.	(5CC16) LINEAR AND DIGITAL IC APPLICATIONS	To maintain the right blend of theory and practice in analyzing and designing a wide variety of applications using IC 741 op-amps.	Demonstrate the concepts of Differential Amplifier and Operational Amplifier and their characteristics.
		To acquaint the learners with a wide variety of Digital ICs families, and their applications in various digital circuits and systems	Design the basic circuits using Operational Amplifiers.
			Explore, design and analyze Filters, Timers, Voltage Controlled Oscillator and Phase Locked Loop.
			Demonstrate the design and analyze Oscillators, D/A Converters and A/D Converters.

			Classify and characterize the various Logic Families.
48.	(5D516) SIGNALS AND MODULATION THEORY	Familiarize various signals and their processing through linear systems.	Represent linear systems and find response.
		Applications of Fourier series and Fourier transform.	Use Fourier series and Fourier transform to analyze signals appropriately.
		Controlling parameters like amplitude, frequency and phase in analog modulations.	Understand various analog modulation schemes
		Sampling and Quantization techniques	Analyze usage of sampling and quantization in pulse and digital modulation schemes
		Familiarize various signals and their processing through linear systems.	Represent linear systems and find response.
		Applications of Fourier series and Fourier transform.	Use Fourier series and Fourier transform to analyze signals appropriately.
		Controlling parameters like amplitude, frequency and phase in analog modulations.	
		Sampling and Quantization techniques	
		Familiarize various signals and their processing through linear systems.	
		Applications of Fourier series and Fourier transform.	
		Controlling parameters like amplitude, frequency and phase in analog modulations.	
		Sampling and Quantization techniques	
49.	(5HC75) QUANTITATI	Learn and practice problems on numbers systems , ratios,	After completing the subject, students will be able to Solve problems related to number systems
			Find averages of numbers and groups

	VE APTITUDE	mensuration and relations to excel in and competitive examinations.	Solve problems related to ratio and proportion
			Find simple interest, solve time work and distance problems
			Solve mensuration problems
			Interpret the various kinds of data and find the relation between them.
			Students use the concepts learned in the courses, so far, in conceptualizing, designing and executing the modules of the projects.
			They also exhibit the interest in learning the modern tools and technologies through the bridge courses arranged in the college, beyond the curriculum, and hence developing the software.
			They also inculcate an enthusiasm to use the creative ideas to build the innovative projects which are meeting the current needs of the market and society as a whole.
			Through this course, communicative skills and team skills largely improve.
			The students learn the ability to work as an individual and in a team.
50.	(5D577) GROUP PROJECT	To acquire basic knowledge on selecting a project , learn related tools and enhance programming and communication skills for employability.	Students use the concepts learned in the courses, so far, in conceptualizing, designing and executing the modules of the projects.
			They also exhibit the interest in learning the modern tools and technologies through the bridge courses arranged in the college, beyond the curriculum, and hence developing the software.
			They also inculcate an enthusiasm to use the creative ideas to build the innovative projects which are meeting the current needs of the market and society as a whole.

			Through this course, communicative skills and team skills largely improve.
			The students learn the ability to work as an individual and in a team.
			Students use the concepts learned in the courses, so far, in conceptualizing, designing and executing the modules of the projects.
			They also exhibit the interest in learning the modern tools and technologies through the bridge courses arranged in the college, beyond the curriculum, and hence developing the software.
			An ability to explore the applications of IC 741 OP-AMP.
			An ability to understand and implement generate square and Triangular waveforms using 555 Timers.
			An ability to design D to A converters and its applications
			An ability to implement combinatorial and sequential designs using TTL Ics.
			Analyze and simulate various signals and study their properties in time and frequency domain
51.	(5CC89) LINEAR AND DIGITAL IC APPLICATIONS LAB	Understand the methods of digital communication and demonstrate the process involved in analog to digital conversion	Understand the LTI system operation and learn to find the response for other related applications
			Grasp the nature and significance of communication systems using various modulation and demodulation techniques like AM, FM, PAM, PWM and PPM
			Understand the methods of digital communication and demonstrate the process involved in analog to digital conversion

52.	(5D585) SIGNALS AND MODULATION TECHNIQUES LAB	Familiarize with various signals and deal with their properties through linear systems	Evaluate simple strategies for executing a distributed query to select the strategy that minimizes the amount of data transfer.
		Control the parameters like amplitude, frequency and phase in analog modulation techniques	Explain how the two - phase commit protocol is used to deal with committing a transaction that accesses databases stored on multiple nodes.
		Demonstrate Sampling and Quantization techniques	Describe distributed concurrency control based on the distinguished copy techniques and the voting methods
			Explain the techniques used for data fragmentation, replication, and allocation during the distributed database design process.
53.	(5D595) TECHNICAL LITERATURE REVIEW AND SEMINAR - I	Learn basics of technical paper writing and enhance verbal and writing skills useful for employability	Gains introductory knowledge of Cloud computing along with Virtualization concepts and implementation.
54.	(5FC13) DISTRIBUTED DATABASES	This course will introduce principles and foundations of distributed databases, including architecture, design issues, integrity control, query processing and optimization, transactions, and concurrency control.	Understand the basics of virtualization.
			Describe different types of virtualization and its applications.
			Understand the implementation of Network and Application virtualization
			Understand the basic concepts of Cloud Computing.
55.	(5FC25) CLOUD COMPUTING FOR BUSINESS ANALYTICS	To learn virtualization and cloud computing concepts.	Describe different cloud delivery and deployment models.
56.	(5EC30) INTRODUCTION TO VIRTUALIZATION AND CLOUD	Introduction to virtualization and cloud computing demonstrates the basics of virtualization concepts and it gives in depth knowledge of cloud computing delivery models and deployment models.	Apply virtualization and cloud on different case studies
			Students will understand the fundamentals of Data Warehousing and issues of mining with respect to architectures, technologies such as OLAP, Data Cube.

			Student will identify the techniques used in the data preprocessing and the Data Mining Query language primitives.
			Students will learn the significance and methods used for Characterization and the comparison of different classes of mining.
57.	(5DC57) INTRODUCTION TO INTERNET OF THINGS (IOT)		Students will be able to apply the algorithms for mining Association rules in large databases.
58.	(5DC21) SHELL PROGRAMMI NG AND SCRIPTING LANGUAGES		Students will be able to discuss and apply e the models of classification and use those models for prediction of the new samples.
59.	(5FC05) DATAWAREHOU SIN G AND DATA MINING	To understand the principles of Data warehousing and Data Mining.	Students will understand the fundamentals of Data Warehousing and issues of mining with respect to architectures, technologies such as OLAP, Data Cube.
		To know the Architecture of a Data Mining system and Data preprocessing Methods.	Student will identify the techniques used in the data preprocessing and the Data Mining Query language primitives.
		To perform classification and prediction of data.	Students will learn the significance and methods used for Characterization and the comparison of different classes of mining.
		To understand the principles of Data warehousing and Data Mining.	Students will be able to apply the algorithms for mining Association rules in large databases.
			Students will be able to discuss and apply e the models of classification and use those models for prediction of the new samples.
			Students will be able to apply various clustering techniques available for numerous applications. identify the optimal clustering technique for a particular application

60.	(5EC16) IMAGE PROCESSING	Make decisions from image data, online inspection and face recognition	Implement image process and analysis algorithms.
			Analyze general terminology of image processing.
			Examine various types of images, intensity transformations and spatial filtering.
			Develop Fourier transform for image processing in frequency domain.
			Evaluate the methodologies for image segmentation, restoration etc.
61.	(5FC26) BUSINESS INTELLIGENCE (TABLEAU BASED EXERCISE)	The course describes the business intelligence concepts and the development of BI using necessary tools	Learn the best practices to work on BI projects.
			Use IBM Cognos BI tool to develop, implement and administrate wide range of BI artifacts
			Understand & appreciate the use of analytical skills and business principles in operational and strategic decision-making by means of BI.
			Design and develop dashboards.
		Learn the basics of Business Intelligence.	Understand the basic concepts of delivery models in cloud computing.
		Learn dashboards design by utilizing key performance indicators those managerscan use to improve day-to-day business operations.	Understand the basic concepts of Service models in cloud computing.
		To learn how to plan and implement BI development projects.	

		To know the administrative and deployment scenarios & issues in BI space.	
62.	(5EC33) CLOUD COMPUTING ARCHITECTURE & DEPLOYMENT MODELS	Students must demonstrate the concepts of cloud computing reference architecture and In depth of cloud computing service models and delivery models.	Explain in detail about hybrid cloud deployment models.
			Understand the basic concepts of delivery models in cloud computing.
			Explain in detail about private cloud deployment models. Explain in detail about public cloud deployment models.
			Describe the cloud computing reference architecture.
63.	(5EC11) SOFTWARE AUTOMATION AND TESTING	To Understand the Basic concepts in Software testing, concepts of Flow graphs, Path testing and Data Flow Testing, understand the concept of metrics and their types. Understand and implement various testing techniques and to make a thorough study on various testing tools. Set a strategy for testing environment and to learn the testing methodologies in detail.	Describe Graph matrices and applications, and practice and apply automated testing tools such load Runner, UFT and QTP.
			Describe concepts of Software testing
			Describe and apply the concepts Flow graphs, Path testing and Data Flow testing.
			Practice Software testing strategy and Environment with economics and apply Software Metrics useful in software development and maintenance.
			Software Testing Methodology, finding defects hard to find, Verification and validation, Functional and structural, Workbench concept, Eight Consideration of software testing methodology, checklist. Describe Agile computing with agile testing

			Demonstrate Software Testing Techniques such as JADs, Pareto Analysis, Regression Tasting, Structured walkthroughs, Thread testing , Performance testing and White box testing.
64.	(5FC09) WEB TECHNOLOGIES	To understand the basics of Web Designing using HTML, DHTML, and CSS. To study about data processing techniques like XML.	Implement HTML tags and describe role of Java scripts of web technologies to setup a web site Implementation using XML document and the associated XML. Use DOM and SAX. Describe the basic server side technologies. Implementation of servlets and write programs using cookies session tracking. Implementation of applications using JSP with real time examples. Write programs using Text and Images. Implement multimedia applications using multimedia objects.
65.	(5FC04) DESIGN AND ANALYSIS OF ALGORITHMS	To learn the basics about Client side scripts and Server side scripts.	
66.	(5DC05) MICROPROCESSO RS AND MICROCONTROLLE RS	The microprocessor and microcontroller architecture, instructions set and procedures of programming.	Generate number and alphabet series
		Understand the assembly language programs, pin diagram and timing diagrams for 8086 & 8051.	Apply concepts related to Microprocessors and Microcontrollers.
			Write ALP for 8086 and 8051.
		Understand and practice the interfacing related applications of 8255 with 8086 and serial communication.	Design hardware interface with 8086 & 8051 to A/D, D/A, 8251, Keyboard.

		Learn the usage of multiple interrupts of 8051, USART architecture, RS232.	
		The microprocessor and microcontroller architecture, instructions set and procedures of programming.	
67.	(5H677) LOGICAL REASONING	Understand and solve arithmetic , analogy , coding , puzzles and ranking related problems	Generate number and alphabet series
		for enhancing employability.	Apply concept of analogy and solve related problems
			Classify and figure out odd one
			Realize the various techniques for coding and decoding
			Solve the relations puzzles.
			Solve the problem related to number, ranking and arithmetic reasoning
68.	(5FC80) WEB TECHNOLOGIES LAB	To understand the basics of Web Designing using HTML, DHTML, and CSS.	Implement HTML tags and describe role of Java scripts of web technologies to setup a web site
		To study about data processing techniques like XML.	Implementation using XML document and the associated XML. Use DOM and SAX.
		To learn the basics about Client side scripts and Server side scripts.	Describe the basic server side technologies. Implementation of servlets and write programs using cookies session tracking.
			Implementation of applications using JSP with real time examples.
			Write programs using Text and Images.
			Implement multimedia applications using multimedia objects.
	(5DC71)	Analyze and apply working of 8086. Compare the various interface	Familiarize the architecture of 8086 processor, assembling language programming and interfacing with various modules.

69.	MICROPROCESSO RS AND MICROCONTROLLE RS LAB	techniques. Analyze and apply the working of 8255, 8279, 8259, 8251, 8257 ICs and design and develop the programs Learning the Communication Standards.	The student can also understand of 8051 Microcontroller concepts, architecture, programming and application of Microcontrollers.
			Student able to do any type of VLSI, embedded systems, industrial and real time applications by knowing the concepts of Microprocessor and Microcontrollers.
70.	(5D696) TECHNICAL LITERATURE REVIEW AND SEMINAR - II	Learn basics of technical paper writing and enhance verbal and writing skills useful for employabilty	Students identify a topic from the current technical topics of their choice in the computer science domain and the allied fields, after surveying in the internet resources, journals and technical magazines in the library.
			Student learnt to arrange the contents of the presentation and scope of the topic, in an effective manner.
			Each student then presents the technical topic they chose in front of the panel and the fellow students, using the oratory skills.
			Students also face the questions posed by the panel and the students and answer them.
71.	(5AC46) CONTROL SYSTEMS ENGINEERING	Course Objective is to Study the principles of system modeling, system analysis and feedback control and use them to design and evaluate feedback control systems with desired performance	Learn basic concepts of control systems.
			Study about time response analysis.
			Learn basic concepts of stability and root locus method.
			Study about frequency response analysis.
			Learn basic concepts stability analysis in frequency domain.

			Learn fundamentals of state space analysis.
72.	(5ZC03) BANKING OPERATIONS, INSURANCE AND RISK MANAGEMENT	To make the students understand the concepts and principles of Indian Banking Business, Insurance Business and Capital market business products and services, which facilitate them to understand the nature of market.	Describe the new dimensions and products served by the banking system in INDIA.
			Explain the credit control system and create awareness on NPA's
			Apply the knowledge of Insurance concepts in real life scenarios
			Recognize the importance of regulatory and legal frame work of IRDA
			Identify the risk management process and methods.
			Calculate the diversity of risk and return
73.	(5BC61) FUNDAMENTALS OF SMART MATERIALS	To provide the knowledge on principles of smart materials, their functions and applications.	Apply the knowledge for developing/producing sensors, devices based on the assimilated know-how of composites, ceramics, electro-magnetic materials, shape memory alloys, and their properties.
			Develop/process new sensing and actuating smart devices based on the assimilated knowledge on the principles of phase transformations.
			Evaluate shape memory materials, electro rheological fluids and develop newer applications.
			Comprehend the principles of operation of optical fibers, actuators, and methods of analyses employed in smart materials.
			To apply the principles for developing smart skins for aerospace and transportation vehicles.

			To develop or process sensors and actuators for MEMS using shape memory alloys, PZT actuators.
74.	(5ZC20) PRODUCT AND SERVICES	This course helps to provide the basic concepts of Product and Services. This course will enable the students to study areas of basic insights in product management and Services Design.	The students will be introduced to basic concepts of product .
			Will enlighten the students with the process of new product development and stages in the process.
			Will help the students understand the concept of product testing, product planning and the preparatory groundwork for launching a new product
			Will help the students to understand the nature of services, its differences with the goods and the application of marketing principles for services.
			Will enlighten the students to understand the attributes of a good service design and the tools for producing and distributing the services.
			To make the students understand about the importance of quality of services and also introduce some measurement scales to evaluate the service quality.
75.	(5EC26) SAP - I : SAP ABAP WORKBENCH FUNDAMENTALS	Understand the SAP NetWeaver AS fundamentals	To acquire through knowledge of SAP Net weaver architecture, ABAP fundamentals (like language elements, modularization, ABAP dictionary)
		Work with the ABAP Workbench tools	To write simple ABAP programs and reports
		Write simple ABAP programs	To be able to debug and analyze errors and performance of programs
		Understand the ABAP Dictionary	

76.	(5HC46) GERMAN	Use definite, indefinite articles, Nouns nd cases. Use Verbs with prefixes, subordinate clauses. Use reflexive verbs in accusative.Dative cases and imperative constructions. Use Pronouns and Prepositions. Use Adjective with articles and Conjunctions in coordination with respect to the position of the verb Use of Perfect tense Use general structure and principles observed in German language	
77.	(5FC15) INFORMATION RETRIEVAL SYSTEMS	To learn the basics of information retrieval systems, data structures and file structures, algorithms, storage of different data and efficient retrieval which is distributed in different systems.	Apply Text Search Algorithms and describe Information System Evaluation.
			Describe Multimedia Information Retrieval – Models and Languages and explain role and significance of Libraries and Bibliographical Systems – Online IR Systems, OPACs, Digital Libraries.
78.	(5FC27) HADOOP AND BIG DATA ANALYTICS	To work with unconventional & unstructured data sources like Web server logs, Internet click stream data, social media activity reports, mobile-phone call detail records and information captured by sensors to produce analytics.	Understand and appreciate the use-cases & architectural considerations for big data analytics implementation.
		To understand and use the technologies associated with big data analytics including NoSQL databases, Hadoop and MapReduce.	Learn best practices to extend data warehousing with Hadoop and other big data
79.	5FC16 C# AND .NET FRAMEWORK	To work with unconventional & unstructured data sources like Web server logs	Introduction to Networking and the World Wide Web. Building multi-tier enterprise applications. Introduction to the .NET framework. .NET Interoperation services.
		To understand and use the technologies associated with big data analytics including NoSQL databases	Server side programming: Web Forms, ASP.NET Web Services, ADO.NET Data Access
		To work with unconventional & unstructured data sources like Web server logs	Client/Server Programming, 3-tier architecture. .NET Remoting.

		Introduction to Networking and the World Wide Web.	ASP.NET Web services and web service security.
		Building multi-tier enterprise applications.	RESTful, SOAP, DISCO, and UDDI. Client side programming: HTTP, CGI, Cookies, JavaScript, HTML, XML.
		Introduction to the .NET framework.	Simple Object Access Protocol (SOAP) and Web Services. Software as a Service (SaaS).
		.NET Interoperation services.	Cross-Platform Mobile Application Development with HTML5 and PhoneGap
80.	5FC17 BIG DATA ANALYTICS	Be exposed to big data	Work with big data platform and its analysis techniques.
		Learn the different ways of Data Analysis	Analyze the big data for useful business applications.
		Be familiar with data streams	Select visualization techniques and tools to analyze big data
		Learn the mining and clustering	Implement search methods and visualization techniques
		Be familiar with the visualization	Design efficient algorithms for mining the data from large volumes.
			Explore the technologies associated with big data analytics such as NoSQL, Hadoop
81.	5EC32 SOCIAL, WEB AND MOBILE ANALYTICS	Students must demonstrate knowledge of collecting and managing the relevant data of web and Social media analytics, identify the social business analytics and analyzing mobile data analytics with respect to publishers, operators and e-mail marketing	Understand the basic concepts of Web and Social Analytics.
			Explain the process of collecting relevant data.
			Identify the common business objectives.

			Understand the concepts of mobile analytics.
			Explain the concepts of mobile customer experience.
			Analyze the mobile analytics for publisher, operator and email marketing.
82.	5FC14 CLOUD COMPUTI NG	It attempts to present cloud computing in a way that anyone can understand. We do include technical material, but we do so in a way that allows managers and technical people alike to understand what exactly cloud computing is and what it is not.	Describe the characteristics of cloud
		We try to clear up the confusion about current buzzwords such as PaaS, SaaS, etc., and let you all see how and why the technology has evolved to become "the cloud" as we know and use it today.	Describe the cloud services.
		The beauty and advantage of this course is that at the end in the last units students are practically involved in preparing various case studies.	Understand different architectures for cloud applications, Creation and running of python programs, running amazon ec2 instance
			Understand Data Intensive applications and future trends of Internet Clouds supporting Mobile Computing, Ubiquitious Computing and Social Networking
			Discuss mapreduce and image processing app on cloud.
			Discuss cloud security architecture.
	4DC06 EMBEDDED	Embedded System design process using ARM Processor	Identify and summarize the characteristics and challenges of designing an embedded system
		ARM Architecture and Programming (Assembly and C)	Utilize and apply ARM architecture for Embedded System Design

83.	AND REAL TIME SYSTEMS	ARM interfacing with various bus protocols	Design simple input output hardware interfaces using ARM
		Concepts and constraints related to real-time systems	Explain the concepts and design requirements related to a real time systems
84.	4DC07 VLSI DESIGN	IC fabrication process of various technologies and to understand the electrical properties of MOS transistor.	Design the complex digital VLSI circuits at transistor level.
		Various Layers and layouts for a different technology design rules and how scaling impacts its performance.	Draw layouts for a digital circuit for a specified technology and verify design rules and validate them.
		Design of various combinational and sequential circuits using MOS transistors and about CMOS testing	Test the circuit various level for different fault models by applying test generation procedures.
85.	4FC05 DATAWAREHOU SIN G AND DATA MINING	To understand the principles of Data warehousing and Data Mining.	Understand the fundamentals of Data Warehousing and issues of mining with respect to architectures , technologies such as OLAP , Data Cube .
		To know the Architecture of a Data Mining system and Data preprocessing Methods.	Identify the techniques used in the data preprocessing and the Data Mining Query language primitives.
		To perform classification and prediction of data.	learn the significance and methods used for Characterization and the comparison of different classes of mining.
			apply the algorithms for mining Association rules in large databases.
			discuss and apply e the models of classification and use those models for prediction of the new samples.
			Apply various clustering techniques available for numerous applications. identify the optimal clustering technique for a particular application
			Describe quality and philosophies of total quality management and importance of top management in

86.	4ZC09 TOTAL QUALITY MANAGEMENT		TQM.
			Importance of statistical quality control charts, internal customer conflict and marketing in TQM.
			Explains evolution of TQM organizing, Bench marking and its process.
			Describes leverage of productivity and quality and business process re-engineering.
			Explains the costs of the quality and accounting system.
			Importance of ISO:9000 and documentation process involved in ISO:9000
87.	4GC33 CULTURE, VALUES, PROFESSIONAL ETHICS AND IPR	To gain comprehensive knowledge in environmental science, environmental issues and the management and to use professional engineering solutions in environmental context to respond effectively to the needs of sustainable development.	
88.	4GC06 ENVIRONMENTAL STUDIES		Ability to demonstrate the knowledge of Components of Ecology And Ecosystems and Environmental organizations, Environmental activists
			Ability to demonstrate the knowledge of Metal Ions In Biological System like Nitrogen Fixation, Oxygen transport
			Ability to demonstrate the knowledge of Environmental Chemistry in atmosphere, Hydrosphere, Litho sphere.
			Ability to demonstrate the knowledge of Bio Diversity And Its Conservation
			Ability to demonstrate the knowledge and regulatory issues and case studies in Air and water

			Ability to demonstrate the knowledge in Waste water treatment, soil, noise, marine and waste management.
89.	4E709 SOFTWARE TESTING	To Understand the Basic concepts in Software testing, concepts of Flow graphs, Path testing and Data Flow Testing, understand the concept of metrics and their types	Describe concepts of Software testing
		To clearly understand and implement various testing techniques and to make a thorough study on various testing tools	Describe and apply the concepts Flow graphs, Path testing and Data Flow Testing.
		To set a strategy for testing environment and to learn the testing methodologies in detail	Practice Software testing strategy and Environment with economics and apply Software Metrics useful in software development and maintenance.
			Software Testing Methodology, finding defects hard to find, Verification and validation, Functional and structural, Workbench concept, Eight Consideration of software testing methodology, checklist. Describe Agile computing with agile testing
			Demonstrate Software Testing Techniques such as JADs, Pareto Analysis , Regression Tasting, Structured walkthroughs, Thread testing , Performance testing and White box testing.
			Describe Graph matrices and applications, and practice and apply automated testing tools such load Runner, UFT and QTP.
90.	4D779 MAIN PROJECT PHASE - I		Students identify a topic from the current technical topics of their choice in the computer science domain and the allied fields, after surveying in the internet resources, journals and technical magazines in the library.
			Student learnt to arrange the contents of the presentation and scope of the topic, in an effective manner.

			Each student then presents the technical topic they chose in front of the panel and the fellow students, using the oratory skills.
			Students also face the questions posed by the panel and the students and answer them.
91.	4D778 INDUSTRY ORIENTED MINI PROJECT		Students used the concepts learned in the courses, so far, in executing the modules of the projects.
			They also exhibited the interest in learning the modern tools and technologies through the bridge courses arranged in the college, beyond the curriculum, and hence developing.
			They also inculcated an enthusiasm to use the creative ideas to build the innovative projects which are meeting the current needs of the market and society as a whole.
			Through this course, communicative skills and team skills are largely improved.
			The students learnt the ability to work as an individual and in a team
92.	4DC73 VLSI LAB	To familiarize students with VLSI CAD Tools (Xilinx, Microwind and NG SPICE).	
		To make students understand and implement digital logic gates and circuits using SPICE and Verilog HDL.	
		To introduce the student to physical design by implementing layouts using Microwind.	
		To make students implement combinatorial and sequential designs on FPGA boards (SPARTAN 3) using Xilinx tools	

93.	4D797 TECHNICAL PAPER WRITING AND SEMINAR - VII		Students identify a topic from the current technical topics of their choice in the electronics & computer engineering domain and the allied fields, after surveying in the internet resources, journals and technical magazines in the library.
			Student learnt to arrange the contents of the presentation and scope of the topic, in an effective manner.
			Each student then presents the technical topic they chose in front of the panel and the fellow students, using the oratory skills.
			Students also face the questions posed by the panel and the students and answer them.
94.	4ZC02 MANAGEMENT SCIENCE	The course is aimed at giving the basics of management	outlines the significance of management, defines the basic concepts and applicability of management principles in changing paradigms.
		The course is aimed at giving the basics of management	demonstrates the procedures of the work study method and work measurement, Project management.
			infers the need to understand the importance of materials management and quality control techniques.
			relates the knowledge of two functional areas of business, human resource management and marketing management.
			explains the different dimensions of behavior, personality, perception, attitudes overall to gain insights into organizational behavior.
			distinguish some aspects related to strategic planning and strategic implementation to gain competitive advantage over competitors

95.	4DC55 INTERNET OF THINGS	Technology and applications of IoT	Identify the implementation layers of an IoT application system
		IoT system management using M2M (machine to machine) with necessary protocols	Describe the management of an IoT system using necessary protocols
		Python Scripting Language preferred for many IoT applications	Design, Develop and Illustrate IoT applications using Raspberry PI platform and Python Scripting
		Raspberry PI as a hardware platform for IoT sensor interfacing	Implement web based services on IoT devices
		Implementation of web based services for IoT with case studies	
96.	4D883 COMPREHENSIVE VIVA-VOCE		Students are assessed in the courses they have undergone till the completion of that academic year.
			They are asked to comprehend the concepts in the core subjects and the elective subjects, to make them ready to face technical interviews which improve
			their employability skills.
97.	4D898 TECHNICAL PAPER WRITING AND SEMINAR - VIII		Students identify a topic from the current technical topics of their choice in the electronics & computer engineering domain and the allied fields, after surveying in the internet resources, journals and technical magazines in the library.
			Student learnt to arrange the contents of the presentation and scope of the topic, in an effective manner.
			Each student then presents the technical topic they chose in front of the panel and the fellow students, using the oratory skills.
			Students also face the questions posed by the panel and the students and answer them.

ACADEMIC REGULATIONS,

COURSE STRUCTURE

AND

DETAILED SYLLABUS (II YEAR II SEM)

for

B.Tech Four Year Degree Course

(A-20 – Regulation)

in

ELECTRICAL AND ELECTRONICS ENGINEERING

(EEE)

(Applicable for the batches admitted from 2020-21)

SREENIDHI INSTITUTE OF SCIENCE AND TECHNOLOGY
(An Autonomous Institution approved by UGC and affiliated to JNTUH)
(Accredited by NAAC with 'A' Grade and Accredited by NBA of AICTE)
Yamnampet, Ghatkesar, Malkajigiri Medchal District -501 301.

January, 2021

DEPARTMENT OF
ELECTRICAL AND ELECTRONICS ENGINEERING (EEE)

Program objective:

B. Tech in Electrical and Electronics Engineering program emphasizes the fundamentals of electrical & electronics in daily life.

The first two years of this program begins with a set of introductory courses, like Mathematics, physics, English, computer languages (C, C++), circuits and networks, DC machines and introduction to power systems which provide students with a firm foundation in mathematics, Electrical, as well as communication skills. These courses include weekly labs in which students use state-of-the art techniques and equipments to create solutions to interesting problems.

The last two years of study focuses on the concepts and techniques used in the design and development of advanced systems in electrical and electronics. In addition, students choose from a rich set of electives, which covers skills in demand. These advanced courses give broad opening for research and help them to choose specialization in their higher studies. A generous allotment of open electives allows students to learn foreign languages like French, German, Spanish; and it includes computing with a business focus.

Students in this program pursue an inter-disciplinary course of study that combines strong foundation in electrical and electronics with a focus on interdisciplinary areas. This program is designed for students who seek to blend their abilities with skills in demand and skills specific to another domain to solve problems in that domain.

Having completed this course, a student is prepared to work independently within a well structured design frame work in the job and for higher studies.

VISION

To emerge as a leading Electrical and Electronics Engineering Department in Technical Education and Research in India with focus to produce professionally competent and socially sensitive engineers capable of working in multidisciplinary global environment.

MISSION

1. To empower the students and provide the academic environment to pursue and attain competencies in their studies at undergraduate, post graduate level in Electrical & Electronics Engineering.
2. To develop liaison with academia, R&D institutions and electrical industry for hands-on training which enable the students to design and produce novel products for better society.
3. To inculcate interpersonal skills, team work, leadership qualities and professional ethics in students.
4. To enable the students to pursue higher studies and conduct research which will help them in developing the qualities for life-long learning and for a successful professional career.

Program Educational Objectives of B. Tech

(Electrical and Electronics Engineering)

PEO-I: To empower the students by providing necessary knowledge, critical thinking and problem solving capabilities in the field of Electrical and Electronics Engineering so that they can excel in their profession, in industry, higher studies and Research & Development.

PEO-II: To develop competencies in core and allied fields, so as to conduct experiments, comprehend, analyze, design and apply appropriate techniques / tools to arrive at optimal solutions to face real time challenges.

PEO-III: To inculcate the sense of responsibility towards ethics, Intellectual Property rights, good communication skills and entrepreneurship with adequate knowledge of project / finance management skills for betterment of society at large.

PEO-IV: To motivate the students to be academically excellent and also to be sensitive to Professional ethics, to acquire leadership skills and to be life-long learners for a successful professional career.

Program Outcomes of EEE Department

1. **Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. **Problem analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3. **Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
4. **Conduct investigations of complex problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
5. **Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
6. **The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
7. **Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
8. **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. **Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

10. **Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
11. **Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
12. **Life-long learning:** Recognize the need for, and have the preparation and ability to engage in Independent and life-long learning in the broadest context of technological change.

Program Specific Outcomes (PSO)

1. Able to demonstrate the applications of knowledge gained into the recent technologies in the areas of Power systems, Power electronics and allied fields.
2. Recognize the need of self learning and ability to get into the advanced fields such as renewable energy systems and smart grids.

1	2	3	4	5	6	7	8	9	10	11	12
H	H	M						M			**L**

H: High M: Medium L: Low

Syllabus for B. Tech (E.E.E.) II Year I semester

DIGITAL LOGIC DESIGN

(Common to ECE/ECM/EEE)

CODE: 8CC02

L	T	P/D	C
2	-	-	2

COURSE OBJECTIVES:

To learn the different numbering systems, Boolean functions and design of Combinational circuits

To learn design of Sequential Circuits, design using PLDs and digital controllers using Algorithmic State machines

COURSE OUTCOMES:

After completing this course, the students will have demonstrated

[1] An ability to understand number systems and apply the rules of Boolean algebra and K-maps to simplify Boolean expressions.
[2] An ability to design MSI combinational circuits such as full adders, multiplexers, decoders, encoders, Code converters.
[3] An ability to design basic memory units (latches and flip-flops) and sequential circuits such as counters and registers
[4] An ability to design digital design using PLD's such as ROM's, PLA's, PALs and digital controllers using Algorithmic State Machine Charts.

Mapping of Course Outcomes with Program Outcomes andProgram specific outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	2	2	3				2	2		2	3	3	2
CO2	3	3	3	2	3				2	2		2	3	3	2
CO3	3	3	3	2	3				2	2		2	3	3	2
CO4	3	3	2	2	3				2	2		2	3	2	2
Over all	3	3	3	2	3				2	2		2	3	3	2

1	2	3	4	5	6	7	8	9	10	11	12
M	H	M	H	M							L

H: High M: Medium L: Low

Syllabus for B. Tech (E.E.E.) II Year I semester

L	T	P/D	C
2	1	-	3

Code: 8CC01 **ELECTRONIC DEVICES AND CIRCUITS**
(Common to ECE/EEE/ECM)

Course Objectives

- To provide the learners a comprehensive understanding of electronic Components like Diodes, Transistors, Field Effect transistors and their applications.
- To maintain the right blend of theory and practice in analyzing and designing of Amplifiers and Oscillators.

Course Outcomes

After studying this course, the students will be able to

[CO1] Demonstrate the concepts of pn Diode, Zener Diode, Bipolar Junction Transistor, Field Effect Transistor and their characteristics.
[CO2] Design and Analyze the Amplifier circuit's using BJT and FET.
[CO3] Classify and characterize the Feed Back amplifiers and design various Oscillator circuits.
[CO4] Understand the Basic regulator circuits and voltage multipliers.

Mapping of Course Outcomes with Program Outcomes and Program Specific Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	2	2									1	3		1
CO2	3	3	3									1	3		1
CO3	3	3	3									1	3		1
CO4	3	3	3									1	3		**1**
Overall mapping	3	3	3									1	3		1

1	2	3	4	5	6	7	8	9	10	11	12
H	M			L							L

H: High M: Medium L: Low

Syllabus for B. Tech (E.E.E.) II Year I semester

Electrical and Electronics Engineering

Code: 8A302 **ELECTRO MAGNETIC FIELDS**

L	T	P/D	C
2	--	--	2

Course Objective: Students learn about fundamental concepts of static and dynamic electric fields.

Course Outcomes:

1. Understand the Principle of electrostatics.
2. Understand the principle of dipole and field due to dipole.
3. Understand the Fundamentals of dielectrics and calculation of capacitance.
4. Understand the Fundamentals of Ampere circuital law and force in magnetic field.
5. Understand the magnetic dipole and magnetic potential.
6. Understand the self and mutual inductance and time varying fields.

1	2	3	4	5	6	7	8	9	10	11	12
M	H										L

H: High M: Medium L: Low

II Year I semester

Electrical and Electronics Engineering

Code: 8A303 **ELECTRICAL MACHINES – I**

L	T	P/D	C
3	--	--	3

Course Objective: Electrical machines course is one of the important courses of the Electrical discipline. In this course the different types of DC generators and motors which are widely used in industry are covered and their performance aspects will be studied.

Course Outcomes:

1. Understand the Electromechanical Energy conversion.
2. Understand the constructional features & Principle of operation of DC machine.
3. Understand the characteristic features of DC machines.
4. Understand the starting & speed control techniques of various types of DC motors.
5. Analyze the various testing procedures of DC machines.
6. Understand the various applications of DC machines.

1	2	3	4	5	6	7	8	9	10	11	12
H	M										L

H: High M: Medium L: Low

II Year I semester

Electrical and Electronics Engineering

Code: 8A304 ELECTRICAL CIRCUITS and NETWORKS- II

L	T	P/D	C
3	-	-	3

Course Objective: Students learn about fundamental concepts of electrical engineering.

Course Outcomes:

1. Understand the three phase circuits.
2. Understand the DC and AC transients.
3. Understand the network functions.
4. Analyze the network parameters.
5. Understand the different types of filters.
6. Understand the Fourier analysis of AC circuits.

1	2	3	4	5	6	7	8	9	10	11	12
H		M									L

H: High M: Medium L: Low

B. Tech. II Year I semester
Electrical and Electronics Engineering

Code: 8EC42 **PROGRAMMING IN JAVA**
(ONLY FOR EEE)

L	T	P/D	C
2	--	--	2

Course Objective:

Understand the concepts of Object oriented programming principles of Java. Write the programs and execute using OOP principles such as garbage collection, overloading methods, constructors, recursion, string handling, String Tokenizer, inheritance and its types, packages, multithreading and threads.

Course Outcomes:

1. Understand the concept of OOP with the need of constructing objects, and classes. Write programs using classes, objects, members of a class and the relationships among them needed for a specific problem.
2. Identify the purpose and usage of principles of inheritance and polymorphism. Implement concepts of polymorphism, encapsulation and methodoverloading
3. Create Java application programs using sound OOP practices (e.g., interfaces and APIs) and proper program structuring (e.g., by using access control identifiers, automatic documentation through comments)
4. Students understand and implement error exception handling and multi- threading.
5. Students learn to create GUI for the specificapplications.
6. Write programs for event-handling using various user interface components on applets.

a	b	c	d	e	f	g	h	i	j	k	l	m
L					H	H	M					

L	T	P	C
2	0	0	2

CODE: 8HC05

ENVIRONMENTAL SCIENCE AND ECOLOGY

II B. Tech I Sem (for EEE, ME, IT and ECM)

II B. Tech II Sem (for CSE, ECE and CE)

Course Objectives:

1. To understand structure and function of ecosystem
2. To learn classification and uses of natural resources
3. To learn about Understanding the impacts of developmental activities and mitigation measures.
4. To know the source, causes and preventive methods of pollution
5. To understand the importance of ecological balance for sustainable development.
6. To understand the environmental policies and regulations

H: High M: Medium L: Low

a	b	c	d	e	F	g	H	i	j	k	l	M
X	X	X	X									

II Year, I - Sem.
Electrical and Electronics Engineering
ELECTRONIC DEVICES & CIRCUITS LAB
(Common to ECE/ECM/EEE)

Code: 8CC71

L	T	P/D	C
-	-	2	1

Course Objectives:

This course introduces the characteristics and applications of semiconductor devices; emphasis is placed on characteristics and testing practically to strengthen the knowledge.

Course Outcomes:

After studying this course, the students will be able to

1. Understand color coding, operations on Diode, BJT, FET and other electronic components.
2. Correlate theoretical concepts with practical implementation.
3. Apply the knowledge of Diodes, Capacitors and Transistors for the realization of rectifiers, regulators, amplifiers and Oscillator circuits.
4. Adapt effective Communication, presentation and report writing skills

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO 3
CO1	3	3	3	3	3				2			2	3	3	2
CO2	3	3	3	3	3				2			2	3	3	2
CO3	3	2	2	2	2						1	2		3	
CO4									2	1					
Overal l	3	3	3	3	3				2	1	1	2	3	3	2

a	b	c	d	e	f	g	h	i	j	k	l
x		x							x		

Syllabus for B. Tech II Year I semester
Electrical and Electronics Engineering (EEE)
ELECTRICAL CIRCUITS AND NETWORKS ANALYSIS LAB

Code: 8A371

L	T	P/D	C
-	-	2	1

Course Objectives:

To make the student to learn:

i. *Verification of network theorems experimentally.*
ii. *To measure frequency of RLC series and parallel circuits under resonance*
iii. *To determine self & mutual inductance and co-efficient of coupling for coupled circuits*
iv. *The construction of current locus diagram for a given parallel circuit.*
v. *Simulation for analysis of electrical networks*
vi. *Method for determining the parameters of a coil*

Course Outcomes:

At the end of the course, students will be able to

i. *Perform the test for verification of various network theorems*
ii. *Measure the frequency for a RLC series/parallel circuits under resonance.*
iii. *Conduct an experiment for determination of self & mutual inductance and coefficient of coupling*
iv. *Construct current locus diagram by performing a test on single phase parallel circuits*
v. *Simulate for analysis of electrical circuits.*
vi. *Determine the parameters of the coil*

1	2	3	4	5	6	7	8	9	10	11	12
								L	H		M

H: High M: Medium L: Low

II Year I semester

Electrical and Electronics Engineering	**L**	**T**	**P/D**	**C**
TECHNICAL SEMINAR – III	**-**	**-**	**2**	**1**

Code: 8A393

Course objective

Develop an ability to understand and present the latest technological developments in computer science. Identify one of them, understand its impact on the event/method/society as a whole and present the seminar on the same which enhances oratory and interview facing skills.

COURSE OUTCOMES :

1 Deliver lecture on emerging technologies.

2 Explain domain knowledge to resolve real time technical issues

3 Demonstrate ability to lead and explain concepts and innovative ideas.

4 Demonstrate team leading qualities.

5 Demonstrate public speaking skills.

6 Exchange new information that would not have been available otherwise.

7. Develop debating and interview skills.

1	2	3	4	5	6	7	8	9	10	11	12
								H	M		L

H: High M: Medium L: Low

II Year I Semester
Electrical and Electronics Engineering
COMPREHENSIVE TEST AND VIVA VOCE – III

Code: 8A383

L	T	P/D	C
-	-	-	1

Course Objective:

Evaluate, Comprehend and Assess the concepts and knowledge gained in the Core Courses of 1st year and 2nd year 1st Semester.

Course Outcomes: After completing this course, the student will be able to

1. Comprehend the concepts in the Core Courses 1st yearand 2nd year 1st Semester.
2. Assess technical knowledge to face interviews.

Exhibit lifelong learning skills to pursue higher studies or professional practice.

a	b	c	d	e	f	g	h	i	j	k	l
X											

II Year B.Tech, Semester-II
PROBABILITY & STATISTICS
(Common to CSE, IT, ECM & EEE)

	L	T	P/D	C
Code: 8HC16	**2**	1	**0**	**3**

Pre Requisites: Mathematics Knowledge at Pre-University Level

Course Objectives: *To make the students to understand and expected to learn*

1. *Concepts of the probability, types of random variables and probability distributions.*
2. *Sampling distributions and their properties, concepts on estimation.*
3. *Concepts on testing the hypothesis concerning to large samples.*
4. *Different kinds of tests related to small samples and tests concerned to small size samples and goodness of fit and independence of attributes using chi-square distribution.*
5. *Preliminaries of basic statistics also correlation.*
6. *Method of least squares and regression*.

Course Outcomes: *After the course completion the students will able to*

i. *Solve the random variable problems and probability distributions.*
ii. *Estimate the parameters and solve the problems using central limit theorem.*
iii. *Test the hypothesis related to samples concerning to the means and proportions of large size samples.*
iv. *Apply and solve the problems using t-test, Chi-square test also testing the hypothesis problems on small size samples, goodness of fit and independence of attributes.*
v. *Solve the problems on measures of central tendency, Correlation and regression models*

1	2	3	4	5	6	7	8	9	10	11	12
	M	H									L

H: High M: Medium L: Low

II Year II Semester

Electrical and Electronics Engineering

Code: 8A405 ELECTRICAL MACHINES-II

L	T	P/D	C
3	-	-	3

Course Objective: Students learn about fundamental concepts of transformers and induction motors with applications.

Course Outcomes: Students

1. Learn basic concepts of single phase transformer.
2. Study about testing of single phase transformer and auto transformer.
3. Study about poly phase transformer.
4. Study about poly phase induction motors.
5. Study about torque speed characteristics and circle diagram of induction motor.
6. Study about different starting methods of induction motor.

1	2	3	4	5	6	7	8	9	10	11	12
	M	**H**		**L**							**L**

H: High M: Medium L: Low

II Year II Semester

Electrical and Electronics Engineering

Code: 8A406 POWER SYSTEMS - I

L	**T**	**P/D**	**C**
2	**-**	**-**	**2**

Course Objective: Students learn about fundamental concepts of different conventional power generation methods and transmission requirements.

Course Outcomes: Students

1. Learn basic concepts of hydro electric and thermal power plants.
2. Study about gas and nuclear power plants.
3. Study about transmission line parameters and efficiency.
4. Study about performance of transmission lines.
5. Learn basic about over head insulators and mechanical design.
6. Learn fundamentals of underground cables.

1	2	3	4	5	6	7	8	9	10	11	12
H	M										L

H: High M: Medium L: Low

II Year II Semester

Electrical and Electronics Engineering

Code: 8AC07 LINEAR CONTROL SYSTEMS

L	T	P	C
2	1	-	3

Course Objective: Students learn about fundamental concepts of time and frequency domain analysis of a given system.

Course Outcomes: Students

1. Learn basic concepts of control systems.
2. Study about time response analysis.
3. Learn basic concepts of stability and root locus method.
4. Study about frequency response analysis.
5. Learn basic concepts stability analysis in frequency domain.
6. Learn fundamentals of state space analysis.

II Year II Semester
Electrical and Electronics Engineering

L	T	P	C
3	-	-	3

CODE : 8CC05 **ANALOG CIRCUITS**

Course Objectives:
To understand the basic functioning and applications of the basic building blocks of analog electronic circuits - amplifiers and oscillators.

COURSE OUTCOMES:
After studying this course, the students will be able to

1. Distinguish between small and large signal amplifier and able to compare the conversion efficiency levels
2. Analyze and Design tuned RF amplifiers and different types of sweep generators
3. Understand linear and non-linear wave shaping methods and able to Analyze various types of Logic gates and Sampling gates.
4. Understand and design various types of multivibrators and applications

Mapping of Course Outcomes with Program Outcomes andProgram specific outcomes

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO 3
CO1	2	2	3										3		
CO2	2	2	3										3		
CO3	2	2	2										3		
CO4	2	3	3										3		
Overal l	2	2	3										3		

a	b	c	d	e	f	g	h	i	j	k	l

L	T	P	C
2	0	0	2

II Year II Semester
Electrical and Electronics Engineering

CODE: 8EC44 **DATABASE SYSTEMS CONCEPTS**

Course Objective:

To understand the different issues involved in the design and implementation of a database system. Study the physical and logical database designs, database modeling, relational, hierarchical, and network models and to understand and use data manipulation language to query, update, and manage a database. Develop an understanding of essential DBMS concepts such as: database security, integrity, concurrency and design and build a simple database system and demonstrate competence with the fundamental tasks involved with modeling, designing, and implementing a DBMS.

Course Outcomes:

1. Students will learn basics of databases and understand the architecture of database management systems.
2. Students will learn about good database design techniques and database theories behind.
3. Understand conceptual database designs, and functional dependencies and normalization.
4. Students will understand the Mathematical foundation for relational databases.
5. Student will be able to understand concept of Constraints, Views and will be able to create dynamic databases.
6. Learn transaction management, concurrency controls.

II Year II Semester
Electrical and Electronics Engineering

UNIVERSAL HUMAN VALUES (UHV)

CODE: 8HC17

L	T	P	C
2	1	0	3

Curricular Structure

Semester	L-T-P-C	Course No. & Title
3 or 4	2-1-0-3	H-102 Universal Human Values 2: Understanding Harmony

Human Values Courses: This course also discusses their role in their family. It, very briefly, touches issues related to their role in the society and the nature, which needs to be discussed at length in one more semester for which the foundation course named as "H-102 Universal Human Values 2: Understanding Harmony" is designed which may be covered in their III or IV semester. During the Induction Program, students would get an initial exposure to human values through Universal Human Values – I. This exposure is to be augmented by this compulsory full semester foundation course.

OBJECTIVE: The objective of the course is four fold:
1. Development of a holistic perspective based on self-exploration about themselves (human being), family, society and nature/existence.
2. Understanding (or developing clarity) of the harmony in the human being, family, society and nature/existence
3. Strengthening of self-reflection.
4. Development of commitment and courage to act.

Proposed Syllabus
SOFT SKILLS
CSE, ECE, CIVIL: II/I
IT, MECH, ECM, EEE: II/II

Subject Code: 8HC03

Maximum Marks: 100 (Internal – 30 / External – 70)

L	T	P/D	C
1	0	2	2

Course objectives:

1. To enable students to make self-assessment and know the importance of certain soft skills and team spirit
2. Know their emotional quotient which guides their thinking, behavior and helps them manage stress efficiently.
3. Equip themselves with the prerequisites, and relevant techniques to effectively attend corporate interviews.

Course Outcomes: After completion of the course, the student will be able to:

1. Assess themselves using SWOT analysis.
2. Appraise the importance of certain soft skills like time management and goal setting.
3. Improve their verbal ability to handle the competitive exams.
4. Enhance their team skills and design thinking capabilities for effective problem solving and decision making.
5. Know their emotional quotient which guides their thinking, behavior and helps them manage stress efficiently.

Equip themselves with the prerequisites, and relevant techniques to effectively attend corporate interviews.

1	2	3	4	5	6	7	8	9	10	11	12
	H	M									L

H: High M: Medium L: Low

II Year II Semester

Electrical and Electronics Engineering

Code: 8A473 **ELECTRICAL MACHINES LAB – I**

L	T	P/D	C
-	-	2	1

Course Objective:

To understand the basics of Electrical machines concepts and applications

Course Outcomes:

After completion of the course, the student will be able to:

1. Understand the principles of DC electrical machines.
2. Understand the load characristics.
3. Understand the principle and operation of DC machine speed control methods.
4. Understand the calculation of losses in DC machines

1	2	3	4	5	6	7	8	9	10	11	12
M	H	M	M					M		M	

H: High M: Medium L: Low

II Year II Semester
Electrical and Electronics Engineering
Analog Circuits Lab

Code: 8CC74

L	T	P/D	C
-	-	2	1

Course Objectives
To prepare students to practice the design and analysis of any Analog electronics circuit.

Course Outcomes:
At the end of the laboratory course, the students will be able to

1. To understand the design and working of various linear and non-linear wave shaping circuits.
2. To demonstrate the working principle of various multivibrators and functionalities of various logic gates.
3. To perform and verify the working of oscillators, feedback amplifiers and voltage regulators.
4. To perform laboratory experiment to verify the conversion efficiency of various power amplifiers.

Mapping of Course Outcomes with Program Outcomes andProgram specific outcomes

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO 3
CO1	2		3		3				2			1	2	2	2
CO2	2		3		3				2			1	2	2	2
CO3	2		3		3				2			1	2	2	2
CO4	2		3		3				2			1	2	2	2
Overal l	2		3		3				2			1	2	2	2

1	2	3	4	5	6	7	8	9	10	11	12
								H	M		M

H: High M: Medium L: Low

II Year II Semester

Electrical and Electronics Engineering

TECHNICAL SEMINAR - IV

L	T	P/D	C
-	-	2	1

Code: 8A494

Course objective

Develop an ability to understand and present the latest technological developments in computer science. Identify one of them, understand its impact on the event/method/society as a whole and present the seminar on the same which enhances oratory and interview facing skills.

COURSE OUTCOMES:

1Deliver lecture on emerging technologies.
2 Explain domain knowledge to resolve real time technical issues
3 Demonstrate ability to lead and explain concepts and innovative ideas.
4 Demonstrate team leading qualities.
5 Demonstrate public speaking and lifelong learning skills for higher studies and to pursue professional practice.
6 Exchange new information that would not have been available otherwise.
7 Develop debating and interview skills.

1	2	3	4	5	6	7	8	9	10	11	12
								H	M		L

H: High M: Medium L: Low

II Year II Semester
Electrical and Electronics Engineering

COMPREHENSIVE VIVA TEST – IV

Code: 8A484

L	T	P/D	C
-	-	-	1

Objective:

Evaluate, Comprehend and assess the concepts and knowledge gained in the Core Courses of 1st year and 2nd year.

Course Outcomes: After completing this course, the student will be able to

1. Comprehend the concepts in the Core Courses 1st year and 2nd year.
2. Assess technical knowledge to face interviews.
3. Exhibit lifelong learning skills to pursue higher studies or professional practice.

B.Tech. (EEE) III Year – I Sem

CODE: 7C508 **IC APPLICATIONS**

L	T	P	C
3	**--**	**--**	**3**

Course Objectives

- To maintain the right blend of theory and practice in analyzing and designing a wide variety of applications using IC 741 op-amps
- To acquaint the learners with a wide variety of Digital ICs families, and their applications in various digital circuits and systems.

Course Outcomes: After studying this course, the students will be able to

1. Demonstrate the concepts of Differential Amplifier and Operational Amplifier and their characteristics.
2. Design the basic circuits using Operational Amplifiers.
3. Explore, design and analyze Filters, Timers, Voltage Controlled Oscillator and Phase Locked Loop.
4. Demonstrate the design and analyze Oscillators, D/A Converters and A/D Converters, and IC regulators.
5. Classify and characterize the TTL/ECL Logic Families.
6. Explore the design of various logic gates using CMOS logic.

Mapping of Course Outcomes with Program Outcomes

	1	2	3	4	5	6	7	8	9	10	11	12
CO1	3		2	3					2			
CO2	3	3	3	3	3				3	3		3
CO3	3	3	3		2				3	3		3
CO4	3	2	3	3	3				2	3		3
CO5	3	2			3							2
CO6	2		3	3	3				2	3		3

B.Tech. EEE III year – I Sem

Code: 7A508 **ELECTRICAL MACHINES - III**

L	T	P	C
3	-		3

1	2	3	4	5	6	7	8	9	10	11	12
x	**x**			**x**				**x**			

Corse Objective:

It deals with the detailed analysis of Synchronous generators and motors which are the prime source of electrical power generation and its utilities. Also concerns about the different types of single phase motors which are having significant applications in house hold appliances and control systems.

Course Outcomes:

After completion of this course the students are able to

1) Explain the constructional details and generation of EMF.
2) Ex plain the causes for harmonics and its suppression and also armature reaction.
3) Evaluate the performance of alternator by different methods.
4) Explain how to operate the alternators in parallel for load sharing and how to control the reactive power.
5) Analyze and explain applications of synchronous motor.
6) Explain the various applications of single phase induction motor and special purpose motors.

III year B.Tech – I Sem

Code: 7A509 **POWER ELECTRONICS**

L	**T**	**P**	**C**
3	**1**		**4**

1	2	3	4	5	6	7	8	9	10	11	12
x	**x**	**x**						**x**			

Course Objective:

With the advent of semiconductor devices, Revolution is taking place in the power transmission distribution and utilization. This course introduces the basic concepts of power semiconductor devices, Converters and choppers and their analysis.

Course Outcomes:

After completion of this course the students are able to

1) Understand the construction and operation of various power semiconductor devices and analyze about the series and parallel operation of SCRs.
2) Analyze the operation of different configurations of single phase converters for different loads.
3) Analyze the operation of different configurations of three phase converters for different loads.
4) Explain the operation of different type's choppers.
5) Explain the operation of inverter and applications of inverters.
6) Explain the working of an AC voltage controller and Cyclo-Converters for different configurations.

III YEAR B.TECH – I SEM

CODE: 7A510 **POWER SYSTEMS-II**

L	**T**	**P**	**C**
3	**1**		**4**

1	2	3	4	5	6	7	8	9	10	11	12
x		**x**	**x**					**x**			

Course Outcomes:

1) Understand the importance of power factor and analyze the different methods of power factor and voltage control.
2) Analyze the factors affecting the economic aspects of power generation and tariff, different methods of tariff.
3) Learn about components of substation and different methods of grounding.
4) Learn about per unit system and symmetrical fault analysis.
5) Learn about symmetrical components, sequence impedances and unsymmetrical fault analysis.
6) Analyze different types of distribution systems.

1	2	3	4	5	6	7	8	9	10	11	12
				x		**x**				**x**	

L	**T**	**P/D**	**C**
3	**0**	**0**	**3**

III Year B.Tech EEE - I Sem

CODE: 7EC01 **DATA STRUCTURES**

(OPEN ELECTIVE-I)

Course Objective:

1. Understand the concepts of Abstract data Type, linear data structures such as stacks, queues and lists and their applications.
2. Comprehend different non linear data structures such as trees and graphs and analyze their time complexities.
3. Understand object oriented programming and advanced C++ concepts and be able to write programs with C++ features such as composition of objects, operator overloads, dynamic memory allocation, inheritance and polymorphism, Templates etc.

Course Outcomes:

1 Explain Abstract data type, stack and Queues with their applications
2 Write programs on Singly linked lists, Doubly linked lists, Circular list and explain their operations.
3 Explain concepts of Trees, AVL Trees and Graphs with examples and applications.
4 Describe and solve problems of searching and sorting and evaluate the time complexity of each algorithm.
5 Explain concepts of OOPs and implement programs using objects, classes, constructors and destructors.
6 Explain and apply concepts of oops, write programs implementing functions, operator overloading and inheritance.

1	2	3	4	5	6	7	8	9	10	11	12
				x		**x**				**x**	

L	**T**	**P/D**	**C**
3	**0**	**0**	**3**

III Year B.Tech EEE - I Sem

CODE: 7ZC22 **BASICS OF ENTREPRENEURSHIP**

(OPEN ELECTIVE-I)

Course Objective: The objective of the course is to make students understand the nature of Entrepreneurship, and its importance to business to the engineering students, which will allow them to get the required intuition and interest in starting their own start-up's

Course Outcomes:

1. The students' will acquire basic knowledge on Skills of Entrepreneurship.
2. The students' will understand the techniques of selecting the customers through the process of customer segmentation.
3. Business Models and their validity are understood by the students'.
4. The basic cost structure and the pricing policies are understood by the students'.
5. The students' will acquire knowledge about the project management and its techniques.
6. The students' get exposure on marketing strategies for the Start up.

1	2	3	4	5	6	7	8	9	10	11	12
							x			**x**	

L	**T**	**P/D**	**C**
3	**0**	**0**	**3**

III Year B.Tech EEE - I Sem

CODE: 7ZC05 BANKING OPERATIONS, INSURANCE AND RISK MANAGEMENT

(OPEN ELECTIVE-I)

Course Objective: To make the students understand the concepts and principles of Indian Banking Business, Insurance Business and Capital market business products and services, which facilitate them to understand the nature of market

Course Outcomes:

1. Describe the new dimensions and products served by the banking system in INDIA.
2. Explain the credit control system and create awareness on NPA's
3. Apply the knowledge of Insurance concepts in real life scenarios
4. Recognize the importance of regulatory and legal frame work of IRDA
5. Identify the risk management process and methods.
6. Calculate the diversity of risk and return

1	2	3	4	5	6	7	8	9	10	11	12
								x		**x**	

L	**T**	**P/D**	**C**
3	**0**	**0**	**3**

III Year B.Tech EEE - I Sem

CODE: 7ZC25 **BASICS OF INDIAN ECONOMY**

(Common to all Branches)

(OPEN ELECTIVE-I)

Course objectives: To provide basic knowledge relating to the Indian Economy thus making the students aware of the current aspects taking place in the Indian and world economy.

Course Outcomes:

1. Gain knowledge relating to Economics, various sectors and its growth
2. Will gain knowledge relating to various concepts of National income and related aggregates
3. Students will learn about Indian Industrial policy and benefits of LPG to India
4. Comprehend knowledge relating to Fiscal policy & Taxation system in India
5. Learn about inflation & business cycles.
6. Know about the BoP and its influence on economy.

III year B.Tech – I Sem

Code: 7H518 **QUANTITATIVE APTITUDE**

L	**T**	**P**	**C**
1	**1**	**0**	**2**

1	2	3	4	5	6	7	8	9	10	11	12
x			**x**								

Course Objective :

Learn and practice problems on numbers systems, ratios, mensuration and relations to Excel in and competitive examinations.

Course Outcomes: After completing this course, students should able to

1. Solve problems related to number systems
2. Find averages of numbers and groups
3. Solve problems related to ratio and proportion
4. Find simple interest, solve time work and distance problems
5. Solve menstruation problems
6. Interpret the various kinds of data and find the relation between them.

III year B.Tech – I Sem
IC APPLICATIONS LAB

Code: 7CC76

L	T	P	C
0	0	4	2

Prerequisites: EDC, ECA, STLD.

Course Objectives:

The objectives of this course are

- To Design and analyze the various circuits and systems using IC 741 op-amp.
- To Design and analyze the various circuits and systems using Digital ICs.

Course Outcomes: After studying this course, the students will be able to

- An ability to explore the applications of IC 741 OP-AMP.
- An ability to design Active filters and its applications
- An ability to understand and implement generate square and Triangular waveforms using 555 Timers
- An ability to design D to A converters and its applications

Mapping of Course Outcomes with Program Outcomes

	1	2	3	4	5	6	7	8	9	10	11	12
CO1	3	3	2	3	3				2	3		3
CO2	3	2		2	3				3	3		3
CO3	3		3		2					3		3
CO4	3	2	3		3				2	3		
CO5	3	2	3		3							
CO6	2		3	3	3				2	3		3

III year B.Tech – I Sem

Code: 7A578 **POWER ELECTRONICS AND SIMULATION LAB**

L	T	P	C
		2	1

1	2	3	4	5	6	7	8	9	10	11	12
	x	**x**	**x**			**x**		**x**		**x**	

Course Outcomes: After completing this course, student shall be able to

1. Understand the concepts studied in theory subject.
2. Understand the applications of the concepts.

III year B.Tech – I Sem

Code: 7A577 **ELECTRICAL MACHINES LAB – II**

L	**T**	**P**	**C**
		2	**1**

1	2	3	4	5	6	7	8	9	10	11	12
	x	**x**		**x**		**x**			**x**	**x**	

Course Outcomes: After completing this course, student shall be able to

1. Understand the concepts studied in theory subject.
2. Understand the applications of the concepts.

III year B.Tech – I Sem

Code: 7586 **SUMMER INDUSTRY INTERNSHIP – I**

1	2	3	4	5	6	7	8	9	10	11	12
								X	**X**		

Course Objectives:

To enhance the knowledge on selecting a project, learn related tools and enhance programming and communication skills for employability.

Pre-Requisites: All Courses till this semester

Course Outcomes: At the end of this course, the student will be able to

- Use the concepts learned in the courses, so far, in conceptualizing, designing and executing the modules of the projects.
- Exhibit the interest in learning the modern tools and technologies through the bridge courses arranged in the college, beyond the curriculum, and hence developing the software.
- Inculcate an enthusiasm to use the creative ideas to build the innovative projects and prototypes which are meeting the current needs of the market and society as a whole.
- Improve their communicative skills and team skills largely improve.
- Work as an individual and in a team.

L	T	P/D	C
0	0	2	1

1	2	3	4	5	6	7	8	9	10	11	12
								X	**X**		

III Year B.Tech – I Sem

Code: 7A595 **TECHNICAL SEMINAR-V**

COURSE OUTCOMES:

1 Deliver lecture on emerging technologies.
2 Explain domain knowledge to resolve real time technical issues
3 Demonstrate ability to lead and explain concepts and innovative ideas.
4 Demonstrate team leading qualities.
5 Demonstrate public speaking and lifelong learning skills for higher studies and to pursue professional practice.
6 Exchange new information that would not have been available otherwise.
7. Develop debating and interview skills.

III year B.Tech – II Sem

Code: 7DC05 **MICROPROCESSOR AND MICROCONTROLLERS**

L	T	P	C
3	-		3

1	2	3	4	5	6	7	8	9	10	11	12
x	**x**		**x**	**x**				**x**			

Course Objectives: *In this course the student will learn*

1. *The microprocessor and microcontroller architecture, instructions set and procedures of programming.*
2. *Understand the assembly language programs, pin diagram and timing diagrams for 8086 & 8051.*
3. *Understand and practice the interfacing related applications of 8255 with 8086 and serial communication.*
4. *Learn the usage of multiple interrupts of 8051, USART architecture, RS232.*

Course Outcomes: *After completing this course, Students will be able to*

1. *Understanding the concepts of 8086 Architecture*
2. *Understanding the concepts of Instruction set & developing skills in writing assembly language programs.*
3. *Ability to interface keyboard, stepper motor ADC, DAC to 8086 using 8255*
4. *Understanding the concepts of 8051 Architecture*
5. *Exploring the concepts of instruction set of 8051*
6. *Ability to interface LED, LCD, Keyboard DAC, ADC with 8051*

III year B.Tech – II Sem

Code: 7A611 **SWITCH GEAR AND PROTECTION**

L	**T**	**P**	**C**
3	**-**		**3**

1	2	3	4	5	6	7	8	9	10	11	12
x		**x**	**x**					**x**			

Course Outcomes:

1) Understand about power system transients and its effects.
2) Learn about protection against over voltages.
3) Learn about different types of circuit breakers and its importance.
4) Learn about different types of electromagnet relays.
5) Learn about different types of static relays.
6) Learn about generator, transformer and feeder protection.

III year B.Tech – II Sem

Code: 7A612 **MEASUREMENTS & INSTRUMENTATION**

L	**T**	**P**	**C**
3	**-**	**-**	**3**

1	2	3	4	5	6	7	8	9	10	11	12
	x	**x**	**x**					**x**			**x**

Course Objective:

The basic principles of all measuring instruments and in measurement of electrical and non-electrical parameters viz., Resistance, Inductance, Capacitance, voltage, current Power factor, Power, Energy, Strain, Temperature, Torque, Displacement etc. and the different types of electrical and non electrical transducers. It introduces the different signal analyzers and oscilloscopes.

Course Outcomes: The student should be able to

1. Understand the principle of operation of different types of instruments viz., PMMC, moving iron type of instruments, the required characteristics of an instrument in general. The student demonstrates the ability to compensate for the errors in the instruments and to extend the range of the instruments.
2. Demonstrates the knowledge of Potential and Current transformers; the errors in them and the effect of having an open/short in the secondary circuits; Understand the principle of operation of Dynamometer and Moving-iron type of Power factor meters.
3. Comprehends the principle of operation of dynamometer type of Wattmeter and Induction type of Energy meter; use the wattmeter to measure the Active and Reactive power and demonstrates the ability to extend the range of them.
4. Identify and use different techniques of measurement of Resistance, Inductance and Capacitance values.
5. Understand the principle of operation of Different type of digital voltmeters, wave analyzers, spectrum analyzers and Cathode ray Oscilloscope.
6. Demonstrates the ability in characterizing the different types of transducers and uses them to measure Strain, Gauge Sensitivity, Displacement, Velocity, Acceleration, Force, Torque and Temperature.

III Year B.Tech – II Sem

Elements of Fluid Mechanics and Hydraulic Machinery

Code: 7BC56

L	T	P/D	C
3	--	--	3

Course Objectives:

To understand the basic principles of fluid mechanics and types of flows. To understand boundary layer concepts and flow through pipes. Evaluate the performance of hydraulic turbines and characteristic curves of pumps.

Course Outcomes:

After studying this course, the students will be able to:

1. Understand the fluid properties and measurement of pressure with monometers.
2. Understand the classification of fluid, Bernoulli's equation, momentum equation and their applications
3. understand Reynolds's experiment, major losses, minor losses
4. Understand velocity triangle, work done calculations, elements of hydroelectric power plant, and pump storage plant.
5. Understand the classifications of turbines working principles of turbines, draft tube theory, performance of turbine.
6. Understand various types of pumps working principle of reciprocating pump, centrifugal pump, performance characteristics of centrifugal pump.

	1	2	3	4	5	6	7	8	9	10	11	12
CO1		**H**	**L**						**M**			**L**
CO2		**H**	**L**						**M**			**L**
CO3		**H**	**L**						**M**			**L**
CO4		**H**	**L**						**M**			**L**
CO5		**H**	**L**						**M**			**L**
CO6		**H**	**L**						**M**			**L**

1	2	3	4	5	6	7	8	9	10	11	12

L	T	P/D	C
3	0	0	3

III Year II semester

CODE: 7FC03 **PYTHON PROGRAMMING**

(Common to all Branches)

(OPEN ELECTIVE-II)

Course Objectives:-

After taking this course, you should be able to:

Use Python interactively, execute a Python script at the shell prompt, use Python types, expressions, and None, use string literals and string type, use Python statements (if...elif..else, for, pass, continue, . . .), understand the difference between expressions and statements, understand assignment semantics, write and call a simple function., utilize high-level data types such as lists and dictionaries, understand the difference between mutable and immutable types, write a simple class and access methods and attributes, import and utilize a module, read from and write to a text file.

Course Outcomes:

CO1: Gains exposure towards Python versions and their specifications.
CO2: Build programs using primitive data types.
CO3: Write applications that include functions, modules, packages along with respective exceptional handling mechanism.
CO4: Writes applications using OO features of Python
CO5: Write applications using Files.
CO6: Hands on exposure on NumPy/Tkinter/Plotpy modules.

1	2	3	4	5	6	7	8	9	10	11	12
				x						**x**	

L	**T**	**P/D**	**C**
3	**-**	**0**	**3**

B. Tech. IV Year I semester

CODE: **7ZC23** **ADVANCED ENTREPRENEURSHIP**

(Common to all Branches)

(OPEN ELECTIVE – III)

Course Objective:

The course is designed to impart the necessary managerial skills and tactics required for an emerging Entrepreneur for the Engineering students to enhance their prospects as an Entrepreneur.

Course Outcomes:

1. The Students' gain knowledge on the stages of Startup and the turbulence environment it undergoes and the stages related to growth of the Startup.
2. The Students are exposed to the various business models and critically evaluating the effectiveness of the business models.
3. The students understand the method of business traction and the need of customer relationship management.
4. The students understand the various channels of revenue building and exploration of new revenue avenues.
5. The students understand the need of sales planning and sales management and also financial modeling
6. The students are exposed to the legal implications affecting the company's prospects and the issues related to intellectual property rights.

1	2	3	4	5	6	7	8	9	10	11	12
								x	**x**	**x**	**x**

L	**T**	**P/D**	**C**
3	**0**	**0**	**3**

III Year II semester

CODE: 7ZC19 ENTREPRENEURSHIP, PROJECT MANAGEMENT AND STRUCTURED FINANCE (OPEN ELECTIVE-II)

Course Objective: The objective of the course is to make students understand the nature of Entrepreneurship, its importance and to create an awareness regarding the systematic planning and implementation of projects; highlight the components of structured finance and establish a framework of CMBS with respect to Servicing Agreements

Course Outcomes:

1. Students will understand the nature of Entrepreneurship and its importance
2. Will gain knowledge regarding project, its life cycle and organization
3. Will gain knowledge relating to project formulation and implementation
4. Comprehend the components of structured finance
5. Establish a framework of CMBS
6. Students will gain knowledge relating to the CRE Servicing

1	2	3	4	5	6	7	8	9	10	11	12
					x		**x**				

L	**T**	**P/D**	**C**
3	**0**	**0**	**3**

III Year II semester

CODE: 7ZC26 **BASICS OF POLITY AND ECOLOGY**

(Common to all Branches)

(OPEN ELECTIVE-II)

Course Objectives:

To provide basic knowledge relating to the Ecology and Disaster Management, thus making the students appreciate the current aspects related to both Ecology and Disaster Management.

Course outcomes:

CO_1: Comprehend knowledge relating to the conservation of the environment.

CO_2: Learn about bio-diversity and climatic changes occurring in the environment.

CO_3: Know about the international treaties, conventions and organizations active in the field of environmental protection.

CO_4: To provide students an exposure to disasters, their significance and types.

CO_5: To enhance awareness of institutional processes in the country

CO_6: To gain a preliminary understanding of approaches of Disaster Risk Reduction (DRR)

III year B.Tech – II Sem

Code: 7HC74 **SOFT SKILLS AND TECHNICAL COMMUNICATION**

L – T –P/D - C
0 0 2 1

1	2	3	4	5	6	7	8	9	10	11	12
							X	X	X		X

To enable students to

- **make a self-assessment**
- **enhance their soft skills and behavioral patterns**
- **equip themselves with the required skill set for their career advancement**
- **develop interpersonal communication skills**
- **participate in group tasks and use effective language skills in interviews**
- **overcome stress and enhance employability quotient**

III year B.Tech – II Sem

Code: 7H619 **LOGICAL REASONING**

L	T	P	C
1	1	0	2

1	2	3	4	5	6	7	8	9	10	11	12
	x	**x**						**x**			

Course Objectives

Understand and solve arithmetic, analogy, coding, puzzles and ranking related problems for enhancing employability.

Course Outcomes: After completing this course, student shall be able to

1. Generate number and alphabet series
2. Apply concept of analogy and solve related problems
3. Classify and figure out odd one
4. Realize the various techniques for coding and decoding
5. Solve the relations puzzles.
6. Solve the problem related to number, ranking and arithmetic reasoning

III year B.Tech – II Sem

Code: 7A681 **ELECTRICAL WORKSHOP**

L	**T**	**P**	**C**
		2	**1**

1	2	3	4	5	6	7	8	9	10	11	12
x	**x**	**x**		**x**				**x**			

Course Outcomes:

1. Ability to understand how a power contactor works and basic control circuit.
2. Ability to connect properly a basic interlocking circuit
3. Ability to analyze importance of star- Delta Starter
4. Ability to develop an inching circuit.
5. Ability to analyze role and importance of interlocking of group of drives
6. Ability to Study different protections to a motor..
7. Ability to know various parts in a three-phase motor
8. Ability to analyze single phase motors.
9. Ability to Differentiate protections given as under voltage and over voltage to a DOL starter.
10. Ability to test transformer oil and know its usefulness as insulator and as heat absorber.

III year B.Tech – II Sem

Code: 7DC71 **MICROPROCESSORS AND MICROCONTROLLERS LAB**

L	T	P	C
		2	1

1	2	3	4	5	6	7	8	9	10	11	12
x	**x**	**x**	**x**	**x**	**x**					**x**	

Course Objectives:

a. *Familiarize the architecture of 8086 processor, assembling language programming and interfacing with various modules.*
b. *The student can also understand of 8051 Microcontroller concepts, architecture, programming and application of Microcontrollers.*
c. *Student able to do any type of VLSI, embedded systems, industrial and real time applications by knowing the concepts of Microprocessor and Microcontrollers.*

Course Outcomes:

- *Analyze and apply working of 8086.*
- *Compare the various interface techniques. Analyze and apply the working of 8255, 8279,8259, 8251, 8257 ICs and design and develop the programs.*
- *Learning the Communication Standards.*

III Year B.Tech – II Sem
FM AND HM LAB

Code: 7BC82

L	T	P/D	C
--	--	2	1

Course Objectives:

To understand the basic principles of fluid mechanics and types of flows. To understand boundary layer concepts and flow through pipes. Evaluate the performance of hydraulic turbines and characteristic curves of pumps.

Course Outcomes:

After studying this course, the students will be able to:

1. compute the performance of pelton wheel under working conditions
2. compute the performance of francis turbine under working conditions
3. compute performance of reciprocating pump under working conditions
4. compute the Performance of centrifugal pump under working conditions
5. compute the Performance of multistage pump under working conditions
6. compute the coefficient of discharge of venturimeter of orifice meter under working conditions

	1	2	3	4	5	6	7	8	9	10	11	12
CO1		**H**	**L**						**M**			**L**
CO2		**H**	**L**						**M**			**L**
CO3		**H**	**L**						**M**			**L**
CO4		**H**	**L**						**M**			**L**
CO5		**H**	**L**						**M**			**L**
CO6		**H**	**L**						**M**			**L**

B. Tech. III Year II semester

Code: 7A674 **GROUP PROJECT**

L	T	P/D	C
-	-	4	2

1	2	3	4	5	6	7	8	9	10	11	12
x											

Course Objectives:

To acquire basic knowledge on selecting a project, learn related tools and enhance programming and communication skills for employability.

Pre-Requisites: All Courses till this semester

Course Outcomes:

At the end of this course, the student will be able to

- Use the concepts learned in the courses, so far, in conceptualizing, designing and executing the modules of the projects.
- Exhibit the interest in learning the modern tools and technologies through the bridge courses arranged in the college, beyond the curriculum, and hence developing the software.
- Inculcate an enthusiasm to use the creative ideas to build the innovative projects which are meeting the current needs of the market and society as a whole.
- Improve their communicative skills and team skills largely improve.
- Work as an individual and in a team.

B. Tech. III Year II semester

Code: 7A676 **COMPREHENSIVE VIVA- VOCE- II**

L	T	P/D	C
-	-	-	1

1	2	3	4	5	6	7	8	9	10	11	12
x	**x**							**x**			

Course Objectives:

Prepare students in basics and advanced relevant courses to revise and face technical interviews for enhancing employability**.**

Course Outcomes:

At the end of this course, the student will be able to

1. Assess the relevant courses they have undergone till the completion of that academic year.
2. Comprehend the concepts in the core subjects and the elective subjects, to make them ready to face technical interviews which improve their employability skills.

IV year B.Tech – I Sem

Code: 7A714 **POWER SYSTEM ANALYSIS AND CONTROL**

L	**T**	**P**	**C**
3	**1**	**-**	**4**

1	2	3	4	5	6	7	8	9	10	11	12
	x	**x**	**x**			**x**		**x**		**x**	

OBJECTIVE:

This subject deals with Economic operation of Power Systems, Hydrothermal scheduling and modeling of turbines, generators and automatic controllers. It emphasizes on single area and two area load frequency control and reactive power control.

Course outcomes:

1) Understand about importance of network matrices and usefulness in power system analysis.
2) Analyze the power system under different types of faults.
3) Analyze the power system under steady state condition for voltage and power flow calculations.
4) Analyze the power system for maintain constant frequency in single area.
5) Analyze the power system for maintain constant frequency in two area.
6) Analyze the power system for maintaining steady state and transient stability.

IV Year, B. Tech – I - Sem.

CODE: 7CC03 **SIGNALS AND SYSTEMS**

(PROFESSIONAL ELECTIVE-I)

L	T	P	C
3	-		3

1	2	3	4	5	6	7	8	9	10	11	12
X	**X**	**X**		**X**							

After studying this course, the students will be able to

1. Understand the concepts of Signals, Classification of Signals, Signal Approximation and Orthogonal Functions.
2. Understand the concepts of Fourier series. Properties of Fourier series, Fourier Transforms and Properties of Fourier Transforms.
3. Understand the concepts of Systems, Classification of Systems, Filter Characteristics of Linear Systems, Ideal LPF, HPF and BPF Characteristics and Relationship between Bandwidth and Rise Time.
4. Understand the Concept of Convolution in Time Domain and Frequency Domain, Convolution Properties., Cross Correlation and Auto Correlation of Functions, Laplace Transforms, inverse Laplace Transforms and Region of Convergence (ROC) for Laplace Transforms.
5. Understand the concept of Sampling Theorem, Aliasing and Effect of under Sampling.
6. Understand the Concept of Z- Transform of a Discrete Sequence, Distinction Between Laplace, Fourier and Z Transforms and Region of Convergence in Z-Transform

IV Year – I Sem. B.Tech

Code: 7A725 **ADVANCED CONTROL SYSTEMS**

(PROFESSIONAL ELECTIVE-I)

1	2	3	4	5	6	7	8	9	10	11	12
X	**X**		**X**								

L	**T**	**P**	**C**
3	**-**	**-**	**3**

Objective:

This subject deals with state space, describing function, phase plane and stability analysis including controllability and observability. It also deals with modern control and optimal control systems.

Course outcomes:

Students will be able to

1. Understand the controllability and observability.
2. Understand the phase plane analysis.
3. Understand the stability analysis.
4. Know about Effect of state feedback on controllability and observability.
5. Understand the minimization of functional of single function
6. Study about formulation of optimal control problem

1	2	3	4	5	6	7	8	9	10	11	12
x			**x**								

IV Year B.Tech – I Sem

CODE: 7A716 **UTILIZATION OF ELECTRICAL ENERGY**

(PROFESSIONAL ELECTIVE – I)

L	**T**	**P/D**	**C**
3	**-**	**0**	**3**

Course Objective:

This subject deals with the fundamentals of illumination and its classification and the electric heating and welding. It gives the detailed study of all varieties of Electric drives and their applications to electrical engineering.

Course Outcomes:

The student will able to:

1. Know the importance of different type of electric drives, selection of motor based on starting and running characteristics, required speed control, tolerance of temperature rise, Particular applications of electric drives, and understands different types of industrial loads, Continuous, Intermittent and variable loads etc
2. Know the importance of advantages and methods of electric heating, and applications of resistance heating induction heating and dielectric heating.
3. Identify the core areas of illumination, terms used in illumination, laws of illumination, polar curves, photometry, integrating sphere, and their applications & sources of light.
4. Differentiate Discharge lamps of MV and SV lamps, tungsten filament lamps and fluorescent tubes, understands basic principles of light control, Types and design of lighting and flood lighting.
5. Understands System of electric traction and track electrification.
6. Understand and Calculations of tractive effort, power, specific energy consumption for a given run, effect of varying acceleration and braking retardation, adhesive weight and coefficient of adhesion.

IV year B.Tech – I Sem

CODE: 7A734 **HVDC & FACTS**

(PROFESSIONAL ELECTIVE-I)

L	**T**	**P**	**C**
3	**-**		**3**

1	2	3	4	5	6	7	8	9	10	11	12
	x	**x**	**x**					**x**		**x**	

Objectives:

Understand operating principles of HVDC systems and control aspects.

- Deals with analysis of harmonics, filters, reactive power and power flow
- Understand concepts and control aspects of FACTS devices.

Course Outcomes: The student will be able to

1. Acquire the knowledge to compare AC and HVDC systems in terms of power transmission and stability.
2. Acquire knowledge on analysis of harmonics, filters, reactive power and power flow in HVDC systems.
3. Acquire knowledge in improving the transmission capability and stability of the power system by applying FACTS controllers.

IV year B.Tech – I Sem

Code: 7A715 **RENEWABLE ENERGY SOURCES**

(Professional Elective – II)

L	**T**	**P**	**C**
3	**-**		**3**

1	2	3	4	5	6	7	8	9	10	11	12
	x	**x**	**x**							**x**	

Course Objectives:

Becomes familiar with solar energy, its radiation, Collection, storage and application and also gets introduced to other forms of Renewable Energy sources viz., the Wind energy, Biomass energy, geothermal energy and ocean energy.

Course Outcomes:

The student should be able to

1. Understand the role and potential of new and renewable energy sources realize the potential of solar energy, its impact on environment; define and understand the terms describing the different angles that one may incur in setting up a solar panel and be able to use the instruments for measuring solar radiation.

2. Demonstrates the knowledge of different techniques of solar collection and storage.

3. The student becomes familiar with the different types of horizontal and vertical axis wind mills and understands the performance characteristics of the same. The student also demonstrates the knowledge of different Bio-gas digesters and factors influencing its yield.

4. Aware of the potential of geothermal energy in India and will be able to characterize different types of geothermal wells.

5. Aware of the different methods of kinetic energy extraction from Ocean waves and tides and thermal energy extraction from Oceans.

6. Demonstrates the knowledge of Direct Energy Conversion in different phenomena viz., Joule Thomson effect, Seebeck effect, Peltier effect etc. and the principle of operation of Fuel Cells.

L	T	P/D	C
3	-	0	3

1	2	3	4	5	6	7	8	9	10	11	12
X	**X**		**X**								

IV Year B.Tech – I Sem

CODE: 7CC11 **DIGITAL SIGNAL PROCESSING**
(PROFESSIONAL ELECTIVE-II)

After studying this course, the students will be able to

1. Distinguish between CT and DT signals and systems and understand the growing need of DSP and study the concepts of discrete time signals and systems.
2. Represent periodic DT signals as a Fourier series; non-periodic DT signals as a Fourier Transform and use a powerful mathematical tool called DFT.
3. Compute the Fourier Transform of DT signals using the FFT algorithms.
4. Realize a digital filter in several forms and structures for a given transfer function H (z).
5. Distinguish IIR and FIR filters; Design each type by several methods once the desired specifications are given.
6. Understand the need and implement the multirate sampling techniques.

1	2	3	4	5	6	7	8	9	10	11	12
	x	**x**	**x**					**x**		**x**	

IV Year B.Tech – I Sem.

Code: 7A724 **DIGITAL CONTROL SYSTEMS**

(Professional Elective – II)

L	**T**	**P**	**C**
3	**-**	**-**	**3**

Objective:

This subject deals with different mathematical methods of optimization.

Course outcomes:

Students will be able to

1. Understand the Sampling And Reconstruction.
2. Understand the Z – Transforms.
3. Understand the State Space Analysis.
4. Know about Stability Analysis.
5. Understand the Design Of Discrete Time Control System By Conventional Methods.
6. Study about State Feedback Controllers And Observers.

IV year B.Tech – I Sem

Code: 7A713 **POWER SEMI CONDUCTOR DRIVES**

(PROFESSIONAL ELECTIVE – III)

L	**T**	**P**	**C**
3	**-**		**3**

1	2	3	4	5	6	7	8	9	10	11	12
	x	**x**	**x**								

Course Objective:

This course is an extension of Power Electronics applications to AC and DC drives. Control of DC motor drives with single phase and three phase converters and choppers are given in detail. The control of AC motor drives with variable frequency converters and variable voltage are presented.

Course Outcomes:

1) Identify the necessity of drive; understand the operation of different converters connected to D.C separately excited motors and series motors derive the Speed.
2) Understand four Quadrant operations of dc drives and analyze electric braking.
3) Understand four Quadrant operations of Chopper fed dc drives.
4) Describe the operation of Induction motor with its equivalent circuit, speed control of Induction motor with V/ F control and its speed torque Characteristics
5) Explain the concept of slip power and deduce an expression for speed variation with slip power
6) Analyze the working of different Synchronous Motor drives.

1	2	3	4	5	6	7	8	9	10	11	12
x	**x**		**x**								

B. Tech. IV Year I semester

Code: 7FC23 **Data Base Systems**

(Open Elective – III)

L	**T**	**P/D**	**C**
3	**-**	**-**	**3**

Course Outcomes:

1. Students will learn basics of databases and understand the architecture of database management systems.
2. Students will learn about good database design techniques and database theories behind.
3. Understand conceptual database designs, and functional dependencies and normalization.
4. Students will understand the Mathematical foundation for relational databases.
5. Student will be able to understand concept of Constraints, Views and will be able to create dynamic databases.
6. Learn transaction management, concurrency controls.

1	2	3	4	5	6	7	8	9	10	11	12
				x		**x**					

L	**T**	**P/D**	**C**
3	**0**	**0**	**3**

III Year II semester

CODE: 7ZC24 **INNOVATION & DESIGN THINKING**

(Common to all Branches)

(OPEN ELECTIVE-III)

Course Objective: The objective of the course is to make students understand the nature of Innovation, creativity and IPRs, and to motivate the student to start his/her own enterprise with innovative skills.

Course Outcomes:

1. The students gain the knowledge on the inputs required for innovation and also gain familiarity on Entrepreneurship.
2. The students will get exposure on creative methods of ideation and the importance of protecting the ideas.
3. The students gain knowledge on design thinking and types of thinking.
4. The students gain familiarity on emerging technologies like Internet of things (IOT).
5. The students understand the process of building the startup.
6. The students gain knowledge on various startup funding and also to branding building for the startup.

1	2	3	4	5	6	7	8	9	10	11	12
x			**x**					**x**			

L	**T**	**P/D**	**C**
3	**-**	**0**	**3**

B. Tech. IV Year I semester

CODE: 7ZC15 FINANCIAL INSTITUTIONS, MARKETS AND SERVICES

(OPEN ELECTIVE – III)

Course Objective: The objective of the course is to provide to students an understanding of Financial Markets, the major Institutions involved and the Services offered within this framework.

Course Outcomes:

1. This unit enables the students to understand the financial structure and the financial sector reforms after 1991.
2. The unit gives the exposure on the role of RBI and the Regulating and credit policies adopted by the RBI.
3. The students get awareness on the role of Non-Banking financial institutions and the role of financial institutions in India.
4. The unit educates the students to know the role of regulatory bodies like SEBI and also to know the capital and money market instruments
5. The unit equips the students to understand about the asset fund based financial services
6. The students will get exposure about the investment banking and merchant banking.

L	T	P/D	C
3	-	0	3

B. Tech. IV Year I semester

CODE: 7ZC27 **INDIAN HISTORY, CULTURE AND GEOGRAPHY**

(Common to all branches)

(OPEN ELECTIVE – III)

1	2	3	4	5	6	7	8	9	10	11	12
x			**x**					**x**			

Course Objectives: To equip the students with necessary knowledge relate to ancient, medieval and modern Indian and its culture and also facts relating to existence of earth.

Course Outcomes:

1. To appreciate and understand our Indian History, Culture and Indian heritage.
2. To understand secularism of our country.
3. To appreciate and understand the social reformers who brought revolutionary changes in Indian society.
4. To understand earth evolution and world climatic change.
5. To understand India Oceanography,
6. Able to enhance and understand Indian monsoons, Indian agriculture.

1	2	3	4	5	6	7	8	9	10	11	12
x	**x**	**x**	**x**	**x**	**x**	**x**	**x**	**x**	**x**	**x**	**x**

B. Tech. IV Year I Semester

CODE: 7A779 **PROJECT - I**

L	**T**	**P/D**	**C**
-	**-**	**4**	**2**

Course Objectives:

To enhance the knowledge on selecting a project, learn related tools and enhance programming and communication skills for employability.

Course Outcomes: After completing this course, student shall be able to

1. Develop plans with relevant people to achieve the project's goals
2. Break work down into tasks and determine handover procedures
3. Identify links and dependencies, and schedule to achieve deliverables
4. Estimate the human and physical resources required, and make plans to obtain the necessary resources
5. Allocate roles with clear lines of responsibility and accountability with team spirit.
6. Design and develop the software or prototype to meet societal needs.

B. Tech. IV Year I Semester

CODE: 7A787 **SUMMER INDUSTRY INTERNSHIP – II**

L	T	P/D	C
-	-	-	**1**

1	2	3	4	5	6	7	8	9	10	11	12
x	**x**	**x**	**x**	**x**	**x**	**x**	**x**	**x**	**x**	**x**	**x**

Course Objectives:

To enhance the knowledge on selecting a project, learn related tools and enhance programming and communication skills for employability.

Pre-Requisites: All Courses till this semester

Course Outcomes:

At the end of this course, the student will be able to

- Use the concepts learned in the courses, so far, in conceptualizing, designing and executing the modules of the projects.
- Exhibit the interest in learning the modern tools and technologies through the bridge courses arranged in the college, beyond the curriculum, and hence developing the software.
- Inculcate an enthusiasm to use the creative ideas to build the innovative projects which are meeting the current needs of the market and society as a whole.
- Improve their communicative skills and team skills largely improve.
- Work as an individual and in a team.

IV year B.Tech – I Sem

Code: 7A782 **MEASUREMENTS AND INSTURMENTATION LAB**

L	**T**	**P**	**C**
		2	**1**

1	2	3	4	5	6	7	8	9	10	11	12
	x	**x**		**x**						**x**	

Objectives of the Course:

Energy can neither be created nor destroyed; it can be transformed from one form into another. Out of all the forms of energies (which are available) electrical energy occupies top position in the hierarchy. So measurement of electrical quantity plays a vital role in the field of Engineering and Technology. In this lab students will be able to measure practically different electrical parameters and calibrate the meters.

Course Outcomes:

1. To draw the graph between the distance and EMF for linear variable differential transformer and to measure the displacement.
2. To measure 3-Φ reactive power using single phase wattmeter.
3. To determine the value of given capacitor and to obtain its dissipation factor, and also the values of the resistance and inductance of a given coil.
4. To determine the percentage of error of a given single phase energy meter.
5. To measure the parameters of a choke coil using 3-voltmeter & 3-ammeter methods
6. To determine the percentage ratio error and the phase angle error of the given transformer by comparison with another current transformer whose errors are known.
7. To determine the value of the resistance of the given wire using Kelvin's double bridge.
8. To apply Crompton's DC potentiometer to, Calibrate a PMMC type ammeter. Voltmeter
9. To calibrate a given 1-Φ power factor meter by phantom loading.
10. To calibrate a given LPF watt meter by phantom loading.
11. To measure the 3-phase power with two number of CTs and a single wattmeter.

IV Year B.Tech – I Sem

Code: 7A783 **POWER SYSTEMS LAB**

L	T	P	C
		2	1

1	2	3	4	5	6	7	8	9	10	11	12
	x	**x**		**x**						**x**	

Course Objective:

Understand the concepts and determination of Equivalent circuit of a 3-windingtransformer., determination of sequence impedances of a cylindrical rotor synchronous machine, determination of Sub-transient reactance`s of Salient Pole Synchronous Machine, determination of Positive, Negative and zero sequence reactance of 3 ph Transformers. Understand Fault Analysis of a 3phaseAlternator, IDMT Characteristics, Testing of Generator/Transformer and Differential Protection.

Course Outcomes:

Students will able to

1. Ability to determination of Equivalent circuit of a 3-windingtransformer.
2. Ability to determination of sequence impedances of a cylindrical rotor synchronous machine.
3. Ability to Fault Analysis of a 3phaseAlternator.
4. Ability to determination of Sub-transient reactance`s of Salient Pole Synchronous Machine.
5. Ability to determination of Positive, Negative and zero sequence reactance of 3 ph Transformers.
6. Ability to determination of IDMT Characteristics of over Current Relay
7. Ability to determination of Characteristics of Percentage biased of Static/Electro Magnetic differential Relay
8. Ability to Performance and Testing of Generator/Transformer Protection System.
9. Ability to Performance and Testing of Transmission line Model 220KV/ 400Km.
10. Ability to determination of Differential Protection on Single Phase Transformer.

IV Year B.Tech – I Sem

Code: 7A784 **POWER SYSTEMS SIMULATION LAB**

L	T	P	C
		2	1

1	2	3	4	5	6	7	8	9	10	11	12
	x	**x**		**x**						**x**	

Course Objective:

Understand the concepts and develop of formation of Y-bus and Z-bus, Guass Seidal method, SIMULINK model for a single area load frequency problem, three phase inverter, automatic voltage regulator, Lag compensator.

Course Outcomes:

Students will able to

1. Ability to write a program for formation of Y-bus and Z-bus.
2. Ability to write a program for a power flow study on a given power system network using Guass Seidal method.
3. Ability to Develop a SIMULINK model for a single area load frequency problem.
4. Ability to develop a program to solve swing equation.
5. Ability to simulate single phase and three phase full converter.
6. Ability to Develop a SIMULINK model for a two area load frequency problem
7. Ability to simulate a three phase inverter
8. Ability to develop a program for PID controller.
9. Ability to Develop a SIMULINK model for a automatic voltage regulator.
10. Ability to Design a Lag compensator through SIMULINK.

L	T	P/D	C
3	0	0	3

1	2	3	4	5	6	7	8	9	10	11	12
x	**x**		**x**								

IV Year B.Tech – II Sem

Code: 7A835 ELECTRICAL AND HYBRID VEHICLES

(PROFESSIONAL ELECTIVE-IV)

Course Outcome:

After learning the course the students should be able to:

1. Understand working of Electric Vehicles and recent trends
2. Analyze different power converter topology used for electric vehicle application
3. Develop the electric propulsion unit and its control for application of electric vehicles

IV year B.Tech – II Sem

Code: 7A817 **HIGH VOLTAGE ENGINEERING**

(PROFESSIONAL ELECTIVE-IV)

L	**T**	**P**	**C**
3	**-**	**-**	**3**

1	2	3	4	5	6	7	8	9	10	11	12
x	**x**	**x**						**x**			**x**

Course Objective :

This subject deals with the detailed analysis of Breakdown occur in gaseous, Liquids and solid dielectrics. Information about generation and measurement of High voltage and current. In addition the High voltage testing methods are also discussed.

Course Outcomes:

1) Learn about applications of different insulating materials.
2) Learn about breakdown in gas, liquid and solid insulating materials.
3) Analyze different methods of generation and measurement of high voltages.
4) Study about high voltage phenomenon and insulation coordination.
5) Study about non destructive testing of material and electrical apparatus.
6) Learn about different tests done on different electrical equipments.

B.Tech IV Year – II Sem.

Code: 7A827 **REACTIVE POWER COMPENSATION & MANAGEMENT**

(Professional Elective-IV)

1	2	3	4	5	6	7	8	9	10	11	12
x	**x**		**x**								

L	**T**	**P**	**C**
3	**-**	**-**	**3**

Objective:

This subject deals with reactive power control and management.

Course outcomes:

Students will be able to

1. Understand the load compensation.
2. Understand the Steady – State Reactive Power Compensation in Transmission System.
3. Understand the Reactive Power Coordination.
4. Know about Demand Side Management.
5. Understand the User Side Reactive Power Management
6. Study about Reactive Power Management In Electric Traction Systems And Arc Furnaces.

B.Tech IV Year – II Sem.

CODE: 7CC35 **FUNDAMENTALS OF VLSI AND EMBEDDED SYSTEMS**

(Professional Elective-IV)

1	2	3	4	5	6	7	8	9	10	11	12
x	**x**										

Prerequisites: *STLD, Programming concepts of any language*

Course Objectives:

The objectives of this course are

- *To provide basic knowledge in embedded system design using Embedded C.*
- *To introduce syntax, lexical conventions, data types and memory related to Verilog HDL.*
- *To design, test and implementation of the digital hardware using various modeling styles.*

Course Outcomes*: After studying this course, the students will be able to*

CO1	*Understand levels of design description, concurrency, simulation and synthesis.*
CO2	*Apply language constructs, data types, operators available in verilog HDL.*
CO3	*Design combinational logic and sequential logic in gate level modeling.*
CO4	*Demonstrate the use of development software for a particular application and choosing appropriate OS.*
CO5	*Understanding and building basic embedded system using 8051.Understanding its design*
CO6	*Design of embedded systems and implementation of switch reading.*

1	2	3	4	5	6	7	8	9	10	11	12
x	**x**										

IV Year B.Tech – II Sem

CODE: 7A820 **ELECTRICAL DISTRIBUTION SYSTEMS**
(PROFESSIONAL ELECTIVE – V)

L	**T**	**P**	**C**
3	**-**	**0**	**3**

Course Objective:

This course is an extension of Power System I& II. Knowledge of distribution system modeling, and understanding of various factors like coincidence factor, contribution factor, loss factor etc helps in how loads effects the system .Various models of feeders & substations and location of faults and protective devices gives awareness to students their usage in practical applications.

Course Outcomes:

By the end of the unit the student will be able to

1) Know the importance of terms used in distribution system such as load factor, loss factor etc and how these are interred related.
2) Know the importance of different voltages in primary & secondary distribution systems and types of feeders in our country.
3) Identify the importance of location of optimal sub –station through theoretical methods.
4) Calculate power loss and voltage drop in balanced lines and derivations connected with these.
5) Understand various types of protective devices and where and how these are used and the general procedure to coordinate protective devices.
6) Understand the importance of power factor voltage control and how to improve it with various types of correction equipments and best location for them in a system so as to give optimum results.

1	2	3	4	5	6	7	8	9	10	11	12
x	**x**		**x**								

IV Year B.Tech – II Sem.

Code: 7A833 **SWITCH MODE POWER CONVERSION**

(Professional Elective – V)

L	**T**	**P**	**C**
3	**-**	**-**	**3**

Course Objective:

Understand the concepts of buck, boost converters, voltage, current fed converters, phase modulation technique, buck, boost, design of drive circuits for switching devices and mechanisms of loop stabilization.

Course Outcomes:

Students will able to

1. Describe Basic topologies of buck, boost converters, buck-boost converters, and cuk converter.
2. Explain Voltage mode and current mode control of converters.
3. Explain types of resonant converters, methods of control and phase modulation technique.
4. Explain Application of state-space averaging to switching converters.
5. Understand Design of filter inductor & capacitor, and power transformer.
6. Understand mechanisms of loop stabilization.

1	2	3	4	5	6	7	8	9	10	11	12
x	**x**		**x**								

IV Year B.Tech – II Sem.

CODE: 7C831 **ARTIFICIAL NEURAL NETWORKS**

(Professional Elective – V)

L	**T**	**P**	**C**
3	**-**	**-**	**3**

The student who has completed this course will

CO1- Demonstrate fundamental understanding of the history of artificial intelligence (AI) and its foundations

CO2- Apply basic principles of AI in solutions that require problem solving, inference, perception, knowledge representation and learning.

CO3- Demonstrate awareness and a fundamental understanding of Expert Systems and its applications

CO4- Demonstrate fundamental understanding of models of machine learning.

CO5- Apply basic principles of supervised learning

CO6- Apply basic principles of unsupervised learning

IV Year B.Tech – II Sem

CODE: 7A883 **PROJECT - II**

L	**T**	**P/D**	**C**
0	**0**	**10**	**5**

1	2	3	4	5	6	7	8	9	10	11	12
x	**x**	**x**	**x**	**x**	**x**	**x**	**x**	**x**	**x**	**x**	**x**

Course Objectives:

To enhance the knowledge on selecting a project, learn related tools and enhance programming and communication skills for employability.

Course Outcomes: At the end of this course, the student will be able to

1. Develop plans with relevant people to achieve the project's goals
2. Break work down into tasks and determine handover procedures
3. Identify links and dependencies, and schedule to achieve deliverables
4. Estimate the human and physical resources required, and make plans to obtain the necessary resources
5. Allocate roles with clear lines of responsibility and accountability with team spirit.
6. Design and develop the software or prototype to meet societal needs

B.Tech (IT) Course Outcomes
A.Y 2020-2021
I YEAR I SEMESTER COURSE OUTCOMES

SNO	Subject Code	Course	COs
1	8HC07	Engineering Physics	**1.** Differentiate the wave and particle, de-Broglie matter waves-its experimental evidence, Schroedinger's wave concept and its application for a particle in one dimension box. **2.** Explain about emission, its types, laser principle, types, working and its applications and to reveals about TIR principle, optical fiber-types and signal propagation, attenuation, communication system and applications of optical fibers (sensors and medical endoscopy) **3.** Reveals about the magnetism-its origin and types, Hysteresis, domain theory, Anti-ferro and ferri-magnetism,Superconductivity,experimental facts, theoretical analysis, types of superconductors and its applications. 4. Explain the basic concepts of dielectric materials, polarization and its types, local fields, frequency and temperature effect on dielectrics and their applications (piezo, ferro and Pyro electricity). 5. Explain semiconductor behavior, types, carrier concentration, Hall effect, Thermistor, demonstrate and analyze semiconductor devices like a PN-junction, I-V characteristics, LED, solar cell, photo diode and their applications. 6. Summarize nano & bulk concepts, surface to volume ratio, quantum confinement, CNTs and preparation methods (physical & chemical), analysis the techniques like XRD, SEM, TEM and also to understand the radioactivity, fusion & fission, alpha, beta and gamma rays decay and its applications.
2	8FC01	Problem Solving using C	1. To formulate simple algorithms for arithmetic, logical problems and to translate the algorithms to programs(in C language) 2. To test and execute the programs and correct syntax and logical errors, to implement conditional branching, iteration and recursion 3. To decompose a problem into functions and synthesize a complete program using divide and conquer approach. 4. To use arrays, pointers and structures to formulate algorithms and programs. 5. To apply programming to solve matrix addition and multiplication problems and searching and sorting problems. 6. To apply programming to solve simple numerical method problems, namely rot finding of function, differentiation of function and simple integration.
3	8HC10	Linear Algebra and Calculus	1. Check the consistency or inconsistency of a linear system and also solve real time problems. 2. Calculate the Eigen values and Eigen vectors of a matrix and their application for orthogonal transformation. 3. Identify the dependence and independence of vectors and solve the problems on basis. 4. Solve problems on Inner product spaces. 5. Verify the mean value theorems and also express the given function in series form using Taylor's theorem. 6. Solve the problems using special functions; evaluate surface areas and volumes of revolutions.
4	8BC02	Engineering Graphics	1. Get familiar to use the instruments to solve the engineering problem and draw various type of curves used in engineering 2. Understand and Implement Orthographic projections and draw projections of simple drawing entities such as points Lines, and Planes 3. Draw projections of different types of regular solids in various positions wrt principal planes of projection 4. Draw Sections of various Solids including Cylinders, cones, prisms and pyramids and draw the developments of these solids and their sections. 5. Construct Isometric Scale, Isometric Projections and Views and convert 3D views to 2D orthographic views 6. Understand from basic sketching through 2D and 3-D solid modeling using computer aided design (CAD) software

5	8HC02	Written Communication Skills	1. Differentiate between confusing words, learn correct spellings and have a sound grip over the use of phrasal verbs 2. Upgrade their knowledge of basic writing skills, writing cohesive paragraphs and effective letters 3. Upgrade their knowledge of basic reading skills using different techniques 4. Improve the technical report writing skills 5. Learn the importance of building a strong resume 6. Acquaint themselves with the concept of soft skills, having the right attitude towards their education, career and life in general.
6	8FC61	Problem Solving using C Lab	1. To formulate the algorithms for simple problems 2. To translate given algorithms to a working and correct program 3. To be able to correct syntax errors as reported by the compilers 4. To be able to identify and correct logical errors encountered at run time 5. To be able to write iterative as well as recursive programs 6. To be able to represent data in arrays, strings and structures and manipulate them through a program 7. To be able to declare pointers of different types and use them in defining self referential structures. 8. To be able to create, read and write to and from simple text files.
7	8HC66	Engineering Physics Lab	1. Understand the concepts of photo electric effect, importance, photo current, colour filters, optical sensors. 2. Know about the light properties-dispersion, prism, spectrometer and minimum deviation arrangement. 3. Recognize the difference between the interference and diffraction, grating, laser characteristics. 4. Analyze the concepts of fiber optics, fundamentals, numerical aperture its importance, attenuation in fiber and applications. 5. Understand and search to apply the fundamentals of magnetic induction, Ampere's law, Oersted's law and the Biot-Savart law. 6. Know the difference between AC and DC fundamentals, Magnetostriction, resonance, air column vibrations. 7. Analyze the LCR circuit combination, parallel, series electrical resonance, inductance, reactance, capacitance and electrical and electronic fundamentals. 8. Summarize the fundamentals of modulus-types, stress, strain, elasticity, plasticity and Hook's law. 9. Analyze the concept a semiconductors, types, calculation of energy gap of a semiconductor diode and importance. 10. Analyze the difference between normal diode, LED, forward bias, reverse bias, I-V characteristics, direct and indirect band gap semiconductors. 11. Characterize the RC network,time constant, capacitor functioning and its application. 12. Understand the concept of radiation, ionizing radiation, radiological protection and inverse square law.
8	8HC62	Written Communication Skills Lab	1. .Differentiate between confusing words, learn correct spellings and have a sound grip over the use of phrasal verbs, Upgrade their knowledge of basic writing skills, writing cohesive paragraphs and effective letters, Upgrade their knowledge of basic reading skills using different techniques, Improve the technical report writing skills, Learn the importance of building a strong resume, Acquaint themselves with the concept of soft skills, having the right attitude towards their education, career and life in general.
9	8F185	Technical Seminar - I	1. Identify current general, political and technology related topics. 2. Arrange and present seminar in a effective manner 3. Collect, survey and organize content in presentable manner 4. Demonstrate oratory skills with the aidof Power Point Presentations 5. Exhibit interview facing skills and team leading qualities
10	8F191	Comprehensive Test and Viva Voce –I	1. Comprehend the concepts in the Core Courses 1st year. 2. Assess technical knowledge to face interviews. 3. Exhibit life long learning skills to pursue higher studies or professional practice.

I YEAR II SEMESTER COURSE OUTCOMES

SNO	Subject Code	Course	COs
1	8HC04	Engineering Chemistry	1. Understand and analyse microscopic chemistry in terms of atomic orbitals, molecular orbitals and intermolecular forces. 2. Identify and differentiate polymers, thermoplastic, thermosetting plastics and various lubricants. 3. Recognize and select the domestic and industrial problems caused by hard water and also learn about the municipal water treatment using various methods. 4. Understand and interpret the important fundamental concepts of electrochemistry and solve the problems related to batteries. 5. Differentiate the types of corrosion and methods used to prevent the corrosion, surface coating techniques 6. Learn and implement synthesis of drug molecules and learn fundamentals of analytical techniques like electronic, vibrational and rotational spectroscopy.
2	8EC01	Data Structures and C++	1 Demonstrate the concepts of Abstract data type and also applications of stack and Queues 2 Select the data structure that efficiently model the information in a problem 3 Design programs using variety of data structures including Trees, AVL Trees and Graphs and their applications. 4 Solve problems and also assess efficiency trade off among searching and sorting using time complexity of each algorithm and also the applications of hashing and hash tables. 5 Describe the concepts of OOPs and implement programs using objects, classes, constructors and destructors. 6 Apply concepts of oops to write program on over loading functions and concepts of inheritance.
3	8HC13	Differential Calculus and Numerical Methods	1. Find the solutions of first order first degree and not of first degree differential equations and their applications such as Newton's law of cooling, Natural growth and decay. 2. Identify and solve higher order ordinary differential equations with constant coefficients using some standard methods and also their applications in LCR circuits. 3. Evaluate the maxima and minima of functions of two variables and find the Gradient, Divergence and Curl. 4. Solve algebraic and transcendental equations with the help of numerical methods also able to solve problems using numerical integration methods. 5. Solve problems using Finite differences and interpolating methods. vi. Solve first order differential equations using numerical methods.
4	8FC02	Python Programming	1. Gains exposure towards Python versions and their specifications. 2. Build programs using primitive data types. 3. Write applications that include functions, modules, packages along with respective exceptional handling mechanism. 4. Writes applications using OO features of Python 5. Write applications using Files. 6. Hands on exposure on NumPy/Tkinter/Plotpy modules.
5	8BC01	Workshop/ Manufacturing Processes	1. To understand various basic tools to perform simple joints using metal and wood. 2. To understand the principle of various electrical and electronic appliances and their applications. 3. To understand the manufacturing process of welding, casting and tin smithy and their applications. 4. To understand the operation of basic as well as advanced machines used for fabrication of Metals, Plastics and Glass.

6	8HC01	Oral Communication Skills	1. Understand, Analyse and respond to the audience by listening effectively 2. Practice effectively the speaking skills with the apt body language 3. Develop strategies to improve speaking skills 4. Plan, prepare and present effectively to meet the standards of corporate and real world in a group 5. Comprehend the reading skills through note taking and other study skills 6. Express the opinions effectively on the given topic through role play and situational dialogues in group discussions
7	8HC08	Basic Mathematics, Analysis and Reasoning	1. After completion of this course students will be able to solve, the questions given on testing divisibility, HCF and LCM,averages, percentage and profit and loss, ratio and proportion simple and compound interest, time and work, time and distance and etc. Also able to solve the questions given on series completion and analogy, odd one out and coding and decoding, blood relations, directions and Arithmetical reasoning, Venn diagrams,cubes and dice, clocks and calendar.
8	8EC61	Data Structures(C,C++) Lab	1 Implement Stacks, Queues and circular queues. 2 Write programs using tree traversals. Inorder, preorder and postorder. 3 Program searching, sorting and hashing operations. 4 Write programs on Binary trees 5 Implement classes and operator overloading.
9	8HC64	Engineering Chemistry Lab	1. Preparation of Inorganic compounds 2. Determination surface tension of a liquid 3. Determination viscosity of lubricant 4. Determination acid value of an oil 5. Estimation hardness of water 6. Analysis the amount of chloride content 7. Determination of cell constant and conductance of solutions 8. Determination of redox potential and emf of solutions 9. Determination of the rate constant of acid 10. Synthesis of a polymer (Thiakol rubber / Urea-Farmaldehyde resin) 11. Synthesis of a drug- Aspirin 12. Estimation of Mn+7 by Colorimetry method
10	8FC62	IT Workshop and Python Programming	1. Apply knowledge for computer assembling and software installation and ability to solve the trouble shooting problems. 2. Apply the tools for preparation of PPT, Documentation and budget sheet etc. 3. Install and run the Python interpreter ,Create and execute Python programs. 4. Apply the best features of mathematics, engineering and natural sciences to program real life problems. 5. Describe the Numbers, Math functions, Strings, List, Tuples and Dictionaries in Python, Express different Decision Making statements and Functions, Interpret Object oriented programming in Python. 6. Understand and summarize different File handling operations, explain how to design GUI Applications in Python
11	8BC61	Workshop/ Manufacturing Processes Lab	1. Use various types of conventional manufacturing Processes 2. Manufacture components from wood, MS flat, GI Sheet etc. – hands on experience 3. manufacturing of components by machining like shafts, holes & threaded holes, surface finishing of components etc. 4. Produce small devices / products /appliances by assembling different components
12	8HC61	Oral Communication Skills Lab	1. Understand, Analyse and respond to the audience by listening effectively, Practice effectively the speaking skills with the apt body language, Develop strategies to improve speaking skills, Plan, prepare and present effectively to meet the standards of corporate and real world in a group, Comprehend the reading skills through note taking and other study skills, Express the opinions effectively on the given topic through role play and situational dialogues in group discussions

13	8F286	Technical Seminar - II	1. Identify current general, political and technology related topics. 2. Arrange and present seminar in a effective manner 3. Collect, survey and organize content in presentable manner 4. Demonstrate oratory skills with the aidof Power Point Presentations 5. Exhibit interview facing skills and team leading qualities
14	8F292	Comprehensive Test and Viva Voce –I	1. Comprehend the concepts in the Core Courses 1st year. 2. Assess technical knowledge to face interviews. 3. Exhibit life long learning skills to pursue higher studies or professional practice.
15	8HC18	Orientation Course*	1. Learns Being a human, understands human values and purpose of education 2. Understands the importance of different harmony levels needed. Understand Self and being in the current moment are the sources of happiness. 3. Improves Learning capabilities and communication skills. 4. Improves Personality Development and Life Skills 5. Understands and appreciate the importance of personality development and yoga for a holistic life. 6. Understands the essence and Values and Social responsibilities for successful life.

II YEAR I SEMESTER COURSE OUTCOMES

SNO	SUBJECT CODE	COURSE	COs
1.	7AC41	Basic Electrical Engineering	1. Understand the principles of electrical engineering. 2. Understand the principles of single and three phase AC circuits. 3. Understand the principle and operation of DC machine along with its applications. 4. Understand the principle and operation of single phase transformer along with its applications. 5. Understand the principle and operation of three phase induction motor with its applications. 6. Understand the principle and operation of different measuring instruments along with its applications.
2.	7C354	Analog Electronic Circuits	1. Understand the operation of semiconductor diode and its application as rectifier. 2. Understand the Fundamentals of BJT operation, Characteristics and different biasing circuits. 3. Understand the Fundamentals of JFET and MOSFET operation and their Characteristics. 4. Understand The need of transistor biasing and its significance is explained. The quiescent point or operating point is explained. 5. Understand Small signal equivalent circuit analysis of BJT and FET transistor amplifiers in different configuration is explained. 6. Understand negative feedback and analysis of oscillators
3.	7EC02	Object Oriented Programming through Java	1 Describe fundamentals of JAVA, its Classes, and Objects and write simple programs using constructors. 2 Explain Write simple programs using inheritance, interface and packages. 3 Explain and write programs using Packages, I/O Stream and collections. 4 Describe and write programs to implement Exception handling and Multithreading. 5 Describe and write programs using AWT, Swings and develop applications using event handling. 6 Describe and develop applications using Applets and develop client server programs

			using networking concepts.
4.	7ZC01	Management Science and Financial Accounting	1. Outlines the significance of management, defines the basic concepts and applicability of management principles in changing paradigms. 2. Helps in understanding organization behavior, personality determinants and other key aspects 3. Infers the need to understand the importance of Strategic management and Business environment in particular 4. Enrich students with basic concepts of Financial Accounting. 5. Understand basic concepts of Depreciation and need for preparing trial balance. 6. Helps in preparation of Financial Statements (final accounts).
5.	7F302	Discrete Mathematics	1. To evaluate elementary mathematical arguments and identify fallacious reasoning (not just fallacious conclusions). 2. To reason about arguments represented in Predicate logic. 3. Perform operations on discrete structures such as sets, functions, relations, and sequences. 4. Solve discrete mathematics problems that involve: computing permutations and combinations of a set. 5. Analyze and deduce problems involving recurrence relations and generating functions. 6. Apply graph theory models of data structures and state machines to solve problems of connectivity and constraint satisfaction, for example, scheduling.
6.	7FC03	Python Programming	1: Gains exposure towards Python versions and their specifications. 2: Build programs using primitive data types. 3: Write applications that include functions, modules, packages along with respective exceptional handling mechanism. 4: Writes applications using OO features of Python 5: Write applications using Files. 6: Hands on exposure on NumPy/Tkinter/Plotpy modules.
7.	7EC72	Object oriented programming through Java Lab	1. Write programs to generate Prime numbers, Roots of quadratic equation and Fibonacci series. 2. Write small application such as banking system. 3. Write programs on operator , function overloading and dynamic method dispatch. 4. Write programs to implement interface and packages. 5. Explain and write programs to implement threads. 6. Write programs to implement applets and event handling. 7. Write an application to implement client and server scenario.
8.	7AC91	Basic Electrical Engineering and Analog Electronics Circuits Lab	1. Understand the working of single phase transformer under different conditions. 2. Understand the performance of three phase induction motor. 3. Understand the different speed control methods of DC motor. 4. Understand the performance of DC motor with and without loading. 5. Understand the applications of Thevenin's Theorem in circuit analysis. 6. Identify, Specify and test R, L, C Components (Colour Codes), Potentiometers, Switches, Coils, Relays. 7 Identify, Specify and test Active Devices, Diodes, BJTs, Low power JFETs. 8 Explain and demonstrate working of PN Junction and Zener diode. 9 Explain and demonstrate working Half and Full wave Rectifier without filters. 10 Demonstrate working of CE characteristics and its application as an amplifier.
9.	7F372	IT Workshop and Python Programming Lab	1. Apply knowledge for computer assembling and software installation and ability to solve the trouble shooting problems. 2. Apply the tools for preparation of PPT, Documentation and budget sheet etc. 3. Install and run the Python interpreter ,Create and execute Python programs. 4. Apply the best features of mathematics, engineering and natural sciences to program real life problems.

			5. Describe the Numbers, Math functions, Strings, List, Tuples and Dictionaries in Python, Express different Decision Making statements and Functions, Interpret Object oriented programming in Python. 6. Understand and summarize different File handling operations, explain how to design GUI Applications in Python.
10.	7F393	Technical Seminar - III	1 Deliver lecture on emerging technologies. 2 Explain domain knowledge to resolve real time technical issues 3 Demonstrate ability to lead and explain concepts and innovative ideas. 4 Demonstrate team leading qualities. 5 Demonstrate public speaking skills. 6 Exchange new information that would not have been available otherwise. 7. Develop debating and interview skills.

II YEAR II SEMESTER COURSE OUTCOMES

Sl. No	SUBJECT CODE	COURSE	COs
1.	7HC16	Mathematics –II	1. Evaluate the maxima and minima for functions of two variable functions 2. Find the solutions of first order first degree and not of first degree differential equations and their applications such as Newton's law of cooling, Natural growth and decay. 3. Identify and solve higher order ordinary differential equations with constant coefficients using some standard methods 4. Find the root of a given equation. 5. Estimate the value for the given data using interpolation 6. Find the numerical solutions for a given ODE's, Use the Laplace transforms techniques for solving ODE's
2.	7CC55	Digital Electronics	1. an ability to understand number systems and apply the rules of Boolean algebra to simplify Boolean expressions. 2. an ability to simplify of Boolean expressions using K-map. 3. an ability to design MSI combinational circuits such as full adders, multiplexers, decoders, encoders. Code converters. 4. an ability to design basic memory units (latches and flip-flops) and sequential circuits such as counters and registers 5. an ability to design digital design using PLD's such as ROM's, PLA's, PAL s. 6. an ability to design digital controllers using Algorithmic State Machine Charts .
3.	7D408	Computer Organization	1.Understand basic operational concepts of computer and data processing. 2.Use data types with instruction set of specified architecture. 3. Understand different control unit design and algorithms for various operations 4. understand basic architecture of 8086 processor.

			5. write assembly language programming and debug to 8086. 6.Interface various devices to 8086 processor like keyboard, LED display, Stepper Motor, ADC etc.
4.	7EC03	Database Management Systems	1. Write relational algebra expressions For a given query and optimize the developed expressions 2. Design the databases using E-R model for a given specification of the requirement and suggest normalization. 3. Construct the SQL queries for Open source and Commercial DBMS -MYSQL, ORACLE, and DB2 for a given specification 4. For a given query optimize its execution using Query optimization algorithms 5. For a given transaction-processing system, determine the transaction atomicity, consistency, isolation, and durability. 6. Implement the isolation property, including locking, time stamping based on concurrency control and Serializability of scheduling.
5.	7F404	Software Engineering and OOAD	1 Students can able to identify software process and software engineering practices to select and justify approaches for a given project and its constraints and distinguish lifecycles for developing software product. 2 Students understand the importance and principles of Unified Modeling Language, its building blocks and to relate UML paradigm for problem solving. 3 Students can define and design models for the requirements stated in the software project. 4 Students can able to know what and how to gather the requirements for a project. 5 Students can able to design class, object and interactive diagrams and know their significance. 6 Students can able to design advanced behavioral and architectural modeling and work on case studies.
6.	7CC57	Data Communications	1. Knowledge of working of basic communication systems 2. Ability to evaluate alternative models of communication system design
7.	7EC73	Database Management Systems Lab	1 Create tables for a database and apply Queries using ANY, ALL, IN, EXISTS, NOTEXISTS, UNION, INTERSET, Constraints. 2 Write Queries using Aggregate functions such as [COUNT, SUM, AVG, MAX, MIN, GROUP BY, HAVING], Conversion functions and use string functions for a given application. 3 Explain and write programs using PL/SQL programs using exceptions, COMMIT, ROLLBACK and SAVEPOINT in PL/SQL block. 4 Develop programs using WHILE LOOPS, FOR LOOPS, nested loops using BUILT–IN Exceptions and write Procedures. 5 Write Programs for stored functions invoke functions in SQL Statement and write

			Programs for packages specification. 6 Describe and write programs using features of CURSORs and its variables. 7 Develop Programs implementing Triggers.
8.	7F473	Computer Aided Software Engineering (CASE) Tools Lab	1. Students can able to identify software process and software engineering practices to select and justify approaches for a given project and its constraints and distinguish life cycles for developing software product. 2. Students understand the importance and principles of Unified Modeling Language, its building blocks and to relate UML paradigm for problem solving. 3. Students can define and design models for the requirements stated in the software project. 4.Students can able to design class, object and interactive diagrams and know their significance. 5.Students can able to design advanced behavioral and architectural modeling and work on case studies.
9.	7D475	Computer Organization Lab	1. Familiarize the architecture of 8086 processor, assembling language programming and interfacing with various modules. 2. Arithmetic operations of binary number system. 3. Student able to do any type of VLSI, embedded systems, industrial and real time applications by knowing the concepts of Microprocessor and Microcontrollers.
10.	7F494	Technical Seminar – IV	1 Deliver lecture on emerging technologies. 2 Explain domain knowledge to resolve real time technical issues 3 Demonstrate ability to lead and explain concepts and innovative ideas. 4 Demonstrate team leading qualities. 5 Demonstrate public speaking and lifelong learning skills for higher studies and to pursue professional practice. 6 Exchange new information that would not have been available otherwise. 7. Develop debating and interview skills.
11.	7F495	Comprehensive Viva –Voce I	1. Comprehend the concepts in the core and elective courses. 2. Exhibit technical knowledge to face interviews. 3. Exhibit lifelong Learning skills for higher education and to pursue Professional practice.
12.	7FC81	SUMMER INDUSTRY INTERNSHIP-I	1. Select the real-time problem in the industry. 2. Analyze the requirements with respect to the problem statement 3. Design the optimal solution for the problem. 4. Implement the solution using the appropriate modern tools. 5. Present and submit the report

III YEAR I SEMESTER COURSE OUTCOMES

Sl. No	SUBJECT CODE	Course	COs
1.	7ZC05	BANKING OPERATIONS, INSURANCE AND RISK MANAGEMENT	1. Describe the new dimensions and products served by the banking system in INDIA. 2. Explain the credit control system and create awareness on NPA's 3. Apply the knowledge of Insurance concepts in real life scenarios 4. Recognize the importance of regulatory and legal frame work of IRDA 5. Identify the risk management process and methods. 6. Calculate the diversity of risk and return
2.	7EC16	INTRODUCTION TO DATA SCIENCE	1. Implement Data analysis techniques for solving practical problems. 2. Perform Data analysis on variety of data. 3. Perform appropriate statistical tests using R and Python to visualize the outcome. 4. Apply of data pre-processing, extraction, cleaning, annotation, integration on data. 5. Apply the suitable visualization techniques to output analytical results. 6. Identify and apply appropriate Regression model for the type of input data given
3.	7F505	Design and Analysis of Algorithms	1) Analyze worst-case running times of algorithms using asymptotic analysis. 2) Describe the divide-and-conquer paradigm and explain when an algorithmic design Situation calls for it. Recite algorithms that employ this paradigm. Synthesize divide and-conquer algorithms. Derive and solve recurrences describing the performance of divide-and-conquer algorithms. 3) Describe the dynamic-programming paradigm and explain when an algorithmic design situation calls for it. Recite algorithms that employ this paradigm. Synthesize dynamic programming algorithms, and analyze them. 4) Describe the greedy paradigm and explain when an algorithmic design situation calls for it. Recite algorithms that employ this paradigm. Synthesize greedy algorithms, and analyze them. 5) Explain what amortized running time is and what it is good for. Describe the different Methods of amortized analysis (aggregate analysis, accounting, potential method). Perform amortized analysis. 6) Describe Backtracking, Branch and Bound algorithms and Concept of P and NP Problems.

4.	7EC04	Data Warehousing and Data Mining	**1.** Fundamentals of Data Mining and various data preprocessing techniques. and the Data Mining Query language primitives. **2.** Identify the schemas used in designing Architecture of Data warehouse and OLAP operations. **3.** Learn the significance and methods used for Characterization and the Analysis of Attribute Relevance.. **4.** Applications of Apriori and FP Growth algorithms for mining Association rules in large databases. **5.** Applications of various classification models like Naïve Baye's & ID3 Decision Tree along with the prediction of the new samples. **6.** Applications of clustering techniques available for numerous applications. Identify the optimal clustering technique for a particular application
5.	7EC05	Computer Networks	1 Identify the different types of network topologies and protocols useful for real time applications and transmission medias. 2 Discuss design issues of data link layer and solve problems on Checksum and flow control. 3 Describe Channel allocation issues, MAC protocols such as ALOHA, CSMA and CSMA/CD and MAC addresses with IEEE 802.X and wireless LAN. 4 Discuss network layer design issues, routing algorithms and Internetworking concepts. 5 Discuss network layer sub netting concepts, its protocols of control and congestion and QOS. 6. Describe concepts and services and protocols of transport, Application layers along with the network security issues.
6.	7HC74	Soft Skills and Technical Communication	1. make a self-assessment and also enhance their soft skills and behavioral patterns 2. equip themselves with the required skillset for their career advancement 3. develop interpersonal communication skills 4. participate in group tasks and use effective language skills in interviews 5. overcome stress and enhance employability quotient 6. practice technical communication with ease
7.	7H518	Quantitative Aptitude	1. The questions given on testing divisibility, prime number and questions of HCF and LCM . 2. The questions given on averages, percentage and profit and loss. 3. The questions given on ratio and proportion. 4. The questions given on simple and compound interest. 5. The questions given on time and work, time and distance. **6.** The questions given on mensuration and data sufficiency.
8.	7E574	Data Warehousing and Data Mining Lab	1. Ability to work with the ETL and Mining tools. 2. Demonstrate the classification, clustering techniques on the data sets. 3. Comprehend the results obtained in the clustering, Association and Classification techniques applied on the data sets with varied input parameters. 4. Ability to apply mining techniques for realistic data.
9.	7EC75	Computer Networks Lab	1. Implement and analyze framing methods of data link layer. 2. Implement and analyze framing methods of data link layer. 3. Illustrate and implement error detection & correction techniques. 4. Implement different Routing Algorithm. 5. Understand basic Network Commands. 6. Use of Wireshark and NS-2 tools

10.	7F574	Design and Analysis of Algorithms Lab	1. Ability to write programs in java to solve problems using algorithm design techniques such as Divide and Conquer, Greedy, Dynamic programming, and Backtracking.
11.	7F596	Technical Seminar – V	1. Identify a topic from the current technologies of their choice in the computer science domain and the allied fields, after surveying in the internet resources, journals and technical magazines in the library. 2. Arrange the contents of the presentation and also write the report of the research paper.. 3. Present the technical topic in front of the panel and the fellow students, using the oratory skills and also submit the report of the research paper. 4. Interact through answering the questions and also can add some points to the seminar
12.	7F581	Summer Industry Internship-I	1. Use the concepts learned in the courses, so far, in conceptualizing, designing and executing the modules of the projects. 2. Exhibit the interest in learning the modern tools and technologies through the bridge courses arranged in the college, beyond the curriculum, and hence developing the software. 3. Inculcate an enthusiasm to use the creative ideas to build the innovative projects which are meeting the current needs of the market and society as a whole. 4. Improve their communicative skills and team skills largely improve. 5. Work as an individual and in a team.

III YEAR II SEMESTER COURSE OUTCOMES

Sl. No	SUBJECT CODE	Course	COs
1.	7ZC19	Entrepreneurship Project Management and Structured Finance	1. Students will understand the nature of Entrepreneurship andits importance 2. Will gain knowledge regarding project, its life cycle and organization 3. Will gain knowledge relating to project formulation and implementation 4. Comprehend the components of structured finance 5. Establish a framework of CMBS 6. Students will gain knowledge relating to the CRE Servicing
2.	7EC21	Cloud Computing	1. Describe the characteristics of cloud 2. Describe the cloud services. 3. Understand different architectures for cloud applications, Creation and running of python programs, running amazon ec2 instance 4. Understand Data Intensive applications and future trends of Internet Clouds supporting Mobile Computing, Ubiquitious Computing and Social Networking 5. Discuss mapreduce and image processing app on cloud. 6. Discuss cloud security architecture.
3.	7F606	Automata Theory and Compiler Design	1. Discuss principles of Finite state machine, finite automation models, and transition diagrams. Design NFA , DFA and FSM transition with suitable examples expressions which are useful in text editors. 2. Describe regular languages, regular expressions , grammars and derivations of strings with suitable examples. Describe context free grammars, syntax analysis useful in designing compilers. 3. Design of PDA and Turing Machine. 4. Explain Overview of compiler its Environment phases and features of Lexical

			Analyzer, LEX tool Describe Top down parsing technique, Recursive decent parsing with back tracking, Ambiguous grammar, Predictive parsing, LL(1). 5. Demonstrate and solve problems on SLR, CLR, LALR, operator precedence parser, LR (O), LR(1), LR(K) grammar and use YACC tool. 6. Describe and use Semantic Analysis concepts to design compiler : and describe Intermediate code generation such as 3-address code form.
4.	7EC06	Operating Systems	1. Describe the basic functionalities and structure of the Operating System 2. Explain the concepts and implementations of: Processes, Process Scheduling. Describe, contrast and compare various types of Operating systems like Windows and Linux. 3. Comprehend the concepts of Synchronization and Deadlocks in the Operating System 4. Discuss the concepts of Memory Management(Physical and Virtual memory) 5. Explain the concepts of File System with regard to directory and disk management algorithms. 6. Students understand the concepts of I/O systems, protection and security in a case study given
5.	7EC07	Web Technologies	1. Describe WWW features and Demonstrate/ use of HTML tags. Develop dynamic programs involving Java scripts, popup windows in JavaScript along with Event Handling. (2. Implement, deploy and execute server side programs and components using PHP. 3. Develop scripts using XML and XSLT and to read XML document using parsers, DOM parser and SAX parser. 4. Write programs on JDBC, using JDBC API . 5. Use Web Servers and servers in a JAVA along with the Installation and testing of Software Development Kit, Tomcat Server and Tomcat. Develop Servlets programs and describe security issues while using web applications 6. Develop programs with JSP and MVC. Develop JSP Application.
6.	7GC49	Intellectual Property Rights	1. Demonstrate a breadth of knowledge in Intellectual property 2. Overview of Patents, Searching, filling and drafting of Patents 3. Overview of copyright & GI . 4. Overview of Trade Mark & Trade Secret, 5. Overview of Integrated Circuit and Industrial Design. 6. Knowledge about different national and international: Conventions and Treaties Governing the IPRs
7.	7H619	Logical Reasoning	1. The questions given on series completion and analogy. 2. The questions given on odd one out in classification and coding and decoding. 3. The questions given on blood relations. 4. The questions given on directions and Arithmetical reasoning. 5. The questions given on Venn diagrams, cubes and dice. . **6.** The questions given on clocks and calendar.
8.	7F675	Compiler Design Lab	1. Understand the working of lex and yacc compiler for debugging of programs. 2. Understand and define the role of lexical analyzer, use of regular expression and transition diagrams. 3. Understand and use Context free grammar, and parse tree construction. 4. Learn & use the new tools and technologies used for designing a compiler. 5. Develop program for solving parser problems. 6. Learn how to write programs that execute faster.
9.	7E676	Operating System Lab	1. Simulate and implement operating system concepts such as scheduling, deadlock management, page replacement techniques, file management and memory management
10.	7EC77	Web Technologies Lab	1. Demonstrate use of HTML tags and able to design the web pages. 2. Develop dynamic programs involving Java scripts, popup windows in JavaScript along with Event Handling. 3. Develop an application in PHP. 4. Develop scripts using XML and XSLT and to read XML document using parsers,

			DOM parser and SAX parser. 5. Implement Java servlets using Apache Tomcat Server for user authentications 6. Develop JDBC Application using JSP and ODBC Connectivity.
11.	7F682	Group Project	1. Use the concepts learned in the courses, so far, in conceptualizing, designing and executing the modules of the projects. 2. Exhibit the interest in learning the modern tools and technologies through the bridge courses arranged in the college, beyond the curriculum, and hence developing the software. 3. Inculcate an enthusiasm to use the creative ideas to build the innovative projects which are meeting the current needs of the market and society as a whole. 4. Improve their communicative skills and team skills largely improve. 5. Work as an individual and in a team.
12.	7F697	Comprehensive Viva -Voce II	1. Assess the relevant courses they have undergone till the completion of that academic year. 2. Comprehend the concepts in the core subjects and the elective subjects, to make them ready to face technical interviews which improve their employability skills.
13.	7F684	Summer Industry Internship-II	1. Use the concepts learned in the courses, so far, in conceptualizing, designing and executing the modules of the projects. Exhibit the interest in learning the modern tools and technologies through the bridge courses arranged in the college, beyond the curriculum, and hence developing the software. Inculcate an enthusiasm to use the creative ideas to build the innovative projects which are meeting the current needs of the market and society as a whole. Improve their communicative skills and team skills largely improve. Work as an individual and in a team.

IV YEAR I SEMESTER COURSE OUTCOMES

S.No	SUBJECT CODE	Course	COs
1	6EC09	Advanced Software Engineering	1. Understand the issues affecting the organization, planning, and development of large and complex software systems 2. Understand the concepts of software metrics and reuse-based software engineering 3. Apply software engineering principles in the development of distributed software systems 4. Design and implement service-oriented software systems 5. Understand the design and development of aspect-oriented software systems 6. Understand software re-engineering process model
2	6ZC21	GENERAL MANAGEMENT AND ENTREPRENEURSHIP	1. Describe the necessary managerial skills and tactics required for an emerging Entrepreneur. 2. Distinguish various methods for business process and product development 3. Demonstrate the skills required for the project planning, implementing and controlling 4. Outline the legal aspects and applying for Intellectual Property Rights 5. Illustrate the various sources of finance for venturing a business project. 6. Designing production plant and quality management system.

3	6ZC23	Advanced Enterpreneurship	1. The Students' gain knowledge on the stages of Startup and the turbulence environment it undergoes and the stages related to growth of the Startup. 2. The Students are exposed to the various business models and critically evaluating the effectiveness of the business models. 3. The students understand the method of business traction and the need of customer relationship management. 4. The students understand the various channels of revenue building and exploration of new revenue avenues. 5. The students understand the need of sales planning and sales management and also financial modeling 6. The students are exposed to the legal implications effecting the company's prospects and the issues related to intellectual property rights.
4	6FC12	Mobile Application Development	1. Describe those aspects of mobile programming that make it unique from programming for other platforms, 2. Critique mobile applications on their design pros and cons, 3. Utilize rapid prototyping techniques to design and develop sophisticated mobile interfaces, 4. Program mobile applications for the operating system that use basic and advanced phone features, and 5. Deploy J2ME applications to the marketplace for distribution. 6. Authentication with a Web Server and Web Application using J2ME
5	6FC11	Information Security	1. Explain various security attacks and security services. 2. Describe encryption using cryptographic techniques and key elements of cryptographic principles for confidentiality of data. 3. Explain and comprehend privacy to emails using PGP and S/MIME. 4. Discuss IP security Architecture and its role in security framework. 5. Discuss SSL and compare SSl with TLS, explain how to secure credit card details in online transactions. 6. Describe design issues of Firewall and concepts of Intrusion Detection Systems
6	6GC49	Intellectual Property Rights	1. The Students' gain knowledge on the stages of Startup and the turbulence environment it undergoes and the stages related to growth of the Startup. 2. The Students are exposed to the various business models and critically evaluating the effectiveness of the business models. 3. The students understand the method of business traction and the need of customer relationship management. 4. The students understand the various channels of revenue building and exploration of new revenue avenues. 5. The students understand the need of sales planning and sales management and also financial modeling 6. The students are exposed to the legal implications affecting the company's prospects and the issues related to intellectual property rights.
7	6EC11	Software Automation Testing	1. Describe concepts of Software testing 2. Describe and apply the concepts Flow graphs, Path testing and Data Flow Testing. 3. Practice Software testing strategy and Environment with economics and apply Software Metrics useful in software development and maintenance. 4. Software Testing Methodology, finding defects hard to find, Verification and validation, Functional and structural, Workbench concept, Eight

			Consideration of software testing methodology, checklist. Describe Agile computing with agile testing 5. Demonstrate Software Testing Techniques such as JADs, Pareto Analysis , Regression Tasting, Structured walkthroughs, Thread testing , Performance testing and White box testing. 6. Describe Graph matrices and applications, and practice and apply automated testing tools such load Runner, UFT and QTP.
8	6F780	Project-I	1. Students identify vast application areas for mobile / wireless communication / computing. 2. They also understand the working principle of GSM technology. 3. Students understand various media access controlmethods that are meant for wireless communication, each methods' pros and cons 4. Understand the issues in the Network layer in the wireless communicationand identifying suitable solutions for the same 5. Understand the issues in the Transport layer in the wireless communication and identifying suitable solutions for the same 6. Understand MANETs with an example like Bluetooth technology. 7. Understand Security Issues related to mobile computing and various solutions to mitigate the security problems. 8. Prepare for the Project Phase_II
9	6F781	Industry Oriented Mini Project	9. Use the concepts learned in the courses, so far, in conceptualizing, designing and executing the modules of the projects. 10. Exhibit the interest in learning the modern tools and technologies through the bridge courses arranged in the college, beyond the curriculum, and hence developing the software. 11. Inculcate an enthusiasm to use the creative ideas to build the innovative projects which are meeting the current needs of the market and society as a whole. 12. Improve their communicative skills and team skills largely improve. Work as an individual and in a team.
10	6FC90	Software Testing and Information Security Lab	1. Students prepare Test Plan document and write Test Cases for Small scale Project (Like for their B.Tech IV Year Project or Post-Graduate Projects), they are learn how to Analyze SRS document in order to prepare Test Plan Document. 2. Students demonstrate skills to use modern software testing tools (EX: QTP, Bugzilla, Selenium, Test Director and Quality Center) and test application (web, Window application) by using the tools. 3. Students demonstrate the ability to differentiate between different Testing tools present in the market (like functional testing tools, Test Management Tools, Bug Tracking Tools and Performance Testing Tools) and prepare Test Plan document and write Test Cases for Small scale Project (Like for their B.Tech IV Year Project or Post-Graduate Projects).
11	6F777	Mobile Application Development Lab	1. Understand the Installation of Java Wireless Toolkit (J2ME) 2. Working with J2ME Features: Say, creating a Hello World program Experiment with the most basic features and mobile application interaction 3. Create an MIDP application with . Input checking 4. Working on Drawing and Images 5. Developing Networked Applications using the Wireless Toolkit

			6. Authentication with a Web Server and Web Application using J2ME
12	6F596	Technical Literature Review and Seminar-III	1. Identify a topic from the current technologies of their choice in the computer science domain and the allied fields, after surveying in the internet resources, journals and technical magazines in the library. 2. Arrange the contents of the presentation and also write the report of the research paper.. 3. Present the technical topic in front of the panel and the fellow students, using the oratory skills and also submit the report of the research paper. 4. Interact through answering the questions and also can add some points to the seminar

IV YEAR II SEMESTER COURSE OUTCOMES

S.No	SUBJECT Code	COURSE	COs
1	6EC14	Mobile Computing	1. Identify vast application areas for mobile / wireless communication / computing. They also understand the working principle of GSM technology. 2. Discuss various media access control methods that are meant for wireless communication along with SDMA, FDMA, TDMA and CDMA. 3. Identify IP mobile primitives in Network layer in the wireless communication and recognize suitable solutions for the same. 4. Explain the issues in the Transport layer in wireless communication and identifying suitable solutions for the same 5. Discuss MANETs with examples and explain hoarding, client server computing along with the data delivery mechanisms. 6. Discuss protocols and tools such as WAP, Blue Tooth and explain emerging mobile operating systems.
2	6ZC02	Management Science	1. Outlines the significance of management, defines the basic concepts and applicability of management principles in changing paradigms. 2. Demonstrates the procedures of the work study method and work measurement, Project management. 3. Infers the need to understand the importance of materials management and quality control techniques. 4. Relates the knowledge of two functional areas of business, human resource management and marketing management. 5. Explains the different dimensions of behavior, personality, perception, attitudes overall to gain insights into organizational behavior.
3	6F884	Project – II	1. Identify vast application areas for mobile / wireless communication / computing. 2. They also understand the working principle of GSM technology. 3. Students understand various media access control methods that are meant forwireless communication, each methods' pros and cons 4. Understand the issues in the Network layer in the wireless communication and identifying suitable solutions for the same 5. Understand the issues in the Transport layer in the wireless communication and identifying suitable solutions for the

			same 6. Understand MANETs with an example like Bluetooth technology. 7. Understand Security Issues related to mobile computing and various solutions tomitigate the security problems.
4	6F885	Comprehensive Viva-Voce III	1. Assess the relevant courses they have undergone till the completion of that academic year. 2. Comprehend the concepts in the core subjects and the elective subjects, to make them ready to face technical interviews which improve their employability skills. 3. They are asked to comprehend the concepts in the core subjects and the elective subjects, to make them ready to face technical interviews which improve their employabilityskills. 4. Assessment is done in the relevant courses they have undergone till the completion of that academic year.
5.	6F898	Technical Literature Review and Seminar - IV	1. Identify a topic from the current technologies of their choice in the computer science domain and the allied fields, after surveying in the internet resources, journals and technical magazines in the library. 2. Arrange the contents of the presentation and also write the report of the research paper.. 3. Present the technical topic in front of the panel and the fellow students, using the oratory skills and also submit the report of the research paper. 4. Interact through answering the questions and also can add some points to the seminar