Sri Sairam Engineering College
Department of Information Technology
Regulation 2017 – Course Outcomes

Subject Code:	**HS8151**	**Semester**	**1**
Subject Name:	**COMMUNICATIVE ENGLISH**		
Course Code: C101			
Course outcomes			
CO1	Understand the basics of LSRW skills and will be able to participate effectively in conversations, to exchange personal information and to express opinions in English. (K2)		
CO2	Comprehend reading and listening tasks and also to describe a simple process with a right choice of vocabulary. (K2)		
CO3	Articulate ideas coherently and write on general and creative topics using grammatically correct sentences. (K6)		
CO4	Read, comprehend and interpret articles of a general kind in magazines and newspapers and also write informal letters and e-mails in English employing grammatically correct sentences. (K2)		
CO5	Speak clearly, confidently and comprehensively using communicative strategies and write paragraphs and short essays cohesively and coherently. (K6)		

Subject Code:	MA8151	**Semester**	**1**
Subject Name:	**ENGINEERING MATHEMATICS - 1**		
Course Code: C102			
Course outcomes			
CO1	Apply various techniques in solving differential equations with constant and variable coefficients. (K3)		
CO2	Gain knowledge on limits, continuity and rules of differentiation and apply them to find the derivative of various functions. (K2)		
CO3	Understand the concepts of partial differentiation, total derivatives and Jacobian. (K2)		
CO4	Evaluate integrals using both Riemann sums, fundamental theorem of calculus and various integration techniques and determine the convergence and divergence of improper integrals. (K3)		
CO5	Apply various integration techniques to compute multiple integrals and find the area and volume using double and triple integrals respectively (K4)		

Subject Code:	PH8151	Semester	1
Subject Name:	ENGINEERING PHYSICS		
Course Code: C103			
Course outcomes			
CO1	Understand the basics of properties of matter and its applications. (K2)		
CO2	Acquire knowledge on the concepts of waves and optical devices and their applications in fibre optics (K1)		
CO3	Evaluate the concepts of thermal properties of materials and their applications in expansion joints and heat exchangers (K3)		
CO4	Get knowledge on advanced physics concepts of quantum theory and its applications in tunneling microscopes (K1)		
CO5	Understand the basics of crystals, their structures and different crystal growth techniques (K3)		

Subject Code:	CY8151	Semester	1
Subject Name:	ENGINEERING CHEMISTRY		
Course Code: C104			
Course outcomes			
CO1	Identify the origin of water resources and develop innovative methods to produce soft water for industrial use and potable water at cheaper cost. (K2)		
CO2	Explore the fundamental concepts in surface chemistry and their application in the field of catalysis. (K5)		
CO3	Gain knowledge about phase diagrams and their applications of heterogeneous equilibrium. Emphasis on heat treatment of alloys and applications. (K4)		
CO4	Understand the chemistry of fuels and combustion and its application in various levels. (K3)		
CO5	Acquire the basics of non-conventional sources of energy and understand the principles and the reaction mechanism of batteries and fuel cells. (K4)		

Subject Code:	GE8151	Semester	1
Subject Name:	PROBLEM SOLVING AND PYTHON PROGRAMMING		
Course Code: C105			
Course outcomes			
CO1	Understand the syntax of python program statements. (K2)		
CO2	Illustrate simple python programs using branching statements(K4)		
CO3	Illustrate python programs using List, Tuples, dictionaries. (K4)		
CO4	Compare different programming structures of python. (K5)		
CO5	Develop a python program for a given problem. (K6)		

Subject Code:	GE8152	Semester	1
Subject Name:	ENGINEERING GRAPHICS		
Course Code: C106			
Course outcomes			
CO1	Communicate thoughts and ideas graphically in a neat fashion and ability to perform free hand sketching of basic geometrical constructions, curves used in engineering practices, multiple views of objects.(K2)		
CO2	Understand the concepts of orthographic projection from lines and plane surfaces (K2)		
CO3	Acquire the knowledge of Orthographic projection in three dimensions from solids of basic shapes using change of position and change of reference line method (K3)		
CO4	Understand the interior shapes of machine elements and structures through sections of solids and development of lateral surfaces. (K3)		
CO5	Understand the three dimensional view of an object using isometric and perspective projections. (K4)		

Subject Code:	GE8161	Semester	1
Subject Name:	PROBLEM SOLVING AND PYTHON PROGRAMMING LAB		
Course Code: C107			
Course outcomes			
CO1	Write, test and debug simple Python programs.(K1)		
CO2	Implement Python programs with conditionals and loops. (K3)		
CO3	Develop the Python programs step-wise by defining functions and calling hem (K4)		
CO4	Use Python lists, tuples, dictionaries for representing compound data.(K3)		
CO5	Read and write data from/to files in Python.(K1)		

Subject Code:	BS8161	Semester	1
Subject Name:	PHYSICS AND CHEMISTRY LAB		
Course Code: C108			
Course outcomes			
CO1	Apply the principles of Laser for engineering applications (K3)		
CO2	Understand the basic knowledge of elasticity (K2)		
CO3	Know the practical applications of thermal physics (K2)		
CO4	Acquire practical skills in the determination of water quality parameters through volumetric method (K3)		
CO5	Understand the practical knowledge on pH and conductometric titrations (K2)		

Subject Code:	HS8251	Semester	2
Subject Name:	TECHNICAL ENGLISH		
Course Code: C109			
Course outcomes			
CO1	Read, identify the transition in texts and comprehend scientific and technical contexts in an enhanced way. (K1)		
CO2	Read and interpret data from graphical representations and charts in an effective way. (K2)		
CO3	Write reports effectively using appropriate vocabulary and accurate spelling and grammar. (K6)		
CO4	Draft job application letters with Resume and e-mails in a convincing manner. (K2)		
CO5	Describe processes, participate in formal and informal conversations, Group Discussions and make technical presentations effectively. (K6)		

Subject Code:	MA8251	Semester	2
Subject Name:	ENGINEERING MATHEMATICS – II		
Course Code: C110			
Course outcomes			
CO1	Evaluate Eigen values and Eigen vectors and apply them in diagonalization of matrices. (K5)		
CO2	Acquire knowledge in the fundamentals and basic concepts in vector calculus. (K4)		
CO3	Apply the concept of analyticity in complex functions and evaluate complex derivatives. (K3)		
CO4	Recognize the nature of singularities, evaluate residues and contour integrals. (K2)		
CO5	Understand the usage of Laplace transforms in mathematics and apply in relevant situations (K2)		

Subject Code:	PH8252	Semester	2
Subject Name:	PHYSICS FOR INFORMATION SCIENCE		
Course Code: C111			
Course outcomes			
CO1	Gain knowledge on classical and quantum electron theories and energy band structures (K2)		
CO2	Acquire knowledge basics of semiconductor physics and its applications in various devices (K2)		
CO3	Get knowledge on magnetic properties of materials and their applications in data storage. (K2)		
CO4	Have the necessary understanding on the functioning of optical material for optoelectronics (K3)		
CO5	Understand the basics of quantum structures and their applications in carbon electronics. (K2)		

Subject Code:	BE8255	Semester	2
Subject Name:	BASIC ELECTRICAL, ELECTRONICS AND MEASUREMENT ENGINEERING		
Course Code: C112			
Course outcomes			
CO1	Understand the basic concepts of electric circuits analysis (K2)		
CO2	Learn the basic concepts of both AC and DC Mchines(K2)		
CO3	Familiar about the working of different type of lamps and other electrical appliances.(K2)		
CO4	Realize the basic electronic devices and its applications (K4)		
CO5	Analyze the working of different types of measuring instruments and various Transducers.(K4)		

Subject Code:	IT8201	Semester	2
Subject Name:	INFORMATION TECHNOLOGY ESSENTIALS		
Course Code: C113			
Course outcomes			
CO1	Design and deploy web-sites (K3)		
CO2	Design and deploy simple web-applications (K3)		
CO3	Create simple database applications (K3)		
CO4	Develop information system (K4)		
CO5	Describe the basics of networking and mobile communications (K2)		

Subject Code:	CS8251	Semester	2
Subject Name:	PROGRAMMING IN C		
Course Code: C114			
Course outcomes			
CO1	Develop simple applications in C using basic constructs (K4)		
CO2	Design and implement applications using arrays and strings (K3)		
CO3	Develop and implement applications in C using functions and pointers (K4)		
CO4	Develop applications in C using structures (K4)		
CO5	Design applications using sequential and random access file processing (K3)		

Subject Code:	GE8261	Semester	2
Subject Name:	ENGINEERING PRACTICES LAB		
Course Code: C115			
Course outcomes			
CO1	Elaborate on the components, gates, soldering practices.Calculate electrical parameters such as voltage, current, resistance and power. (K2)		
CO2	Measure the electrical energy by single phase and three phase energy meters. (K3)		
CO3	Prepare the carpentry and plumbing joints. (K2)		
CO4	Perform different types of welding joints and sheet metal works (K2)		
CO5	Perform different machining operations in lathe and drilling (K2)		

Subject Code:	CS8261	Semester	2
Subject Name:	C PROGRAMMING LAB		
Course Code: C116			
Course outcomes			
CO1	Develop C programs for simple applications making use of basic constructs, array (K4)		
CO2	Develop C programs involving Strings & functions. (K4)		
CO3	Develop C programs involving recursion & pointers. (K4)		
CO4	Design applications using Structures. (K3)		
CO5	Design applications using file Concepts. (K3)		

Subject Code:	IT8211	Semester	2
Subject Name:	INFORMATION TECHNOLOGY ESSENTIALS LAB		
Course Code: C117			
Course outcomes			
CO1	Design interactive websites using basic HTML tags, different styles, links and with all basic control elements. (K3)		
CO2	Create client and server side programs using scripts and PHP (K4)		
CO3	Design dynamic websites and handle multimedia components (K3)		
CO4	Create application with PHP connected to database (K4)		
CO5	Create Personal Information System and study the technologies associated with mobile communication (K4)		

Subject Code:	MA8351	Semester	3
Subject Name:	DISCRETE MATHEMATICS		
Course Code: C201			
Course outcomes			
CO1	Acquire knowledge in testing the logic of a program (K2)		
CO2	Evaluate problems using the counting principles (K4)		
CO3	Understand the concepts of graphs, connected graphs, Euler and Hamilton graphs.(K2)		
CO4	Understand properties of algebraic structures such as groups, rings and fields. (K2)		
CO5	Analyze the class of functions which transform a finite set into another finite set which relates to input and output functions in computer science. (K4)		

Subject Code:	CS8351	**Semester**	**3**
Subject Name:	**DIGITAL PRINCIPLES AND SYSTEM DESIGN**		
Course Code: C202			
Course outcomes			
CO1	Design digital circuits using simplified Boolean functions (K3)		
CO2	Analyze and design combinational circuits (K4)		
CO3	Analyze and design synchronous and asynchronous sequential circuits (K4)		
CO4	Understand Programmable Logic Devices (K2)		
CO5	Develop HDL code for combinational and sequential circuits (K4)		

Subject Code:	CS8391	**Semester**	**3**
Subject Name:	**DATA STRUCTURES**		
Course Code: C203			
Course outcomes			
CO1	Understand the concept of abstract data type and its types.(K2)		
CO2	Analyze the applications of linear data structure using Stack and Queue implementation.(K4)		
CO3	Evaluate the expression using the Non-Linear Data Structure Trees. (K3)		
CO4	Create and apply the basic concepts of the Non-Linear Data Structure - Graph in finding the shortest path. (K4)		
CO5	Illustrate the various sorting algorithms and Hashing Techniques with examples(K3)		

Subject Code:	CS8392	**Semester**	**3**
Subject Name:	**OBJECT ORIENTED PROGRAMMING**		
Course Code: C204			
Course outcomes			
CO1	Comprehend Object Oriented Programming Concepts in Java (K2)		
CO2	Apply the Object Oriented Programming Concepts such as inheritance and interfaces to develop the reusable Applications (K3)		
CO3	Illustrate the object oriented applications using Java Exceptions and I/O Streams (K2)		
CO4	Understand Multi-threading and Generic Classes in Java (K2)		
CO5	Apply AWT to develop simple Graphical User Interface Applications (K4)		

Subject Code:	EC8394	**Semester**	**3**
Subject Name:	**ANALOG AND DIGITAL COMMUNICATION**		
Course Code: C205			
Course outcomes			
CO1	Apply analog communication techniques.(K2)		
CO2	Use data and pulse communication techniques (K4)		
CO3	Apply Digital communication techniques. (K4)		
CO4	Analyze Source and Error control coding (K5)		
CO5	Utilize multi-user radio communication. (K4)		

Subject Code:	CS8381	Semester	3
Subject Name:	DATA STRUCTURES LAB		
Course Code: C206			
Course outcomes			
CO1	Write functions to implement linear and non-linear data structure operations.(K2)		
CO2	Implement the different operations of search trees. (K3)		
CO3	Implement the Graph Traversal Algorithm. (K3)		
CO4	Implement Various searching and Sorting Algorithm. (K3)		
CO5	Apply appropriate hash functions that result in a collision free scenario for data storage and retrieval. (K4)		

Subject Code:	CS8383	Semester	3
Subject Name:	OBJECT ORIENTED PROGRAMMING LAB		
Course Code: C207			
Course outcomes			
CO1	Develop and implement Java programs for simple applications that make use of classes (K4)		
CO2	Develop and implement Java programs for simple applications that make use of packages and interfaces (K4)		
CO3	Develop and implement Java programs with array list, exception handling and multithreading (K4)		
CO4	Design applications using file processing (K3)		
CO5	Design applications using generic programming and event handling & Java Swing (K3)		

Subject Code:	CS8382	Semester	3
Subject Name:	DIGITAL SYSTEMS LAB		
Course Code: C208			
Course outcomes			
CO1	Use Boolean simplification techniques to design a combinational hardware circuit. (K2)		
CO2	Design and implement combinational and sequential circuits. (K4)		
CO3	Analyze a given digital circuit-combinational and sequential. (K4)		
CO4	Design the different functional units in a digital computer system (K5)		
CO5	Design and implement a simple digital system. (K4)		

Subject Code:	HS8381	Semester	3
Subject Name:	Intepersonal Skills/Listening & Speakng		
Course Code: C209			
Course outcomes			
CO1	Listen and respond appropriately. (K2)		
CO2	Participate in group discussions (K2)		
CO3	Make effective presentations (K3)		
CO4	Involve confidently and appropriately in conversations both formal and informal (K3)		
CO5	Understand the role of communication in personal & professional success (K2)		

Subject Code:	MA8391	Semester	4
Subject Name:	PROBABILITY AND STATISTICS		
Course Code: C210			
Course outcomes			
CO1	Use basic counting techniques (multiplication rule, combinations and permutations) to compute probability and odds. Compute conditional probabilities directly and using Bayes' theorem, and check for independence of events. Know basic properties of the binomial, Poisson, Gaussian and other distributions and apply them in engineering and computer science applications. Determine the expectation and variance of a random variable from its distribution. (K2)		
CO2	Use 2-dimensional random vectors to model experiments with two simultaneous outcomes and compute correlation and regression of two dimensional random variables. Understand the central limit theorem. (K2)		
CO3	Learn how to formulate and test hypotheses about means, variances and proportions and to draw conclusions based on the results of statistical tests. (K2)		
CO4	Understand how the analysis of variance procedures can be used to determine if means of more than two populations are equal (K2)		
CO5	Understand the fundamentals of quality control and the methods used to control systems and processes. (K2)		

Subject Code:	CS8491	Semester	4
Subject Name:	COMPUTER ARCHITECTURE		
Course Code: C211			
Course outcomes			
CO1	Understand the basic structure, hardware-software interface and operation of digital computers. (K2)		
CO2	Apply the fixed and floating point operations in arithmetic and logical unit. (K3)		
CO3	Design and analyse the concepts and control units of pipelining. (K4)		
CO4	Understand and evaluate the processing activities of parallel processing architectures. (K2)		
CO5	Evaluate performance of memory systems including cache and virtual memory with I/O device communications (K4)		

Subject Code:	CS8492	Semester	4
Subject Name:	DATABASE MANAGEMENT SYSTEMS		
Course Code: C212			
Course outcomes			
CO1	To learn the fundamentals of data models and to represent a database system using ER diagrams. (K2)		
CO2	To study SQL and relational database design. (K2)		
CO3	To understand the internal storage structures using different file and indexing techniques which will help in physical DB design. (K2)		
CO4	To understand the fundamental concepts of transaction processing-concurrency control techniques and recovery procedures. (K2)		
CO5	To have an introductory knowledge about the Storage and Query processing Techniques (K2)		

Subject Code:	CS8451	Semester	4
Subject Name:	DESIGN AND ANALYSIS OF ALGORITHMS		
Course Code: C213			
Course outcomes			
CO1	Analyze worst-case running times of algorithms using asymptotic analysis and argue the correctness of algorithms using inductive proofs and invariants. (K3)		
CO2	Illustrate how computing problems are solved using brute force and divide and conquer methods (K2)		
CO3	Demonstrate how problems are solved using dynamic programming and greedy techniques (K3)		
CO4	Illustrate the iterative improvement method for problem solving (K2)		
CO5	Find the limitations of algorithms and apply backtracking and branch and bound techniques to solve the problems (K3)		

Subject Code:	CS8493	Semester	4
Subject Name:	OPERATING SYSTEMS		
Course Code: C214			
Course outcomes			
CO1	Design various Scheduling algorithms. (K2)		
CO2	Apply the principles of concurrency, Design deadlock, prevention and avoidance algorithms. (K3)		
CO3	Compare and contrast various memory management schemes. (K4)		
CO4	Design and Implement a prototype file systems. (K5)		
CO5	Perform administrative tasks on Linux Servers, Compare iOS and Android Operating Systems. (K3)		

Subject Code:	GE8291	Semester	4
Subject Name:	ENVIRONMENTAL SCIENCE AND ENGINEERING		
Course Code: C215			
Course outcomes			
CO1	Understand the basics of Structure and functions of an ecosystem, the values of biodiversity and conservation of biodiversity. (K2)		
CO2	Understand the causes, effects and control measures of different pollution and disasters. (K2)		
CO3	Remember the importance of natural resources and to know the role of an individual in conservation of natural resources and their case studies. (K1)		
CO4	Gain knowledge about the concept of Sustainable development, Environmental Laws and role of Government and Non- Governmental Organizations (NGO) in Environmental Protection. (K2)		
CO5	Learn the importance of family welfare programs, population explosion and Value education. (K2)		

Subject Code:	CS8481	Semester	4
Subject Name:	DATABASE MANAGEMENT SYSTEMS LAB		
Course Code: C216			
Course outcomes			
CO1	Use typical data definitions and manipulation commands (K2)		
CO2	Design applications to test Nested and Join Queries (K4)		
CO3	Implement simple applications that use Views (K4)		
CO4	Implement applications that require a Front-end Tool (K4)		
CO5	Critically analyze the use of Tables, Views, Functions and Procedures (K3)		

Subject Code:	CS8461	Semester	4
Subject Name:	OPERATING SYSTEMS LAB		
Course Code: C217			
Course outcomes			
CO1	Learn the basic Unix commands and shell programming. (K2)		
CO2	Be exposed to Programming in C using system calls (K4)		
CO3	Be familiar with implementation of CPU scheduling Algorithm and file allocation and organisation methods. (K4)		
CO4	Implement Deadlock avoidance and Detection algorithms and various Page replacement algorithms. (K5)		
CO5	Create a process and implement an IPC and synchronization application. (K4)		

Subject Code:	MA8551	Semester	5
Subject Name:	ALGEBRA AND NUMBER THEORY		
Course Code: C301			
Course outcomes			
CO1	Know the fundamental definitions and results in group theory, ring theory, integral domain and fields.		
CO2	State and establish elementary propositions relating irreducibility, roots and factorization in polynomial rings over a field.		
CO3	Define and interpret the concepts of divisibility, congruence, greatest common divisor, prime and prime-factorization.		
CO4	Solve linear Diophantine equations and linear congruences.		
CO5	Solve polynomial congruences using Chinese remainder theorem.		
CO6	Apply Euler-Fermat's theorem to prove relations involving prime numbers.		

Subject Code:	CS8591	Semester	5
Subject Name:	COMPUTER NETWORKS		
Course Code: C302			
Course outcomes			
CO1	Understand the basic layers and its functions in computer networks (K2)		
CO2	Evaluate the performance of a network (K5)		
CO3	Understand the basics of how data flows from one node to another (K2)		
CO4	Analyze and design routing algorithms.(K4)		
CO5	Design protocols for various functions in the network(K6)		
CO6	Understand the working of various application layer protocols (K2)		

Subject Code:	EC8691	Semester	5
Subject Name:	MICROPROCESSORS AND MICROCONTROLLERS		
Course Code: C303			
Course outcomes			
CO1	Restate the architecture, memory organization of 8086 and 8051.(K2)		
CO2	Identify the different ways of interfacing memory,I/O with 8086 and 8051 (K1)		
CO3	Apply the programming using ALP in 8086 and 8051 for arithmetic logical and real time applications.(K3)		
CO4	Analyze the interfacing concept of different programmable interfacing devices.(K4)		
CO5	Developing programming concepts for various applications.(K6)		
CO6	Design microprocessor and microcontroller based applications.(K6)		

Subject Code:	IT8501	Semester	5
Subject Name:	WEB TECHNOLOGY		
Course Code: C304			
Course outcomes			
CO1	Describe the fundamental concepts to develop web pages.(K2)		
CO2	Apply the various Client side scripting technologies to design interactive web pages.(K3)		
CO3	Apply the various Server side scripting technologies to design interactive web pages.(K3)		
CO4	Analyze the Advanced web technologies.(K4)		
CO5	Evaluate the web page using web technologies.(K5)		
CO6	Review the web technologies. (K2)		

Subject Code:	CS8494	Semester	5
Subject Name:	SOFTWARE ENGINEERING		
Course Code: C305			
Course outcomes			
CO1	Identify the key activities in managing a software project and understand the agile methodology**(K1)**		
CO2	Analyze different process models and apply to real world problems **(K4)**		
CO3	Understand the concepts of requirements engineering and Analysis Modeling. (**K2)**		
CO4	Apply systematic procedure for software design and deployment**. (K3)**		
CO5	Compare and contrast various testing and maintenance methods.**(K2)**		
CO6	Interpret the project schedule, estimate project cost and effort required.**(K2)**		

Subject Code:	OBT554	Semester	5
Subject Name:	PRINCIPLES OF FOOD PRESERVATION		
Course Code: C306 (a)			
Course outcomes			
CO1	Acquire knowledge about the basic concepts and principles of food preservation techniques.(K1)		
CO2	Demonstrate the crop harvesting methods and basic food processing techniques for fish, meat, fruits and vegetables.(K2		
CO3	Illustrate the methods for freezing and packaging of raw and processed foods. (K2)		
CO4	Identify and apply the processing operations used food preservation including thermal processing methods. (K3)		
CO5	Interpret the different types of dryers and freezers used in food storage. (K3)		
CO6	Disseminate the non thermal methods of food preservation. (K2)		

Subject Code:	OEC552	Semester	5
Subject Name:	SOFT COMPUTING		
Course Code: C306 (b)			
Course outcomes			
CO1	Describe various soft computing concepts for building practical applications. (**K2**)		
CO2	Review the concepts of neural networks and its algorithms to address real time problems. (**K2**)		
CO3	Apply fuzzy rules and reasoning to develop decision making and expert system. (**K3**)		
CO4	Classify the importance of optimization techniques and genetic programming. (**K4**)		
CO5	Evaluate and compare different solutions by various soft computing approaches for a given problem. **(K5)**		
CO6	Compose various hybrid soft computing techniques. **(K6)**		

Subject Code:	EC8681	Semester	5
Subject Name:	MICROPROCESSORS AND MICROCONTROLLERS LAB		
Course Code: C307			
Course outcomes			
CO1	Write ALP Programmes for fixed and Floating Point Arithmetic operations (k2)		
CO2	Interface different I/Os with processor (K2)		
CO3	Generate waveforms using Microprocessors (K2)		
CO4	Understand the working of MASM and execute programs in MASM (K2)		
CO5	Execute Programs in 8051 (K3)		
CO6	Explain the difference between simulator and Emulator (K2)		

Subject Code:	**CS8581**	**Semester**	**5**
Subject Name:	**NETWORKS LABORATORY**		
Course Code: C308			
Course outcomes			
CO1	Implement various protocols using TCP and UDP. **(K3)**		
CO2	Compare the performance of different transport layer protocols. **(K2)**		
CO3	Use simulation tools to analyze the performance of various network protocols. **(K3)**		
CO4	Analyze various routing algorithms. **(K4)**		
CO5	Implement error correction codes. **(K3)**		
CO6	Experimenting to know the concept of data transfer between nodes. **(K3)**		

Subject Code:	**IT8511**	**Semester**	**5**
Subject Name:	**WEB TECHNOLOGY LAB**		
Course Code: C309			
Course outcomes			
CO1	Design and develop basic websites using Client side scripting.(K6)		
CO2	Design and implement user interactive dynamic web based applications using server scripting. (K6)		
CO3	Infer the information interchange formats of XML, contrast document parsing with SAX and DOM. (K2)		
CO4	Learn the installation procedure of Apache Tomcat Server. (K2)		
CO5	Develop web applications that interact with data bases(K6)		
CO6	Examine client server communication using web services. (K4)		

Subject Code:	IT8601	Semester	6
Subject Name:	COMPUTATIONAL INTELLIGENCE		
Course Code: C310			
Course outcomes			
CO1	Discuss the fundamental concepts and Problem-solving through various searching techniques in Computational Intelligence (K2)		
CO2	Apply basic principles of AI in solutions that require problem solving, inference, perception, knowledge representation, and learning. (K3)		
CO3	Apply the fuzzy logic control and -Neuro-fuzzy Inference to design the fuzzy control using genetic algorithm. (K3)		
CO4	Review problem solving skills using the acquired knowledge in the areas of, reasoning, natural language , Expert systems ,understanding, computer vision, prolog programming and machine learning (k2)		
CO5	Demonstrate awareness and a fundamental understanding of various applications of AI techniques in intelligent agents, expert systems, artificial neural networks and other machine learning models. (K3)		
CO6	Evaluate real time problems on machine learning ,information retrieval and information extraction. (K5)		

Subject Code:	CS8592	Semester	6
Subject Name:	OBJECT ORIENTED ANALYSIS AND DESIGN		
Course Code: C311			
Course outcomes			
CO1	Understand the fundamentals of object-oriented method for analysis and design processes **[K2]**		
CO2	Analyze the given problem domain and to design the solution using OOAD techniques / tools **[K4]**		
CO3	Extract an Object Model and Dynamic Model of system functionality from the requirements **[K4]**		
CO4	Design structured, robust, maintainable object-oriented systems across multiple platforms from the specifications developed **[K5]**		
CO5	Evaluate and use various CASE tools for object-oriented software **[K5]**		
CO6	Demonstrate various issues for object oriented testing **[K3]**		

Subject Code:	IT8602	Semester	6
Subject Name:	MOBILE COMMUNICATION		
Course Code: C312			
Course outcomes			
CO1	Understand the principles and theories of mobile communication technologies. **K2**		
CO2	Understand and Identify the GSM, GPRS and Bluetooth software model for mobile communication **K2**		
CO3	Review the various Wireless and Medium Access Protocols and technologies. **K2**		
CO4	Inspect the architectures of various wireless LAN technologies **K4**		
CO5	Determine the functionality of network layer and Identify a routing protocol for a given Adhoc networks **K5**		
CO6	Summarize the functionality of Transport and Application layer **K2**		

Subject Code:	CS8091	Semester	6
Subject Name:	BIG DATA ANALYTICS		
Course Code: C313			
Course outcomes			
CO1	Discuss the concepts of big data, data storage , big data tools and techniques**.(K2)**		
CO2	Recognize and apply various clustering and classification algorithms. **(K1)**		
CO3	Execute different mining algorithms and evaluate them for different data sets**.(K4)**		
CO4	Evaluate the various recommendation systems for real time problems. **(K4)**		
CO5	To understand the concepts of data stream and stream analytics**.(K2)**		
CO6	Appraise the merits of various NoSQL databases and their applications. **(K5)**		

Subject Code:	CS8092	Semester	6
Subject Name:	COMPUTER GRAPHICS AND MULTIMEDIA		
Course Code: C314			
Course outcomes			
CO1	Identify various Illumination and color models.(K 2)		
CO2	Explain line drawing Algorithms, circle drawing Algorithms and ellipse drawing Algorithms.(K 2)		
CO3	Determine two dimensional transformations, clipping, viewing in Graphics. (K 3)		
CO4	Examine three dimensional transformation, clipping, viewing in Graphics.(K 3)		
CO5	Summarize different types of Multimedia File Format.(K 2)		
CO6	Design Basic 3d Scenes using Blender.(K 5)		

Subject Code:	IT8076	Semester	6
Subject Name:	SOFTWARE TESTING		
Course Code: C315 (a)			
Course outcomes			
CO1	Understand about the Software Testing Principles and Defect Classes (K2)		
CO2	Design test cases suitable for a software development for different domains. (K6)		
CO3	Identify suitable tests to be carried out. (K2)		
CO4	Prepare test planning based on the document and document test plans (k6)		
CO5	Use automatic testing tools.(k3)		
CO6	Develop and validate a test plan. (k6)		

Subject Code:	IT8001	Semester	6
Subject Name:	INFORMATION STORAGE AND MANAGEMENT		
Course Code: C315 (b)			
Course outcomes			
CO1	Understand the logical and the physical components of a Storage infrastructure with virtualization techniques.**(K2)**		
CO2	Describe the different types of RAID implementations and Intelligent Storage System**.(K2)**		
CO3	Evaluate the architecture of storage networking technologies such as DAS, SAN,IP SAN, NAS**.(K4)**		
CO4	Analyse the various storage architectures and compare the key elements in classic and virtualized environments.**(K4)**		
CO5	Assess the business continuity solutions with different backup and recovery techniques.**(K5)**		
CO6	Construct the Information Storage System Environment by applying various archives for managing fixed content and different replication technologies. **(K5)**		

Subject Code:	CS8662	Semester	6
Subject Name:	MOBILE APPLICATION DEVELOPMENT LABORATORY		
Course Code: C316			
Course outcomes			
CO1	Understand the principles and theories of mobile communication technologies. **K2**		
CO2	Understand and Identify the GSM, GPRS and Bluetooth software model for mobile communication **K2**		
CO3	Review the various Wireless and Medium Access Protocols and technologies. **K2**		
CO4	Inspect the architectures of various wireless LAN technologies **K4**		
CO5	Determine the functionality of network layer and Identify a routing protocol for a given Adhoc networks **K5**		
CO6	Summarize the functionality of Transport and Application layer **K2**		

Subject Code:	CS8582	Semester	6
Subject Name:	OBJECT ORIENTED ANALYSIS AND DESIGN LABORATORY		
Course Code: C317			
Course outcomes			
CO1	Make use of object oriented analysis and design concepts to solve a given problem specifications **K3**		
CO2	Identify and map basic software requirements in UML mapping. **K4**		
CO3	Apply design patterns to improve the software quality **K3**		
CO4	Test the compliance of the software with SRS **K3**		
CO5	Map the object oriented design to the developed code **K3**		
CO6	Apply object oriented design to develop software **K3**		

Subject Code:	IT8611	Semester	6
Subject Name:	MINI PROJECT		
Course Code: C318			
Course outcomes			
CO1	State the technical importance of the problem and societal contribution **[K1]**		
CO2	Identify and survey the relevant literature for getting exposed to related solutions**[K2]**		
CO3	Build project plans with feasible requirements.**[K3]**		
CO4	Analyse, design and develop adaptable and reusable solutions**[K4]**		
CO5	Implement and test solutions to trace against the user requirements **[K5]**		
CO6	Deploy and Demonstrate the solutions for future scope for improvement **[K6]**		

Subject Code:	HS8581	Semester	6
Subject Name:	PROFESSIONAL COMMUNICATION		
Course Code: C319			
Course outcomes			
CO1	Implement the employability and career skills relevant to engineering as a profession (K4)		
CO2	Demonstrate a better understanding of the communication process by applying communication theories communication (K3)		
CO3	Adapt the skills towards grooming as a professional (K3)		
CO4	Execute and develop a planned approach towards building a career (K4)		
CO5	Identify different types of personal interview skills through mock interviews and practices (K2)		
CO6	Discuss and develop critical thinking ability and perform well in group discussions (K4)		

Subject Code:	MG8591	Semester	7
Subject Name:	PRINCIPLES OF MANAGEMENT		
Course Code: C401			
Course outcomes			
CO1	Clear understanding of managerial functions like planning, and have same basic knowledge on international aspect of management (K2)		
CO2	To have a deep understanding about the organization and trends (K2)		
CO3	To understand the planning process in the organization (K2)		
CO4	To understand the concept of organization (K2)		
CO5	Demonstrate the ability to directing ,leadership and communicate effectively (K3)		
CO6	To analysis isolate issues and formulate best control methods. (K4)		

Subject Code:	CS8792	Semester	7
Subject Name:	CRYPTOGRAPHY AND NETWORK SECURITY		
Course Code: C402			
Course outcomes			
CO1	Discuss the mechanisms, attacks and services in security using cryptography.(K2)		
CO2	Apply basics of mathematics in encryption and authentication algorithms. (K3)		
CO3	Review the System security standards in OSI Layers. (K2)		
CO4	Evaluate the data integrity using Symmetric Encryption algorithms. (K5)		
CO5	Evaluate the data integrity based on Asymmetric Encryption algorithms. (K5)		
CO6	Apply Data authentications mechanism for a web based application. (K3)		

Subject Code:	CS8791	Semester	7
Subject Name:	CLOUD COMPUTING		
Course Code: C403			
Course outcomes			
CO1	Articulate the main concepts, key technologies, strengths and limitations of cloud computing. **(K2)**		
CO2	Learn the key and enabling technologies that help in the development of cloud. **(K2)**		
CO3	Develop the ability to understand and use the architecture of compute and storage cloud**(K3)**		
CO4	Illustrate the core issues of cloud computing such as resource management and security. **(K4)**		
CO5	Evaluate and use current cloud technologies for the given scenario. **(K5)**		
CO6	Build an cloud application by choosing the appropriate technologies, algorithms and approaches for implementation and use of cloud. **(K6)**		

Subject Code:	OCY751	Semester	7
Subject Name:	WASTEWATER TREATMENT		
Course Code: C404 (a)			
Course outcomes			
CO1	Will have knowledge on water quality standards (K2)		
CO2	Will gain knowledge on preliminary treatment of water.(K2)		
CO3	Will gain knowledge on treatment of water for industrial standards(K2)		
CO4	Will gain knowledge on conventional treatment methods(K2)		
CO5	Will gain knowledge on wastewater characteristics and treatment and treatment and handling of sludge(K2)		
CO6	Will gain knowledge on advanced treatment processes(K2)		

Subject Code:	OCH752	Semester	7
Subject Name:	ENERGY TECHNOLOGY		
Course Code: C404 (b)			
Course outcomes			
CO1	Learn the basics of energy, energy scenario, various types of energy systems and energy conservation principles. (K2).		
CO2	Apply engineering techniques to understand energy scenario, thermal, hydel, nuclear, solar, wind, ocean, tidal, biomass and energy conservation. (K3)		
CO3	Choosing proper methodology to harvest energy from thermal and hydel energy systems.(K3)		
CO4	Integrating the various methods of power generation using nuclear, solar, wind, ocean, tidal energy systems and implementing them in real time usage. (K3)		
CO5	Categorizing the implication of biomass energy systems. (K4)		
CO6	Moderating of energy conservation systems. (K5)		

Subject Code:	IT8075	Semester	7
Subject Name:	SOFTWARE PROJECT MANAGEMENT		
Course Code: C405			
Course outcomes			
CO1	Understand Project Management principles while developing software. **(K2)**		
CO2	Gain extensive knowledge about the basic project management concepts, framework and the process models. **(K1)**		
CO3	Obtain adequate knowledge about software process models and software effort estimation techniques **(K2)**		
CO4	Applying the network planning models and estimate the risks involved in various project activities. **(K3)**		
CO5	Define the checkpoints, project reporting structure, project progress and tracking mechanisms using project management principles. **(K1)**		
CO6	Learn staff selection process and the issues related to people management **(K1)**		

Subject Code:	CS8079	Semester	7
Subject Name:	HUMAN COMPUTER INTERACTION		
Course Code: C406			
Course outcomes			
CO1	Explain the importance of HCI study and principles of user-centered design (UCD) approach.(K4)		
CO2	Understanding of human factors in HCI design.(K2)		
CO3	Examine and Discuss various models, paradigms and context of interactions.(K1)		
CO4	Evaluate effective user-interfaces following a structured and organized user-centered design		
CO5	Design mobile and web interfaces using tools by studying its concepts.(K6)		
CO6	Illustrate the real time scenario with HCI concepts.(K3)		

Subject Code:	IT8711	Semester	7
Subject Name:	FOSS AND CLOUD COMPUTING LABORATORY		
Course Code: C407			
Course outcomes			
CO1	Learn GCC and Version Control System (K3)		
CO2	Configure various virtualization tools such as Virtual Box, VMware workstation.(K3)		
CO3	Design and deploy a web application in a PaaS environment.(K5)		
CO4	Learn how to simulate a cloud environment to implement new schedulers. (K3)		
CO5	Install and use a generic cloud environment that can be used as a private cloud.(K3)		
CO6	Install and use Hadoop (K3)		

Subject Code:	IT8761	Semester	7
Subject Name:	SECURITY LABORATORY		
Course Code: C408			
Course outcomes			
CO1	Implement the classical substitution and transposition techniques. (K3)		
CO2	Build cryptosystems by applying symmetric Key Algorithms (K3)		
CO3	Build cryptosystems by applying Asymmetric Key Algorithms (K3)		
CO4	Evaluate security mechanisms using Hash Functions. (K5)		
CO5	Implement different Digital signature algorithms. (K3)		
CO6	Use different open source tools for network security and analysis (K2)		

Subject Code:	GE8076	Semester	8
Subject Name:	PROFESSIONAL ETHICS IN ENGINEERING		
Course Code: C409			
Course outcomes			
CO1	Acquire the basic knowledge of human values, morals, ethics, industrial standards, code of ethics and role of professional ethics in the engineering field. (K2)		
CO2	Understand professional rights and responsibilities of an engineer. (K2)		
CO3	Understand the safety and risk benefit analysis. (K2)		
CO4	Imbibe the various ethical theories developed and apply them for a professional and societal advancement. (K2)		
CO5	Obtain adequate knowledge about the culture & the value system adopted by MNCs, local business houses and to create an ethical based work environment. (K3)		
CO6	Learn to solve the employees' conflict & grievances in an amicable and ethical way. (K2)		

Subject Code:	IT8005	Semester	8
Subject Name:	ELECTRONIC COMMERCE		
Course Code: C410			
Course outcomes			
CO1	Learn the E- Commerce platform and the concepts of designing a website. (K1)		
CO2	Design website using HTML, CSS and JSS. (K5)		
CO3	Understanding the flow of building an E- Commerce website and Mobile apps.(K2)		
CO4	Implement the various security measures in E-Commerce environment.(K3)		
CO5	Analyse and evaluate the business concepts in Digital Marketing.(K4)		
CO6	Create responsive websites to manage maintain and support Web Apps.(K6)		

Subject Code:	**IT8811**	**Semester**	**8**
Subject Name:	**PROJECT WORK**		
Course Code: C411			
Course outcomes			
CO1	State technically and economically feasible problems.**[K1]**		
CO2	Identify and survey the relevant literature for getting exposed to related solutions**[K2]**		
CO3	Analyse, design, and develop adaptable solutions using modern tools.**[K3]**		
CO4	Implement and integrate framed solutions of the problem.**[K4]**		
CO5	Evaluate the solutions to trace against the user requirements.**[K5]**		
CO6	Deploy and Demonstrate the solutions for future scope for improvement.**[K6]**		

COURSE OUTCOMES - REGULATION 2017

COURSE NAME: TECHNICAL ENGLISH - I (HS8151)

COURSE CODE: C101

CO1	Understand the basics of LSRW skills and will able to participate effectively in conversations, to exchange personal information and to express opinions in English. (K2)
CO2	Comprehend reading and listening tasks and also to describe a simple process with a right choice of vocabulary, Acquire new vocabulary identified from the assigned text. (K2)
CO3	Articulate ideas coherently and write on general and creative topics using grammatically correct sentences. (K3)
CO4	Read, comprehend and interpret articles of a general kind in magazines and newspapers and also write informal letters and e-mails in English employing grammatically correct sentences. (K2)
CO5	Speak clearly, confidently and comprehensively using communicative strategies and write paragraphs and short essays cohesively and coherently. (K4)

COURSE NAME: ENGINEERING MATHEMATICS - I (MA8151)

COURSE CODE: C102

CO1	Apply various techniques in solving differential equations with constant and variable coefficients.(K2)
CO2	Gain knowledge on limits, continuity and rules of differentiation and apply them to find the derivative of various functions.Apply various integration techniques to compute multiple integrals and find the area and volume using double and triple integrals respectively.(K3)
CO3	Apply the concepts of derivative and partial derivatives to find the Maxima and Minima of the function of one and two variables.(K2)
CO4	Understand the concepts of partial differentiation, total derivatives and Jacobian. (K3)

CO5	Evaluate integrals using Riemann sums, fundamental theorem of calculus and various integration techniques and determine the convergence and divergence of improper integrals.(K4)

COURSE NAME: Engineering Physics **(PH8151)**

COURSE CODE: C103

CO1	Gain fundamental knowledge on elasticity and its applications relevant to the field of engineering. (K2)
CO2	will acquire knowledge on the fundamental concepts of oscillatory motion and wave equation (K1)
CO3	understand the basic concepts in laser , fiber optics and crystals, their structures and different crystal growth techniques, their applications in the field of sensors (K3)
CO4	acquire adequate knowledge on the fundamental concepts of thermal properties of materials (K1)
CO5	Gain knowledge on the basic concept of Quantum theory and their application in the field of MicroscopicEngineering. Will gain adequate knowledge on various application based on thermal properties of material (K3)

COURSE NAME: Engineering Chemistry **I (CY 8151)**

COURSE CODE: C104

CO1	An ability to gain knowledge on various water treatment methods, basic design of adsorption systems, and fuels. (K2)
CO2	Develop innovative methods to produce soft water for industrial use and potable water at cheaper cost. (K4)
CO3	Analyze principles of kinetics and mechanisms of surface reactions. (K3)
CO4	Make use of the phase rule in identifying its applications in metallurgy and manufacture of alloys. (K3)

CO5	Acquire basic knowledge of methods to determine the calorific value of fuels and combustion analysis. Disseminating the knowledge about alternative energy sources and energy storage devices. (K4)

COURSE NAME: Engineering Graphics **(GE 8152)**

COURSE CODE: C105

CO1	Relate thoughts and ideas graphically in a neat fashion and ability to perform sketching of engineering curves used in engineering practices, multiple views of objects.(K2)
CO2	Understand the concepts of orthographic projection of basic geometrical constructions (K2)
CO3	Acquire the knowledge of Orthographic projection in three dimensional object(K3)
CO4	Build a strong foundation to analyse the design in various dimensions using Modelling software's.Apply the concept of Sectioning in the interior shapes of machine elements and structures.(K3)
CO5	Analyse the concepts of design in developing various 3-dimensional projections. (K4)

COURSE NAME: Problem Solving and Python Programming **(GE 8151)**

COURSE CODE: C106

CO1	Understand the syntax of python program statements. (K2)
CO2	Illustrate simple python programs using branching statements(K4)
CO3	Illustrate python programs using List, Tuples, and dictionaries. (K4)

CO4	Illustrate python programs using Files, modules, packages (K4)
CO5	Develop a python program for a given problem and compare different programming structures of python. (K5)

COURSE NAME: Problem Solving and Python Programming **Lab (GE 8161)**

COURSE CODE: C107

CO1	Write, test and debug simple Python programs.(K1)
CO2	Apply the concept of conditionals and loops in Python programs andPyGame.(K3)
CO3	Develop the Python programs step-wise by defining functions and calling hem(K4)
CO4	Use Python lists, tuples, dictionaries for representing compound data.(K3)
CO5	Read and write data from/to files in Python.(K1)

COURSE NAME: BS 8161 - PHYSICS AND CHEMISTRY LABORATORY

COURSE CODE: C108

CO 1	To introduce LASER, Spectrometer experiments to test the basic understanding of physics concepts applied in optics. (K2)
CO 2	To introduce Ultrasonic Interferometer experiments to test basic understanding of physics concepts of sound.(K2)

CO 3	To make the student acquire practical skills in Young's modulus using Non uniform bending method. To introduce Thermal conductivity experiments to test basic understanding of physics concepts.(K 3)
CO 4	To make the student acquire practical skills in the determination of water quality parameters through volumetric methods.(K3)
CO 5	To make the student understand the practical knowledge on pH and conduct metric titrations.(K3)

COURSE NAME: Technical English **(HS 8251)**

COURSE CODE: C109

CO1	The factors that influence the use of grammar and vocabulary in speech and writing, Read, identify the transition in texts and comprehend scientific and technical contexts in an enhanced way. (K1)
CO2	Read and interpret data from graphical representations and charts in an effective way. (K2)
CO3	Write reports effectively using appropriate vocabulary and accurate spelling and grammar. (K6)
CO4	Draft job application letters with Resume and e-mails in a convincing manner. (K2)
CO5	Describe processes, participate in formal and informal conversations, Group Discussions and make technical presentations effectively. (K6)

COURSE NAME: Engineering Mathematics II **(MA 8251)**

COURSE CODE: C110

CO1	Find Eigenvalues and Eigenvectors and diagonalizable the matrix using orthogonal transformation. (K2)
CO2	Compute the derivatives and line integrals of vector functions and learn their applications.(K3)

CO3	Evaluate surface and volume integrals and use these integrals to verify Green's, Gauss Divergence and Stoke's theorems.(K4)
CO4	Understand the significance of differentiability for complex functions and be familiar with the elementary complex functions and their properties.(K3)
CO5	Solve ordinary differential equations using Laplace transform. Identify the nature of singularities, find residues and evaluate contour integrals.(K4)

COURSE NAME: Physics for Electronics Engineering (PH 8253)

COURSE CODE: C111

CO1	gain knowledge on fundamentals Classical and Quantum electron theories (K2)
CO2	gain knowledge on the Energy Band Structures in solids (K2)
CO3	Understand the basics of semiconductor physics and its applications in semiconductor devices, the basics of quantum structures and their size dependent effects. (K3)
CO4	Acquire knowledge on magnetic properties of materials and their applications in data storage. (K2)
CO5	Get necessary understanding on the interaction of light with materials and its role in opto- electronics devices and quantum effect in quantum electronic devices. (K3)

COURSE NAME: BE 8252 BASIC CIVIL AND MECHANICAL ENGINEERING

COURSE CODE: C112

CO1	Understand the various surveying practices involved in the field, and gain knowledge about the properties of the materials like bricks, stones, cement, concrete and steel sections.(K3)

CO2	Understand the principals involved in the building components like foundation, super structure , bridges and dams (K2)
CO3	Ability to understand the concept of working principles of power plants (K3)
CO4	Students can able to identify the types and working principles of IC engines (K4)
CO5	Students can able to understand the concepts of Refrigeration and Air Conditioning (K3)

COURSE NAME: Circuit Theory (EE 8251)

COURSE CODE: C113

CO1	Overview of different types electrical circuits and analysis the DC circuits using network theorem (k1)
CO2	Derive and apply the knowledge solving AC circuit equations using network theorems (k3)
CO3	Study the phenomenon of resonance in coupled circuits (k2)
CO4	Learn the transient response of different types of electric circuits and Model and analyze the electric circuits in various power applications (k5)
CO5	Review the basics of Phasor diagrams of AC poly-phase circuits with balanced and unbalanced load (k4)

COURSE NAME: GE8291 Environmental Science and Engineering

COURSE CODE: C114

CO1	Understand the basics of Structure and functions of an ecosystem, the values of biodiversity and conservation of biodiversity(K2)

CO2	Understand the causes, effects and control measures of different pollution and disasters.(K2)
CO3	Understand the importance of natural resources and to know the role of an individual in conservation of natural resources and their case studies. (K2)
CO4	Understand the concept of sustainable development. Attain brief knowledge on environmental laws and role of Government and Non-Governmental Organizations (NGO) in Environmental Protection.(K3)
CO5	Learn the importance of family welfare programs, population explosion and Value education. (K3)

COURSE NAME: Engineering Practice Lab (GE 8261)

COURSE CODE: C115

CO1	Interpret electrical parameters such as voltage, current, resistance and power (K2)
CO2	Measure the electrical energy by single phase and three phase energy meters. (K2)
CO3	Prepare the carpentry and plumbing joints.(K3)
CO4	Perform different types of welding joints and sheet metal works(K3)
CO5	Perform different machining operations in lathe and drilling, hands on working experience with mechanical systems and electrical instruments (K3)

COURSE NAME: Electric Circuits Lab (EE 8261)

COURSE CODE: C116

CO1	Understand the basic concepts of electric circuits.(K2)
CO2	Understand the concept of applications of circuit theorems. (K2)
CO3	Apply the concepts of various theorems in engineering applications (K3)

CO4	Analyze the importance of various theorems in engineering applications (K4)
CO5	Implementation of various theorems in engineering applications to simulate electric circuits and Design of various theorems in engineering applications (K5)

COURSE NAME: MA8353 Transforms and Partial Differential Equations

COURSE CODE: C201

CO1	To understand the mathematical principles of partial differential equations and formulation of equations. (K2)
CO2	To do the Fourier series analysis in order to learn its applications. (K3)
CO3	To learn the applications of partial differential equations in the complicated Engineering concepts.(K2)
CO.4	To acquaint the student with Fourier transform techniques used in wide variety of situations.(K3)
CO5	To develop Z transform techniques for discrete time signals. (K4)

COURSE NAME: EC 8353 Electronic Devices and Circuits

COURSE CODE: C202

CO1	To understand the Structure and operation of PN junction devices.(K2)
CO2	To understand the Structure and operation of transistors.(K3)
CO3	To understand the operation of amplifiers.(K2)
CO4	To understand the operation of multistage amplifiers and differential amplifiers.(K3)

CO.5	To understand feedback amplifiers and oscillators. (K3)

COURSE NAME: Digital Logic Circuits (EE 8351)

COURSE CODE: C203

CO1	To Remember various number systems, Combinational logic circuits, Sequential logic circuits, digital logic families and PLDs(K1)
CO2	To Understand various number systems, Combinational logic circuits, Sequential logic circuits, digital logic families and PLDs (K2)
CO3	To apply various number systems, Combinational logic circuits, Sequential logic circuits, digital logic families and PLDs (K4)
CO4	To analyze various number systems, Combinational logic circuits, Sequential logic circuits, digital logic families and PLDs(K6)
CO5	To Evaluate various number systems, Combinational logic circuits, Sequential logic circuits, digital logic families and PLDs (K5)

COURSE NAME: Electrical Measurements (EI 8351)

COURSE CODE: C204

CO1	To understand the construction and Principle of Measurement Instrument (K2)
CO2	To derive the torque equation of all measurement instruments. (K2)
CO3	To Apply the comparison of measurements and study the errors in measurement. (K3)
CO4	To Analyze the sensitivity of each measurement devices and evaluate the performance of all measurement Instrument. Their applications (K4)
CO5	To Compute the parameters required for calculating the resistance, impedance in bridge (K4)

COURSE NAME: EI 8352 TRANSDUCER ENGINEERING

COURSE CODE: C205

CO1	To have knowledge about the principles and analysis of sensors, its error and error analysis. (K2)
CO2	To understand the characteristics and response of transducers.(K3)
CO3	To understand and have adequate knowledge about resistance transducers. (K3)
CO4	To study the characteristics of inductance and capacitance Transducers.(K3)
CO5	To understand and have adequate knowledge about various types of transducers.(K3)

COURSE NAME: CS8392 Object Oriented Programming

COURSE CODE: C206

CO1	To understand object-oriented concepts (K2).
CO.2	To understand object oriented programming through C++. (K3)
CO3	To gain the basic knowledge in Object Oriented concepts. (K2)
CO4	To develop applications using Object Oriented Programming Concepts and have an overview of JAVA. (K4)
CO5	Students acquire basic knowledge about Packages, Interfaces, Exception handling and about multithreaded programming. (K3)

COURSE NAME: Measurement and Transducers Lab (EI 8361)

COURSE CODE: C207

CO1	To obtain adequate knowledge in measurement and operation of different types of transducers. **(K1)**
CO2	To understand the characteristics of (LDR, STRAIN GAUGE, LOAD CELL) different types of Resistive transducers. **(K2)**
CO3	To derive and analyze step response of RTD, Thermocouple, Thermister**.(K4)**
CO4	To measure the Resistance, Capacitance and Inductance values using DC and AC Bridges**. (K2)**
CO5	To evaluate angular displacement using capacitive transducer andDesign series and shunt type ohmmeters. **(K5)**

COURSE NAME: CS8383 Object Oriented Programming Lab

COURSE CODE: C208

CO1	To understand object-oriented concepts. (K2)
CO2	To understand object oriented programming through C++. (K2)
CO3	To gain the basic knowledge in Object Oriented concepts. (K3)
CO4	To develop applications using Object Oriented Programming Concepts.(K4)
CO5	To implement features of object oriented programming to solve real world problems.(K4)

COURSE NAME: MA8491 NUMERICAL METHODS

COURSE CODE: C209

CO1	Students gain the ability to solve algebraic, transcendental equations, systems of linear equations and Eigenvalue problems. (K3)
CO2	Thorough knowledge of Interpolation and approximation aid students in construction of approximate polynomials from large sets of experimental data.(K3)
CO3	The students will be able to differentiate and integrate an empirical function given by tabulated numerical values.(K3)
CO4	The students will be able to solve first order ordinary differential equations using single step methods and multistep methods.(K4)
CO5	The students gain knowledge in solving boundary value problems in ODE and PDE by finite difference methods.(K4)

COURSE NAME: Electrical Machines (EI 8451)

COURSE CODE: C210

CO1	To explain the construction and working of DC and AC- Motors (K2)
CO2	To explain the construction and working of DC and AC Generators. Also to understand the construction of transformers-single phase-three phase (K2)
CO3	To derive the torque equation of DC motors, Induction Motors- three phase, single phase and apply the concepts to solve real world problems To derive the emf equation of Generator, Transformer, Alternator and apply the concepts to solve real world problems. (K3)
CO4	To Analyse the Characteristics of DC and AC- Motors and Generators. Also to analyse the various applications of motors and Generators (K4)
CO5	To Analyse the Phasor diagrams of Transformers, Alternators and Synchronous Motors and apply the concepts to learn about Regulation and calculation of efficiency. (K4)

COURSE NAME: EI8452 INDUSTRIAL INSTRUMENTATION - I

CODE COURSE: C211

CO1	Students will be able to understand the measurement techniques of force, torque and speed. (K2)
CO2	Students will be able to understand the measurement techniques of acceleration, Vibration and density.(K2)
CO3	Students will be able to understand the pressure measurement techniques.(K3)
CO4	Students will be able to understand the basic temperature measurement techniques.(K3)
CO5	Students will have a sound knowledge about thermocouples and pyrometry techniques.(K4)

COURSE NAME: Linear Integrated Circuits and Applications **(EE 8451)**

COURSE CODE: C212

CO1	To acquire knowledge about fundamentals of IC fabrication procedure (K4)
CO2	To design Integrated circuits by fabricating various components and perform signal analysis of Op-Amp based circuits. (K3)
CO3	To design and analyze various linear applications of Op-Amps like adder, subtractor, differentiator , Integrator, filters.(K3)
CO4	To design and analyze various Non- linear applications of Op-Amps like Data converters, comparators, waveform generators, log amps, clippers.(K3)
CO5	To understand the working of voltage regulatorsand Amplifierslike Instrumentationamplifiers, Trans conductance amplifiers, antilog amplifiers. ICs.(K4)

COURSE NAME: IC8451 CONTROL SYSTEMS

COURSE CODE: C213

CO1	To understand the methods of representation of systems and to desire their transfer function models.(K2)
CO2	To have adequate knowledge in the time response of systems and steady state error analysis.(K3)
CO3	To acquire basic knowledge in obtaining the open loop and closed–loop frequency responses of systems.(K2)
CO4	To understand the concept of stability analysis and designing compensation for a control system.(K3)
CO5	To study the three ways of designing compensation for a control system Understand about state variable analysis.(K4)

COURSE NAME: EC8395 COMMUNICATION ENGINEERING

CODE COURSE: C214

CO1	To understand the different methods of analog communication and their significance.(K2)
CO2	To understand the Digital Communication methods for high bit rate transmission. (K2)
CO3	Analyze the concepts of source and line coding techniques for enhancing rating of transmission of minimizing the errors in transmission.(k3)
CO4	To understand MAC used in communication systems for enhancing the number of users. (K3)
CO5	Students are able to understand the various media for digital communication.(K4)

COURSE NAME: Devices and Machines Lab **(EI 8461)**

COURSE CODE: C215

CO1	To simulate using PSPICE/MATLAB and analyze the characteristics of PN Junction Diode, Transistor and FET (K4)
CO2	To simulate using PSPICE/MATLAB and analyze the characteristics of UJT, Phase Shift Oscillators and Multivibrator (K4)
CO3	To simulate using PSPICE/MATLAB and analyze the characteristics of Passive filters and rectifiers. (K4)
CO4	To conduct an experiment on DC generators and analyze the open circuit and load characteristics (K4)
CO5	To conduct an experiment on DC motors and analyze the load characteristics of DC Shunt motor and induction motors (K4)

COURSE NAME: Linear and Digital integrated Circuits Laboratory (EE 8461)

COURSE CODE: C216

CO1	To understand the working of linear and digital integrated circuits. (K2)
CO2	To construct linear and digital integrated circuits (K3)
CO3	To analyse linear and digital integrated circuits (K4)
CO4	To Evaluate the performance of linear and digital integrated circuits (K5)
CO5	To Understand the working of different application IC's.(K2)

COURSE NAME: EI 8551 ANALYTICAL INSTRUMENTS
Course Code: C301

CO1	To understand the theory of instrumental methods for identification and quantitative analysis of chemical substances by different types of Spectroscopy.(K2)

CO2	To impart fundamental knowledge on gas chromatography and liquid chromatography.(K2)
CO3	To integrate a fundamental understanding of the underlining principles of physics as they relate to specific instrumentation used for gas analyzers and pollution monitoring instruments.(K3)
CO4	To impart knowledge on the important measurement in many chemical processes and laboratories handling liquids or solutions.(K4)
CO5	To understand the working principle, types and applications of NMR and Mass spectroscopy.(K2)
CO6	To understand the operational principles of instrumental methods for identification and quantitative analysis of chemical substances by different types of Spectroscopy.(K2)

COURSE NAME: EI 8552 Industrial Instrumentation II

COURSE CODE: C302

CO1	To analyze about features, installation and applications variable head type flow meters for compressible and incompressible flow. (K4)
CO2	To evaluate coefficient of discharge of various variable head type flow meters like Orifice plate, Venturi tube, Flow nozzle, Dall tube and Pitot tube. (K5)
CO3	To analyze the features of positive displacement flow meters, Variable area flow meter and Mass flow meter, various electrical flow meters and dynamic weighing method for flow meter calibration .(K4)
CO4	To evaluate the different methods of level measurement for a variety of applications (K5)
CO5	To analyze the basic concepts of pneumatic and electronic transmitter (K4)
CO6	To examine the behavior of smart transmitter used in flow, level, pressure, temperature measurement together with its installation and calibration. (K4)

COURSE NAME: Process Control (EI 8553)

COURSE CODE: C303

CO1	To introduce technical terms and nomenclature associated with Process control domain.(K2)
CO2	To provide an overview of the features associated with Industrial type PID controller.(K4)

CO3	To elaborate the model parameters and design Specifications of controller(K4)
CO4	To make the students understand the various PID tuning methods and different types of control schemes such as cascade control ,feed-forward control and Model Based control schemes.(K2)
CO5	To elaborate different types of PID Implementation Issues (K4).
CO6	To familiarize the students with characteristics, selection, sizing of control valves. (K3)

COURSE NAME: Microprocessor and Microcontroller (EE 8551)

COURSE CODE: C304

CO1	Explain the architecture and memory organization of 8085 processor and 8051 Controller (K2)
CO2	Describe the importance and use of interrupt Structure, Ports, Timers/counters, memory of 8085 processor as well as 8051 Controller (K3)
CO3	Acquire knowledge in Addressing modes and instruction set of 8085 processor (K3)
CO4	Acquire knowledge in Addressing modes and instruction set of 8051 Microcontroller (K3)
CO5	Develop 8085 Microcontroller and 8051 Microprocessor application using Assembly language instructions and compare the instructions of 8085 and 8051 (K4)
CO6	Explain about various interfacing devices with their internal architecture and control registers. Compare various architectures. (K2).

COURSE NAME: EE 8591 DIGITAL SIGNAL PROCESSING
COURSE CODE: 305

CO1	To understand the importance of Fourier transform, digital filters and DS Processors.(K2)
CO2	To acquire knowledge on Signals and systems & their mathematical representation.(K4)
CO3	To understand and analyze the discrete time systems.(K2)

CO4	To analyze the transformation techniques & their computation.(K4)
CO5	To understand the types of filters and their design for digital implementation.(K2)
CO6	To acquire knowledge on programmability digital signal processor & quantization effects.(K3)

COURSE NAME: AIR POLLUTION AND CONTROL ENGINEERING (OCE 551)

COURSE CODE: C306

CO1	To understand the composition of atmosphere, measure of Air pollution, effect of air pollution in human, animals and plants, air quality standards**. (K6)**
CO2	Tocomputethe Effects of meteorology on Air Pollution - Fundamentals, Atmospheric stability, Inversion, Wind profiles and stack plume patterns-Atmospheric Diffusion Theories - Dispersion models, Plume rise**. (K3)**
CO3	To Review the concept of control of particulate contaminants. **(K2)**
CO4	To Examine the controlof gaseous contaminants **(K4)**
CO5	To Discuss the effects wind profiles and indoorair quality management**(K5)**
CO6	To Remember the effects of noise pollution and Atmospheric Conditions**.(K1)**

COURSE NAME: EI 8561 Industrial Instrumentation Laboratory

COURSE CODE: C307

CO1	To experimentally measure industrial process parameters such as flow, level.(K2)
CO2	To experimentally measure industrial process parameters such as temperature, pressure.(K2)
CO3	To experimentally measure industrial process parameters such as viscosity.(K2)
CO4	To measure and analyze pH, conductivity. (K3)
CO5	To measure and analyze UV absorbance and transmittance.(K3)
CO6	To measure and analyze physiological parameters such as BP, ECG and pulse rate.(K4)

COURSE NAME: EI 8681 MICROPROCESSORS AND MICROCONTROLLERS LABORATORY
COURSE CODE: C308

CO1	To understand and apply computing platform and software for engineering problems.(K2)
CO2	To programming logics for code conversion.(K2)
CO3	To understand basics of software simulators (K2)
CO4	To understand basics of serial communication. (K3)
CO5	To understand and impart knowledge in DC and AC motor interfacing.(K3)
CO6	To acquire knowledge on A/D and D/A..(K4)

COURSE NAME: Logic and Distributed Control Systems (EI 8651)

COURSE CODE: C309

CO1	To Understand all the important components such as PLC, SCADA, I/O modules and field devices of an industrial automation system. (K2)
CO2	To understand and Develop PLC programs using relay logic and ladder logic for industrial sequential applications (K2)
CO3	To Develop PLC program in different languages like FBD, structured list, sequential function chart for real time industrial applications (K3)
CO4	To obtain the knowledge on the architecture and local control unit of Distributed Control System (DCS). (K4)
CO5	Ability to gain knowledge on the recent developments in industrial automation and analyze various case studies in the application of SCADA, DCS and PLC. (K4)
CO6	To gain knowledge from studying about case studies. (K3)

COURSE NAME: Computer Control of Process (EI 8691)

COURSE CODE: C310

CO1	Understand the basic concepts of discrete state variable technique, system identification, z transform, multi loop and multi variable control (K2)
CO2	Apply the concepts like decomposition, least square methods, z transforms, RGA, Tuning methods, Dynamic matrix controller and FLC in computer control of process (K3)
CO3	Analysis of Controllability, Observability, stability test, parametric and non-parametric methods of system identification, Process interaction and pairing and case studies in multi variable control. (K4)
CO4	Design the discrete data system from state equation, Dead beat and Dahlin controller (K4)
CO5	Design the discrete data system from state equation, Dead beat and Dahlin controller. (K6)
CO6	Analyze IMC, Smith predictor, multiloop and multivariable PID controller (K4)

COURSE NAME: Data Structures **(CS 8391)**

COURSE CODE: C311

CO1	To understand the concepts of ADT. (K2)
CO2	To Learn linear data structures - lists, stacks, and queues (K3)
CO3	To understand sorting, searching and hashing algorithms (K2)
CO4	To apply Tree and Graph structures.(K3)
CO5	To Apply the different linear and non-linear data structures to problem. Solutions (K4)
CO6	To Critically analyze the various sorting algorithms. (K5)

COURSE NAME: Electronic Instrumentation (EI 8692)

COURSE CODE: C312

CO1	To Understand electronic Instruments and signal analysers. (K2)
CO2	To understand display devices, signal generators, virtual instrumentation, telemetry (K2)
CO3	To derive the expression for electronic instruments, signal analysers and waveform generators (K3)
CO4	To analyze electronic Instruments, display devices, signal analysers.(K4)
CO5	To analyze signal generators, virtual instrumentation, telemetry (K4)
CO6	To create programs using virtual instrumentation with DAQ and to design electronic instruments based on the application (K6)

COURSE NAME: MEMS and NANO SCIENCE (EE 8072)

COURSE CODE: C313

CO1	To remember the principle of operation of micro devices, micro systems, nano devices, nano systems (K1)
CO2	To understand the construction and working of micro devices, micro systems, nano devices, nano systems (K2)
CO3	To understand the method of fabrication of micro devices, micro systems, nano devices, nano systems (K2)
CO4	To design the micro devices, micro systems using the MEMS fabrication, nano devices, nano systems using the preparation methods. (K3)
CO5	To Analyze the characteristics of Mems and Nems Devices (K4)
CO6	To understand the applications micro devices, micro systems, nano devices, nano systems (K2)

COURSE NAME: Computer Networks (EI 8074)

COURSE CODE: C314

CO1	To Understanding the components required to build different types of networks and Understand network Interconnections (K2)
CO2	To analyze the required functionality at each layer for given application, Routing Protocols and Network structure (K3)
CO3	To evaluate solutions for each functionality at each layer and analyze Routing protocols. (K3)
CO4	To applying connection management information flow tracing from one node to another node in the network and understanding of network traffic for traditional applications (K4)
CO5	To applying various congestion control and Avoidance techniques and Remembering of Node to Node communication (K4)
CO6	To Understanding the tradition applications and web services and Remembering the network building (K4)

COURSE NAME: Advanced Instrumentation Systems (EI 8072)
COURSE CODE: C315

CO1	To understand the construction, working and calibration of Flow, level, pressure and temperature measuring instruments (K2).
CO2	To Analyze the Selection and Application of Flow, level, pressure and temperature measuring instruments. (K5).
CO3	To understand the working of chromatography, chemical analyzers and pollution monitoring Instruments (K2).
CO4	Ability to understand the role of Safety instrumentation system and instrumentation standards in the industry (K2).
CO5	To Separate and Analyze the different elements of the compound. To Analyze process hazards, Process control system and Safety control system. Also to determine the Safety integrity level of the process (K4).
CO6	To Design, develop and interpret the documents used to define instruments and control Systems for a typical project, including P&IDs, loop diagrams, specification forms, Instrument lists, logic diagrams, installation details, and location plans (K6).

Course Name: EE8071- Applied Soft Computing
Course Code: C316

CO1	To apply the basic concepts of science and mathematics to learn about neural networks, fuzzy and metaheuristic algorithms like genetic algorithm, ant colony optimization and tabu search. (K3)
CO2	To understand the definitions and working of feed forward, Feedback neural networks, fuzzy and metaheuristic algorithms like genetic algorithm, ant colony optimization and tabu search. (K2)
CO3	To apply basic neuron models for creating neural network, mathematical concepts like union and intersection to develop fuzzy and simple biological and mathematical concepts for metaheuristic algorithms like genetic algorithm, ant colony optimization and tabu search. (K3)
CO4	To analyze the various learning concept of feed forward and feedback neural network, various fuzzification and defuzzification methods and various methods involved in metaheuristic algorithms like genetic algorithm, ant colony optimization and tabu search. (K4)
CO5	To apply the functions of neural network, fuzzy logic controller and metaheuristic algorithms like genetic algorithm, ant colony optimization and tabu search using mathematical modeling and solving problems(K3)
CO6	To design model-based applications using neural network, Fuzzy logic and metaheuristic algorithms like genetic algorithm, ant colony optimization and tabu search. (K4)

COURSE NAME: CS 8381 DATA STRUCTURES LABORATORY

COURSE CODE: C317

CO1	To implement linear and non-linear data structure operations.(K2)
CO2	To Suggest appropriate linear / non-linear data structure operations for solving a given problem.(K2)
CO3	Appropriately use the linear / non-linear data structure operations for a given problem.(K2)
CO4	To apply appropriate hash functions that result in a collision free scenario for data storage and retrieval. (K3)
CO5	To implement graph traversal algorithms.(K3)
CO6	To get familiarized to sorting and searching algorithms.(K4)

COURSE NAME: EI 8661 PROCESS CONTROL LABORATORY

COURSE CODE: C318

CO1	To understand and analyze process control engineering problems.(K2)
CO2	To build dynamic models using input - output data of a process.(K2)
CO3	To work with real time control loops (flow / level / temperature / pressure).(K2)
CO4	To simulation tools such as MATLAB/LABVIEW/ASPEN. (K3)
CO5	to learn and implement simple adaptive and model based control schemes.(K3)
CO6	To get familiarized to sorting and searching algorithms.(K4)

Course Name: HS 8581 - PROFESSIONAL COMMUNICATION

Course Code: C 319

CO1	To make effective presentations.(K1)
CO2	To enhance the Employability and Career Skills of students.(K2)
CO3	To participate confidently in Group Discussions.(K2)
CO4	To attend job interviews and be successful in them. (K2)
CO5	To develop adequate Soft Skills required for the workplace.(K2)
CO6	To make them Employable Graduates.(K2)

Course Name: EI8751- Industrial Data Networks
Course Code: C401

CO1	To remember the basic concepts of communication and networking in all networking devices(K1)
CO2	To understand OSI model, various types of communication and networking topologies (K2)
CO3	To apply OSI model, communication and networking topologies for networking devices. (K3)
CO.4	To analyze the various networking topology and protocol structures in all networking devices(K4)
CO.5	To evaluate the functions of various topology, protocol structure and networking devices for various applications (K5)
CO6	To understand the case study related to networking and communication topologies. (K6)

Course Name:EE8691 - Embedded Systems
Course Code: C402

CO1	Memorizing the basic concept of embedded processor ,I/O ports and Buses, Embedded Product Development Lifecycle, RTOS.(K1)
CO2	Analyze the various communication protocols for different applications.(K4)
CO3	Validating the various Processor and memory devices for a suitable embedded system (K5)
CO4	Apply the processor scheduling algorithms in embedded systems application.(K3)
CO5	Summarize the various Modeling techniques, Issues in Hardware-Software Co-design, shared memory and inter process communication.(K2)
CO6	Design and develop embedded system for various applications. (K6)

Course Name: EC8093 Digital Image Processing

Course Code: C403

CO1	To understand the basic concepts of digital image fundamentals, transforms and coding. (K2)
CO2	To understand the image enhancement techniques in Spatial and Frequency domain filtering and color models.(K2)
CO3	To derive the concepts of filtering, degradation function and restoration techniques.(K3)
CO4	To analyze the concept of the image segmentation , representation techniques features and Pattern classes.(K4)
CO5	To analyze the concepts of image compression and filtering techniques. (K4)
CO6	To compare the different ways of morphological and recognition methods. (K3)

Course Name:EI8075 - Fiber Optics & Laser Instruments
Subject Code: C404

CO1	To analyze about optical fibers, its construction, basic principle using the basic concepts of science and mathematics together with its classification, mechanical and transmission characteristics, working of various optical sources liker laser and detectors. (K4)
CO2	To apply basic concepts of optical fiber sensors to measure various parameters like pressure, temperature, current, voltage, liquid level and strain, attenuation, dispersion, scattering and absorption losses using various methods. (K3)
CO3	To analyze on the different types of lasers based on level, material used ,power produced along with its properties.(K4)
CO4	To discuss the basic concepts of laser using optical fiber in various Industrial applications together with parameter measurements like length, velocity, acceleration, current, voltage (K5)
CO5	To analyze the basic concepts of laser and optical fibers in industry material processing and medical applications of laser (K4)
CO6	To examine the behavior of holography technique with its classification. (K4)

Course Name: EI8092 THERMAL POWER PLANT INSTRUMENTATION

Course Code: C405

CO1	To Understand the basic methods of power generation ,basic electrical measurements, non-electrical parameters, temperature measurements, speed measurements, pressure measurement and smoke measurement.(K2)
CO2	To Analyze the working of thermal power plant, oxygen analysers, flue gas analyzer(K4)
CO3	To analyze the working of pulverizes , draught system, distributed control system in power plants and interlocks in boiler operation(K4)
CO4	To construct the working of boiler processes, Pand I Diagram ,cogeneration and soot blowing operation (K2)
CO5	To Analyze the various controls of furnace, boiler and turbine (K4).
CO6	To compare the various building blocks of thermal power plants with other power plants and its importance. Gain knowledge of measurement , controlling, monitoring Instruments and different parameters(K3)

Course Name: OME 754 Industrial Safety
Course Code: C406

CO1	Understand the basic concepts of mechanical, fire, chemical and environmental hazards (K2)
CO2	Apply fire prevention techniques, industrial hygiene, environmental control for industrial safety (K3)
CO3	Analysis of Industrial Health Hazards, System Safety Analysis -Techniques - Fault Tree Analysis (FTA), Failure Modes and Effects Analysis(FMEA), HAZOP analysis and Risk Assessment (K4)
CO4	Apply proper safety techniques for Fire prevention, Electrical exposure, Ionizing and Non-ionizing radiation, toxicology, Industrial Noise, Control of Noise, Vibration, Explosions - Disaster management (K3)
CO5	Apply modern safety concepts, catastrophe control, hazard control, Safety education and training - Factories Act, Safety regulations Product safety for industrial safety. (K3)
CO6	Analyze various case studies for identifying and preventing various types of hazards in industries (K4)

Course Name: EI8761 Industrial Automation Lab
Course Code: C407

CO1	Understand the basic concepts of PLC, SCADA and DCS (K2)
CO2	Understand the concept of Foundation Fieldbus /IOT/Wireless HART Enabled Transmitter. (K2)
CO3	Apply the Programming of PLC, SCADA and DCS in real time industrial automation (K3)
CO4	Analyze the interfacing of field devices with PLC and DCS (K4)
CO5	Design of various control schemes in PLC and DCS. (K5)
CO6	Implementation of various control schemes in PLC and DCS (K6)

Course Name: EI8762 INSTRUMENTATION SYSTEM DESIGN LABORATORY
Course Code: C408

CO1	To Obtain adequate knowledge in design of various signal conditioning circuits and Instrumentation systems.(K1)
CO2	To understand and Explain Piping and Instrumentation Diagram, a multi-channel data acquisition system and also prepare documentation of Instrumentation project ,project scheduling for the case study.(K2)
CO3	To derive and calculate the discharge coefficient of orifice plate and rotameter (K3)
CO4	To Analyze converters ,RPS, linearizing, cold compensation circuits, multi range DP transmitter and control valve characteristics(K4)
CO5	To Evaluate Electronics and Instrumentation design(K5)
CO6	To Design Active filters ,PID controller and Instrumentation amplifier(K6)

Course Name:C409- BIOMEDICAL INSTRUMENTATION
Subject Code: EI8073

CO1	To understand the basic medical terminology, relevant for biomedical instrumentation. (K2)
CO2	To understand the different diagnostic measurement methods for identification of human bio potentials and their necessary instrumentation. (K2)
CO3	To understand and measure the electrical and non-electrical parameters of biomedical system (K2)
CO4	To understand different imaging techniques and life assisting techniques (K2)
CO5	To Understand the position of biomedical instrumentation in modern hospital care(K2)
CO6	To Analyse different diagnostic measurement methods for different humane variables and their necessary instrumentation (K3)

Course Name: EI8078 Project management and finance

Subject Code: C410

CO1	To understand the current market trends and thus choose projects accordingly. (K2)
CO2	To understand project management, project implementation, project monitoring and project control. (K2)
CO3	To understand Project Evaluation: Project auditing and e markets in project management.(K3)
CO4	To understand the managerial applications of network analysis and the project cost estimation. (K4)
CO5	To understand asset management, working capital management and Capital budgeting. (K4)
CO6	To understand the concepts of finance and accounts carried out in project management. (K3)

II YEAR III SEM

COURSE OUTCOME

MA8353 - Transforms and Partial Differential Equations-

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

CO	Statement
CO1	Find the Fourier series and Fourier Integral representation of a function in arbitrary interval.
CO2	Formulate and solve partial differential equations and difference equations.
CO3	Find Fourier series solutions for one dimensional wave, one-dimensional and two-dimensional heat equations.
CO4	Learn the properties Fourier, Z transform and determine the Fourier transform of functions and Z transform of sequences.
CO5	Find the half range sine and cosine series and approximate values of Fourier Coefficients by numerical integration.

EE8351- Digital Logic Circuits

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

CO	Statement
CO1	Compare various number systems and distinguish between number systems and coding systems.

CO2	Determine the logical expressions and design logic circuit using boolean functions.
CO3	Analyze and design combinational and sequential Circuits. Write the coding for development of application oriented logic circuits.
CO4	Enumerate memory devices, Apply PLA, PLD, PLC and PROM for logic function implementation.
CO5	Evaluate the performance of various synchronous and asynchronous circuits and also identify the hazards in the digital circuit.

EE8391 - Electromagnetic Theory

At the end of the course, learners will be able to:

CO	**Statement**
CO1	Understand the vector calculus in different co-ordinate systems and the spatial variations of the physical quantities dealt in electromagnetic field theory as functions of space and time.
CO2	Explain fundamental laws governing electromagnetic fields and to evaluate the physical concepts of electromagnetic parameters in different media using the fundamental laws

CO3	Evaluate the electromagnetic force exerted on charged particles, working principle of various types of electromagnetic energy conversion devices.
CO4	Generalize the concepts of electromagnetic theory and its applications in various fields. Distinguish between the physical and mathematical concepts of circuit theory and field theory.
CO5	Describe the concepts of propagation of the electromagnetic wave in different media with reflection and refraction phenomenon.

EE8301- Electrical Machines - I

At the end of the course, learners will be able to:

CO	**Statement**
CO1	Analyze the magnetic circuits and various magnetic materials.
CO2	Acquire knowledge in constructional details and working of single phase and three phase transformers and Investigate the performance of the transformer by conducting various non-loading tests.
CO3	Experiment the working principle, speed control and starting methods of DC Motor.
CO4	Interpret the concepts of electromechanical energy conversion and derive expressions for generated voltage and torque developed in all Electrical Machines.

CO5	Summarize the working principle, types of DC generators, and determination of their characteristics.

EC8353- Electron Devices and Circuits

At the end of the course, learners will be able to:

CO	**Statement**
CO1	Know the basic structure and its applications of various electronic devices.
CO2	Choose and adapt a device in circuit construction for particular application based on its characteristics.
CO3	Express the biasing methods of devices by familiarizing its working and applications of transistors and FETS
CO4	Explore the characteristics and frequency response of amplifiers
CO5	Learn and use the positive and negative feedback systems with amplifiers. Employ their acquired knowledge on design and analysis of oscillators

ME8792 Power Plant Engineering

At the end of the course, learners will be able to:

CO	**Statement**
CO1	Explain the layout, construction and working of the components inside a thermal power plant.

CO2	Explain the layout, construction and working of the components inside a Diesel, Gas and Combined cycle power plants.
CO3	Explain the layout, construction and working of the components inside nuclear power plants.
CO4	Explain the layout, construction and working of the components inside Renewable energy power plants.
CO5	Explain the applications of power plants. Extend their knowledge to power plant economics and environmental hazards and estimate the costs of electrical energy production.

EE8311 -Electrical Machines Laboratory – I

At the end of the course, learners will be able to:

CO	**Statement**
CO1	Identify different types and parts of DC Machines and Transformers. Interpret the parts and working of DC starters and three phase transformer connections.
CO2	Comment on the performance characteristics of self excited DC generators.
CO3	Examine the performance and speed control of DC Motors and Transformers under different loading conditions.
CO4	Calculate the parameters required to predetermine the performance of DC machines and Transformers by conducting non-loading tests.

CO5	Predict the performance characteristics of DC Machines and Transformers by conducting non-loading tests.

EC8311 - Electronics Laboratory

At the end of the course, learners will be able to:

CO	Statement
CO1	Analyse the operation of electronic components based on its characteristics for various configurations. Choose and adapt a device in circuit construction for particular application based on its characteristics.
CO2	Examine the applications of diodes and FET devices
CO3	Examine the design and response of transistors and FET devices.
CO4	Design and Experiment various oscillators
CO5	Demonstrate the generation of waveforms

II YEAR IV SEM

COURSE OUTCOME

MA8491 Numerical Methods

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

CO	Statement

CO1	Apply the fundamental concepts of numerical techniques in solving algebraic and transcendental equations using fixed-point iteration method and Newton-Raphson method and system of simultaneous equations using direct and indirect methods.
CO2	Finding Eigen values and Eigen vector of a matrix using Power method and Jacobi's method for symmetric matrices. Using Finite difference approach by explicit and implicit scheme to compute initial value problem and boundary value problems such as Laplace equation, Poisson equation, hyperbolic equation, parabolic equation.
CO3	Using Lagrange's Method, Newton's divided difference method, Newton's forward and backward Formula, Cubic spline for fitting a polynomial and to find Derivative of the polynomial.
CO4	Evaluate line integral using Trapezoidal, Romberg's and Simpson's one-third rule and surface integral using Trapezoidal and Simpson's one-third rule.
CO5	Solve first ordinary differential equation using Taylor's, Euler's, Modified Euler's, Fourth order Runge-kutta methods, Milne's and Adam-Bash forth method.

EE8401 Electrical Machines - II

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

CO	**Statement**

CO1	Acquire knowledge in constructional details and working of synchronous generators , synchronous motors, Induction motors and special machines.
CO2	Estimate the regulation of synchronous machines and induction machines. Categorize the need of starters in Synchronous Motor, single & three phase Induction Motor.
CO3	Choose a particular machine in the required application by knowing the performance characteristics, starting and speed control techniques.
CO4	Apply different methods of speed control techniques for induction motor with its necessary braking methods.
CO5	Analyse the performance characteristics of Synchronous Machines & induction machines by conducting various tests methods.

EE8402 Transmission and Distribution .

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

CO	**Statement**

CO1	Understand the importance and functions of transmission line parameters, underground cable, grounding system and components used in substation.
CO2	Acquire knowledge about different types of conductor arrangement, transmission line parameters, power flow in transmission lines, insulators, effects on transmission lines and types of distribution system.
CO3	Apply the concepts to calculate the transmission line parameters in single and three phase systems, voltage levels of transmission and distribution lines and single/ three core cable parameters.
CO4	Analyse the performance of transmission lines and underground cables. Design the overhead lines and grounding system and distinguish the function of different components used in transmission and distribution levels of the power system.
CO5	Evaluate the transmission and distribution line parameters, voltage distribution across insulators and string efficiency.

EE8403 Measurements and Instrumentation

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

CO	**Statement**

CO1	Integrate the Basic functional elements of instrumentation to measure electrical parameters.
CO2	Extend the concepts of basic elements of instrumentation to illustrate the working and functions of electrical and electronic instruments. Explain the data acquisition systems.
CO3	Interprete the usage of comparative methods to measure the basic electrical quantities like resistance, inductance and capacitance.
CO4	Distinguish Various storage and display devices.
CO5	Choose the transducers for particular measurement.

EE8451 Linear Integrated Circuits and Applications

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

CO	**Statement**
CO1	Acquire knowledge in IC fabrication procedure.
CO2	Analyze the characteristics and basic applications of Op-Amp.
CO3	Design and acquire knowledge on the Applications of Op-amp. Understand and realize the linear integrated circuits to fabricate, design and implement in various applications.

CO4	Identify the applications of special ICs like Timers, PLL.
CO5	Extrapolate the features and applications of regulator circuits.

IC8451 Control Systems

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

CO	Statement
CO1	Ability to develop various representations of system based on the knowledge of Mathematics, Science and Engineering fundamentals.
CO2	Ability to do time domain and frequency domain analysis of various models of linear system.
CO3	Ability to interpret characteristics of the system to develop mathematical model.
CO4	Ability to design appropriate compensator for the given specifications.
CO5	Ability to understand use of PID controller in closed loop system and come out with solution for complex control problem.

EE8411 Electrical Machines Laboratory – II

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

CO	Statement

CO1	Analyze the voltage regulation of three phase alternator for different loading condition in different methods and compare the results
CO2	Analyze the voltage regulation three phase salient pole synchronous machine in different loading condition and estimate its negative and zero sequence components
CO3	Analyze the characteristic of three phase synchronous machine at different load condition for different excitation
CO4	Analyze performance characteristics of single phase and three phase induction motor at different load condition and estimate its equivalent circuit parameters.
CO5	Explain the Construction and Working Of A.C motor Starters

EE8461 Linear and Digital Integrated Circuits Laboratory

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

CO	**Statement `**
CO1	Understand the importance of boolean postulates and implement the boolean functions in combinational logic circuits and sequential logic circuits
CO2	Analyse the combinational logic circuits like adder, subtractor, code converters, parity generator and checker, encoder and decoder and multiplexer and demultiplexer and to design the circuits
CO3	Implement the sequential logic circuits like counters and shift registers using FF's

CO4	Design the op amp circuits for various application like inverting, non inverting, adder, comparator , differentiator and integrator
CO5	Design and verify the various application of 555 timer. Verify the performance of voltage regulators and special ICs

EE8412 - Technical Seminar

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

CO	**Statement**
CO1	Present seminar in the recent advancement in electrical and electronics engineering discipline.
CO2	Review and prepare the State-of-art technologies in the present technological developments.
CO3	Organize the presentation using the concepts of ordering and determining the central, main and supporting ideas.
CO4	Present any topic in any recent advancement with good communicative skill infront of peers and faculty members.
CO5	Perform well in placement recruitment drive with good technical skills and communication skills. Handle questions after the presentation with confidence

III YEAR V SEM

COURSE OUTCOME

EE8501 Power System Analysis

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

CO	Statement
CO1	Understand the power scenario and model various power system components that are adequate for the basic system studies of load flow and short-circuit.
CO2	Demonstrate the input data required for load flow calculation and select and identify the most appropriate algorithm.
CO3	Analyse a power system network under symmetrical fault conditions and interpret the results .
CO4	Use the method of symmetrical components for analyzing unbalanced three-phase systems and interpret the results
CO5	Calculate the fault current and perform the analysis for single line-to-ground, line-to-line, and double line-to-ground faults.
CO6	Classify the stability and demonstrate different numerical integration methods for factors influencing stability

EE8551 Microprocessors and Microcontrollers

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

CO	Statement
CO1	Demonstrate the detail structure of 8085 processor and 8051 microcontroller.
CO2	Classify the different types of machine cycle and interrupt signals of 8085 &8051 MC.

CO3	Illustrate how the different peripherals are interfaced with processor and microcontroller.
CO4	Discuss the various instruction sets and addressing modes of 8085 and 8051.
CO5	Evaluate their practical knowledge by writing the simple assembly language program using various instruction of 8085 and 8051.
CO6	Design a simple application development using the programming of 8085 &8051.

EE8552 Power Electronics

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

CO	Statement
CO1	Select appropriate power semiconductor devices and design a power converter for an application
CO2	Analyze the working of various types of 1 phase converters such as rectifier, inverter, chopper and cycloconverter
CO3	Analyse the working of various types of 3 Phase converters such as rectifiers ,inverter,chopper and cycloconverter
CO4	Design the driver and control circuit required for various converters.
CO5	Categorize different modulation techniques and firing schemes for various converters in power electronics.
CO6	Review the performance of advanced converters such as dual ,resonant and matrix converter

EE8591 Digital Signal Processing

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

CO	Statement
CO1	Ability to understand the importance of signal and systems in time and frequency domain.
CO2	To acquire knowledge in Signals and systems & their mathematical representation.
CO3	Analyze the Characteristics and properties of Linear Time Invariant (LTI) system in Time domain, Fourier domain and Z-domain.
CO4	Ability to analyze the frequency transformation techniques & their computation.
CO5	Ability to understand the types of filters and their design for digital implementation.
CO6	Ability to acquire knowledge on programmability digital signal processor & quantization effects.

CS8392 Object Oriented Programming

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

CO	Statement
CO1	Acquire the knowledge of OOP & Java fundamentals
CO2	Apply inheritance, interfaces and Generic Program for program development

CO3	Build java applications using exception handling and MultiThreading
CO4	Ability to identify corresponding I/O Functions.
CO5	Develop interactive Java programs using swings
CO6	Design and Build simple Graphical User Interface

OPEN ELECTIVE I

OAT551 AUTOMOTIVE SYSTEMS

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

CO	Statement
CO1	Identify different components in an automobile
CO2	Differentiate different types of frames and steering systems used in an automobile
CO3	Use different types of transmission systems for their respective application
CO4	Understand brakes and their characteristics
CO5	Modify or add components for respective alternative fuels
CO6	Disassemble and assemble a four stroke engine

OAN551 SENSORS AND TRANSDUCERS

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

CO	Statement
CO1	To be Expertise in various calibration techniques and signal types for sensors.
CO2	To Understand the characteristics of various transducers
CO3	To Study the basic principles of various smart sensors
CO4	To Implement the DAQ systems with different sensors for real time applications
CO5	Develop the knowledge of some of the semiconductor & IC sensor
CO6	Apply the various sensors in the Automotive and Mechatronics applications

OMD551 Basics of Biomedical Instrumentation

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

CO	Statement
CO1	Diagnose the biopotentials
CO2	Elaborate the usage of electrodes in capturing the biosignals
CO3	Explain the signal conditioning circuits for biomedical applications
CO4	Devise the recording problems associated with capturing the biosignals
CO5	Demonstrate various methods of measurement of non electrical parameters related to human body
CO6	Summarize the non invasive measurements in biomedical Instrumentation.

EE8511 Control and Instrumentation Laboratory

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

CO	Statement
CO1	Apply control theory to electrical engineering problem
CO2	compare the dynamics of various transducers and sensors
CO3	Design different types of compensators and converters
CO4	choose a particular bridge network for a required application
CO5	measure power and energy in electrical circuits.
CO6	interpret simulation

HS8581 Professional Communication

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

CO	Statement
CO1	Make effective presentations
CO2	Participate confidently in Group Discussion
CO3	Facilitate their ability to work collaboratively with others
CO4	Attend job interviews and be successful in them
CO5	Develop adequate soft skills required for the workplace
CO6	Equip the soft skills that strengthen the prospects of success in competitive examinations

CS8383 Object Oriented Programming Laboratory

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

CO	Statement
CO1	Develop and implement Java programs for simple applications that make use of classes, packages and interfaces.
CO2	Develop and implement Java programs with arraylist, exception handling and multithreading .
CO3	Design applications using file processing, generic programming and event handling.
CO4	Implement abstract data types for linear data structures
CO5	To build software development skills using java programming for real-world applications.
CO6	Students will be able to practice acquired knowledge within the chosen area of application for project development

III YEAR VI SEM

EE8601 Solid State Drives

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

CO	**Statement**
CO1	Enhance the knowledge to select suitable drive
CO2	Acquire the knowledge of steady state and dynamic characteristics of drives

CO3	Study and analyze the operation of the converter/chopper fed dc drive, both qualitatively and quantitatively
CO4	Select suitable Electrical Drive and apply appropriate control method for the application
CO5	Design and Analyze different control techniques involved in both AC and DC Drive
CO6	Analyze current and speed controllers for a closed loop solid state DC motor drive.

EE8602 Protection and Switchgear

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

CO	**Statement**
CO1	Summarize the need for protection of Power System from the various faults occurring in Power System Equipments
CO2	Acquire the knowledge of construction and working principle of Electromagnetic Relays,Static Relays and Numerical Relays
CO3	Illustrate how the torque equation and characteristic curves are obtained for various types of relays
CO4	Formulate the Suitable application of Protective relaying scheme for the Protection of power system equipments
CO5	Analyze various arc interruption theory and to explain about dc and ac circuit breaking
CO6	Evaluate the construction and operation of different types of circuit breakers

EE8691 EMBEDDED SYSTEM .

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

CO	Statement
CO1	Memorizing the basic concept of embedded processor ,I/O ports and Buses, Embedded Product Development Lifecycle, RTOS.
CO2	Analyze the various communication protocols for different applications.
CO3	Validating the various Processor and memory devices for a suitable embedded system
CO4	Apply the processor scheduling algorithms in embedded systems application.
CO5	Summarize the various Modeling techniques, Issues in Hardware-Software Co-design, shared memory and inter process communication.
CO6	Design and develop embedded system for various applications.

PROFESSIONAL ELECTIVE I

EE8002 Design of Electrical Apparatus

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

CO	**Statement**
CO1	Realize basics of design considerations of rotating and static electrical machines.
CO2	Design magnetic circuits of transformers, DC machines and AC machines.

CO3	Design cooling systems of transformers, DC machines and AC machines
CO4	Design windings of transformer and induction machines.
CO5	Design Field windings and armature windings of DC machines and Synchronous machines
CO6	Design of transformers, DC machines and AC machines with computer simulation.

Professional Elective II (EE8005- Special Electrical Machines)

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

CO	Statement
CO1	Study the construction and Principle of operation of different Special Electrical Machines
CO2	Derive the EMF and Torque equation of the different Special Electrical Machines
CO3	Acquire the knowledge in analysis of different Special Electrical Machines
CO4	Discuss the performance of Characteristics of different Special Electrical Machines
CO5	Examine the behaviour of Converters and Controllers for different Special Electrical machines
CO6	Apply different Special Electrical machines in suitable applicative fields .

EE8661 Power Electronics and Drives Laboratory.

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

CO	Statement
CO1	Ability to experiment about switching characteristics of various switches.
CO2	Ability to practice and understand converter and inverter circuits and apply software for engineering problems.
CO3	Ability to evaluate performance characteristics of DC chopper circuits, AC voltage controller circuits, Switched mode power converter circuits and analyzes their operation under different loading conditions.
CO4	Prepare professional quality textual and graphical presentations of laboratory data and computational results, incorporating accepted data analysis and synthesis methods, mathematical software and word-processing tools.
CO5	Primarily via team-based laboratory activities, students will demonstrate the ability to interact effectively on a social and interpersonal level with fellow students, and will demonstrate the ability to divide up and share task responsibilities to complete assignments.
CO6	Practice different types of wiring and devices connections keeping in mind technical, economical, safety issues.

EE8681 Microprocessor and Microcontroller Laboratory

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

CO	Statement
CO1	Apply computing platform and software for engineering problems
CO2	Write the programming logics for code conversion
CO3	Acquire knowledge on A/D . D/A, DC and AC motor interfacing with microcontroller as well as microprocessor.
CO4	Review basics of serial communication programming
CO5	Develop the programming Basics of embedded processors using software simulators
CO6	Able to develop mini projects with processor & controllers

EE8611 Mini Project

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

CO	Statement
CO1	Demonstrate a sound technical knowledge of their selected project topic.
CO2	Undertake problem identification, formulation and solution.
CO3	Design engineering solutions to complex problems utilising a systems approach.
CO4	Conduct an engineering project.

CO5	Communicate with engineers and the community at large in written and oral forms.
CO6	Demonstrate the knowledge, skills and attitudes of a professional engineer.

IV YEAR VII SEM

EE8701 High Voltage Engineering

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

CO	**Statement**
CO1	Acquire the knowledge about causes and protection against over voltages in power system
CO2	Ability to acquire Nature of Breakdown mechanism in solid, liquid and gaseous dielectrics
CO3	Test high voltage electrical Equipment with various testing devices.
CO4	Ability to analyse the Generation of high currents in laboratories

CO5	Ability to Measure over voltages and over currents
CO6	Ability to Test power apparatus and insulation coordination.

EE8702 POWER SYSTEM OPERATION AND CONTROL

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

CO	**Statement**
CO1	Ability to understand the significance of power system operation and control
CO2	Ability to analyze the control actions to be implemented on the system to meet system load variation
CO3	Ability to acquire knowledge on real power-frequency interaction
CO4	Ability to understand the reactive power-voltage interaction and different methods of voltage control against varying system load
CO5	Ability to analyze unit commitment (UC) problem and economic operation of power system
CO6	Ability to design SCADA and its application for real time operation**.**

CO1	Create awareness about renewable Energy Sources and technologies.
CO2	Get adequate inputs on variety of issues in harnessing renewable Energy.
CO3	Recognize current and possible future role of renewable energy sources.
CO4	Explain the various renewable energy resources and technologies and their Applications
CO5	To make the basics about Biomass energy clear and impart adequate knowledge
CO6	To impart knowledge on basics of Solar energy

EE8703 Renewable Energy Systems:

At the end of the course, learners will be able to:

Open Elective II

OCS752 Introduction to C Programming

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

CO	Statement
CO1	Understand the structure and formats of C Language.
CO2	Learned the depth of Arrays in C.
CO3	Build C programs using Strings.

CO4	Implement the concept of pointers
CO5	Developed C applications using functions.
CO6	Implement C programs using structures.

Professional Elective III

GE8071 Disaster Management

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

CO	Statement
CO1	Differentiate the types of disasters, causes and their impact on environment and society
CO2	Assess vulnerability and various methods of risk reduction measures as well as mitigation
CO3	Understand the Relationship between Disaster and Development
CO4	Draw the hazard and vulnerability profile of India, Scenarios in the Indian context
CO5	Disaster damage assessment and management
CO6	Create new methods or technology for risk detection and reduction

Professional Elective III

GE8074 Human Rights

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

CO	Statement
CO1	Demonstrate awareness about Universal Declaration of Human Rights and
CO2	Understand the historical growth of the idea of human rights
CO3	Demonstrate awareness about UN Laws and Monitoring agencies
CO4	understand the constitutional provisions and constitutional guarantees
CO5	Evaluate the role of government , media ngos and educational institutions
CO6	Analyse and evaluate the concepts human rights of disadvantageous sections in the society

Professional Elective III

MA8391 Probability and Statistics

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

CO	Statement
CO1	Understand basic probability axioms; calculate conditional probabilities and use Bayes theorem.
CO2	Understand the concepts of random variables and distributions.
CO3	Compute the marginal and conditional distributions of bivariate random variables and derive the probability density function of transformations of random variables.
CO4	Calculate the covariance, correlation and regression lines for jointly distributed random variables and use Central Limit Theorem to approximate a sampling distribution.
CO5	Apply the statistics for testing the significance of the given large and small sample databy using t- test, F- test and Chi-square test.

CO6	Understand how the analysis of variance procedures can be used to determine if means of more than two populations are equal
CO7	Understand the fundamentals of quality control and the methods used to control systems and processes.

Professional Elective IV

EE8010 Power System Transients

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

CO	Statement
CO1	Ability to describe the analyze switching and lightning transients.
CO2	Ability to acquire knowledge on generation of switching transients and their control
CO3	Ability to analyze the mechanism of lighting strokes.
CO4	Ability to interpret the importance of propagation, reflection and refraction of travelling waves.
CO5	Ability to find the voltage transients caused by faults and concept of circuit breaker action, load rejection on integrated power system.
CO6	Ability to determine the solution of transients caused by concept of flow chart.

Professional Elective IV

GE 8077 Total Quality Management

At the end of the course, learners will be able

CO	Statement

CO1	To gain basic knowledge in TQM relevant to both Manufacturing and Service Industry.
CO2	To Implement basic principles of TQM in Manufacturing and Service Industry.
CO3	To apply Tools and Techniques of Quality Management to Manufacturing and Service Industry.
CO4	To explore the concept of Quality Function, improvements and performance measures.
CO5	To gain knowledge on various ISO standards
CO6	To incorporate basic knowledge in Quality Management System.

EE8711 Power System Simulation Laboratory

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

CO	Statement
CO1	Acquire knowledge to calculate the parameters and to model the transmission line
CO2	Investigate the various load flow analysis for calculating the transmission line losses
CO3	Analyse various fault in the system and to label the fault current
CO4	Analyse theTransient and Small Signal Stability in power system network
CO5	Investigate the generation strategy and economic dispatch in power system
CO6	Analyze the load frequency dynamics of the power system.

EE 8712 Renewable Energy Systems Laboratory

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

CO	Statement
CO1	Understand and analyze Renewable energy systems.
CO2	Train the students in Renewable Energy Sources and technologies.
CO3	Provide adequate inputs on a variety of issues in harnessing Renewable Energy
CO4	Simulate the various Renewable energy sources
CO5	Recognize current and possible future role of Renewable energy sources
CO6	Understand basics of Intelligent Controllers.

IV Year (Even Sem)

Professional Elective V GE8076 - Professional ethics

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

CO	Statement
CO1	To acquire the basic knowledge of human values, moral ethics, industrial standards, code of ethics and role of professional ethics in the engineering field.
CO2	To have an awareness of professional rights and responsibilities of an engineer and to have an understanding for safety and risk benefit analysis.
CO3	To imbibe the various ethical theories developed and apply them for a professional and societal advancement.
CO4	To imbibe adequate knowledge about the culture and the value system adopted by MNC's, local business houses and to create an ethical based work environment.

CO5	To understand and solve the employees conflict and grievences in an amicable and ethical way.
CO6	Formulate and provide solutions to overcome ethical issues for win-win outcome.

Professional Elective VI

EI8073- Biomedical Instrumentation

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

CO	Statement
CO1	To understand the basic medical terminology, relevant for biomedical instrumentation.
CO2	To understand the different diagnostic measurement methods for identification of human biopotentials and their necessary instrumentation.
CO3	To understand and measure the electrical and non electrical parameters of biomedical system
CO4	To understand different imaging techniques and life assisting techniques
CO5	To Understand the position of biomedical instrumentation in modern hospital care
CO6	To Analyse different diagnostic measurement methods for different humane variables and their necessary instrumentation

EE8811 Project Work

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

CO	Statement
CO1	Find a solution for a specific problem.
CO2	Develop a real time solution or a prototype for the problem identified.
CO3	Analyse the designed model.
CO4	Summarize the literature reviews relevant to the problem identified.
CO5	Apply the software which can give all pros and cons for the specific problem and get solutions.
CO6	Test the model designed and compare the results with the Software solution.
CO7	Prepare a paper to publish in conference or journal by summarizing both software and hardware results.

EE8016 - Energy Management & Audit

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

CO	Statement
CO1	Acquire knowledge about suitable energy monitoring system to analyse and optimize energy consumption in an organisation
CO2	Analyse about various energy related aspect of electrical system

CO3	Develop concepts behind economic analysis and load management
CO4	Develop skill in energy management of various electrical equipment and metering
CO5	Analyse the importance of lighting systems and cogeneration
CO6	Acquire knowledge in energy audit methods learn to identify the areas deserving tight control to save energy expenditure

SRI SAI RAM ENGINEERING COLLEGE

DEPARTMENT OF COMPUTER SCINECE AND ENGINEERING

CRITERIA 3

2017 REGULATION

COURSE OUTOMES

Semester :		III
Sub Code :		CS8351
Sub Name:		DIGITAL PRINCIPLES AND SYSTEM DESIGN

1	Simplify Boolean functions using Kmap.	K2
2	Design and Analyze Combinational Circuits.	K6
3	Design and Analyze Sequential Circuits.	K6
4	Implement designs using Programmable Logic Devices.	K2
5	Write HDL code for combinational and Sequential Circuits.	K3

Semester :		III			
Sub Code :		CS8391			
Sub Name:		DATA STRUCTURES			

1	Understand the concept of abstract data type and its types.		
2	Analyze the applications of linear data structure using Stack and Queue implementation.		
3	Apply the basic concepts of the Non Linear Data Structure - Trees and Graph		
4	Illustrate the various sorting algorithms with examples		
5	Define the various hash functions and its implementation		

Semester : III					
Sub Code : CS8392					
Sub Name: OBJECT ORIENTED PROGRAMMING					

1	Comprehend Object Oriented Programming Concepts in Java .(K2)		

2	Apply the Object Oriented Programming Concepts such as inheritance and interfaces to develop the reusable Appl
3	Illustrate the object oriented applications using Java Exceptions and I/O Streams.(K4)
4	Understand Multi-threading and Generic Classes in Java (K2)
5	Apply AWT and Swing package to develop Graphical User Interface Applications.(K3)

Semester : III					
Sub Code : CS8381					
Sub Name: DATA STRUCTURES LABORATORY					

1	Apply Linear data structures using C programs (stack, Queue and Linked List) (K3)
2	Explain applications of Linear data stru tures. (K2)
3	Apply the concepts of Non linear data structures using C programs (Tree, Graph) (K3)
4	Develop the applications of tree (traversal, sorting and searching) (K6)
5	Experiment with the applications of Graph Hashing collision techniques (K3)

Semester :		III	
Sub Code :		CS8382	
Sub Name:		DIGITAL SYSTEMS LAB	

1	Implement simplified combinational circuits using basic logic gates
2	Implement combinational circuits using MSI devices
3	Implement sequential circuits like counters and shift registers
4	Simulate combinational and sequential circuits in HDL
5	Design and implementation of a simple digital system

Semester : III					

Sub Code : CS8383	
Sub Name: OBJECT ORIENTED PROGRAMMING LAB	

1	Develop and implement Java programs for simple applications that make use of classes(K1)
2	Develop and implement Java programs for simple applications that make use of packages and interfaces. (
3	Develop and implement Java programs with array list, exception handling and multithreading (K1)
4	Design applications using generic programming and event handling. (K6)
5	Understand the JAVA SWING Concepts to Design GUI applications. (K2)

Semester :		IV
Sub Code :		CS8492
Sub Name:		Database Management Systems

1	Discuss the concepts of database to apply the Relational,ER model for design and SQL for implementation of the
2	Recognize and identify the use of normalization and functional dependencies to refine the database system.
3	Execute various SQL queries for the Transaction Processing & Locking using concept of Concurrency control.
4	Evaluate the query processing techniques for the optimization of SQL queries.
5	Implement the indexing and hashing techniques and Analyse advanced databases differ from the traditional

Semester :		IV
Sub Code :		CS8451
Sub Name:		DESIGN AND ANALYSIS OF ALGORITHMS

1	To Review the fundamentals of algorithmic problem solving and analyzing efficiency of algorithms. (K2)
2	To Apply mathematical formulation, complexity analysis and methodologies to solve recurrence relations for algor
3	To Compare the time complexities of various algorithms.(K4)
4	To Critically analyze the different algorithm design techniques for a given problem.(K4)
5	To Illustrate NP class problems and formulate solutions using standard approach.(K4)

Semester :	**IV**

Sub Code :	**CS8491**					
Sub Name:	**COMPUTER ARCHITECTURE**					

1	Evaluate performance of the Computer System and decode machine language
2	Design arithmetic and logic unit
3	Design and analyze pipelined control units
4	Understand parallel processing architectures.
5	Evaluate the performance of memory and IO systems.

Semester :	**IV**					
Sub Code :	**CS8492**					
Sub Name:	**Database Management Systems**					

1	Discuss the concepts of database to apply the Relational,ER model for design and SQL for implementation of the
2	Recognize and identify the use of normalization and functional dependencies to refine the database system.
3	Execute various SQL queries for the Transaction Processing & Locking using concept of Concurrency control.
4	Evaluate the query processing techniques for the optimization of SQL queries.
5	Implement the indexing and hashing techniques and Analyse advanced databases differ from the traditional

Semester :	IV					
Sub Code :	CS8493					
Sub Name:	OPERATING SYSTEMS					

CO1	Understand the basic concepts and functionality of operating system. (K2)
CO2	Understand the process concepts, analysing the performance of various CPU Scheduling algorithmsm, threads and dead lock management.(K2)
CO3	Compare and contrast various memory management schemes. (K5)
CO4	Understand file management and various I/O systems (K2)
CO5	Demonstrate Linux system and mobile OS like ios and Android. (K3)

Semester :	IV					

Sub Code :	CS8494				
Sub Name:	SOFTWARE ENGINEERING				

1	Identify the key activities in managing a software project and understand the agile methodology	
2	Analyze different process models and apply to real world problems	
3	Understand the concepts of requirements engineering and Analysis Modeling.	
4	Apply systematic procedure for software design and deployment.	
5	Compare and contrast various testing and maintenance methods.	

Semester :	**IV**					
Sub Code :	**CS8461**					
Sub Name:	**OPERATING SYSTEMS LABORATORY**					

CO1	Evaluate the performance of various CPU Scheduling Algorithms (K4)
CO2	Understand and Implement Deadlock avoidance and Deadlock Detection Algorithms (K2)
CO3	Create processes and implement IPC, Analyze and Implement Semaphores (K5)
CO4	Analyze the performance of the various Page Replacement Algorithms (K4)
CO5	Implement File Organization and File Allocation Strategies (K5)

Semester :		**IV**					
Sub Code :		**CS8481**					
Sub Name:		**Database Management Systems Laboratory**					

1	Use typical data definitions and manipulation commands.
2	Design applications to test Nested and Join Queries
3	Implement simple applications that use Views
4	Implement applications that require a Front-end Tool
5	Critically analyze the use of Tables, Views, Functions and Procedures

Semester :		V			
Sub Code :		CS8501			
Sub Name:		THEORY OF COMPUTATION			

1	Design automata for any given pattern		
2	Specify regular expression of string pattern		
3	Write context free grammar for any language		
4	Apply Turing machine to propose computation solutions		
5	Interpret whether a problem is decidable or not		
6	Interpret NP class problems		

Semester :		V		
Sub Code :		CS8591		
Sub Name:		COMPUTER NETWORKS		

1	Understand the concepts of protocol layering and its functions in computer networks.			
2	Analyze the performance of a network in various transmission medium.			
3	Discuss various protocols in TCP/IP protocol layers and connecting devices to build network			
4	Understand the basics of how data flows from one node to another.			
5	Classify IP addresses,Wired and Wireless LAN			
6	Analyse various Routing protocols			

Semester :		**V**					
Sub Code :		**CS8592**					
Sub Name:		**OBJECT ORIENTED ANALYSIS AND DESIGN**					

	At the end of the course, the students will be able to:
1	Understand the fundamentals of Unified Process, Use cases and UML diagrams.(K2)

2	Develop Domain model ,Class diagram and Use case diagram (K6)
3	Understand dynamic UML diagrams (K2)
4	Design dynamic UML diagrams(K6)
5	Apply design patterns to improve software design (K3)
6	Understand the concepts of SQA and the various testing methodologies for OO software(K2)

Semester :	**V**
Sub Code :	**OEC552**
Sub Name:	**SOFT COMPUTING**

	At the end of the course, the students will be able to:
1	Describe various soft computing concepts for building practical applications (K2)
2	Review the concepts of neural networks and its algorithms to address real time problems (K2)
3	Apply fuzzy rules and reasoning to develop decision making and expert system (K3)
4	Classify the importance of optimization techniques and genetic programming (K4)
5	Evaluate and compare different solutions by various soft computing approaches for a given problem (K5)
6	Compose various hybrid soft computing techniques (K6)

Semester :	V
Sub Code :	CS8581
Sub Name:	NETWORKS LABORATORY

1	Understand the network commands
2	Describe Server client communication using socket.
3	Develop application using socket programming
4	Analyse and implement various network protocols.
5	Analyse various routing protocols using simulation
6	use simulation tools to analyze the performance of various network protocols. (Apply)

Semester :	V
Sub Code :	CS8582
Sub Name:	OOAD LAB

On Completion of the course, the students should be able to:	
1	Identify the problem statement (K2)
2	Perform OO analysis to identify the requirements for the given problem specification (K2)
3	Design and map the basic software requirements using UML(K3)
4	Map the object oriented design to develop code(K4)
5	Apply the design patterns to improve the software quality(K4)
6	Test the compliance of the software with the SRS(K3)

Semester :	V
Sub Code :	CS8591
Sub Name:	COMPUTER NETWORKS

1	Understand the concepts of protocol layering and its functions in computer networks.
2	Analyze the performance of a network in various transmission medium.
3	Discuss various protocols in TCP/IP protocol layers and connecting devices to build network
4	Understand the basics of how data flows from one node to another.
5	Classify IP addresses,Wired and Wireless LAN
6	Analyse various Routing protocols

Semester :	V
Sub Code :	CS6511
Sub Name:	CASE TOOLS LAB

1	Definng problem statements
2	Understand the basics of OO concepts and implement projects .
3	Understand the UML concepts and apply for drawing various diagrams.
4	Applying the UML concepts for drawing diagrams using Software tools.
5	Apply appropriate design patterns.
6	Collaborate to Create code from design.

Semester :	VI		
Sub Code :	CS8602		
Sub Name:	COMPILER DESIGN		

1	Understand different phases of compiler.
2	Apply different parsing algorithms to develop the parsers for a given grammar.
3	Analyze various syntax-directed translation schemes to generate intermediate code
4	Understand different run time environment and storage organization techniques
5	Design a simple Code Generator using code generation Algorithm
6	Implement different code optimization techniques

Semester :	**VI**		
Sub Code :	**CS8603**		
Sub Name:	**Distributed Systems**		

	At the end of the course, the students will be able to:		
1	Outline the foundations and issues of distributed systems (K1)		
2	Understand the clock synchronisation and message ordering (K2)		
3	Analyse the various Group Communication Techniques (K4)		
4	Illustrate the distributed mutex and deadlock detection (K3)		
5	Evaluating the various recovery and consenus techniques in distributed systems (K5)		
6	Describe the concepts of P2P and distributed shared memory (K2)		

Semester :		VI			
Sub Code :		CS8651			
Sub Name:		INTERNET PROGRAMMING			

1	Construct a basic website using HTML and Cascading Style Sheets.

2	Build dynamic web page with validation using Java Script objects and by applying different event handling mechanisms.
3	Develop server side programs using Servlets and JSP.
4	Construct simple web pages in PHP
5	Represent web data using XML and develop dynamic web pages usiing AJAX
6	Use web services to develop interactive web applications

Semester :	**VI**
Sub Code :	**CS8691**
Sub Name:	**ARTIFICIAL INTELLIGENCE**

	At the end of the course, the students will be able to:
1	Understand the various characteristics of Intelligent agents and problem solving approach to AI problem.(K2)
2	Illustrate appropriate search algorithms for solving any AI problem. (K3)
3	Define the Scope of AI using various Game Playing Algorithm.(K1)
4	Interpret the knowledge representation using predicate logic concept.(K2)
5	Design software agents to solve a problem (K6)
6	Illustrate various AI applications for Natural Language Processing.(K4)

Semester :	VI
Sub Code :	CS8661
Sub Name:	INTERNET PROGRAMMING LAB

1	Construct Web pages using HTML and style sheets.
2	Build dynamic web pages with validation using Java Script objects and by applying different event handling
3	Develop dynamic web pages using server side scripting.
4	Use PHP programming to develop web applications.
5	Construct web applications using AJAX and XML
6	Develop web services in Java

Semester :	**VI**
Sub Code :	**CS8662**
Sub Name:	**MOBILE APPLICATION DEVELOPMENT LABORATORY**

	At the end of the course, the students will be able to:
1	Create an application that uses GUI components, Font, Colors, Layout Managers and event listeners. (K6)
2	Apply the components and structure of mobile application development frameworks for Android and windows OS b
3	Understand how to work with various mobile application development frameworks. (K2)
4	Apply the basic and important design concepts and issues of development of mobile applications. (K3)
5	Classify the capabilities and limitations of mobile devices.(K4)
6	Determine various mobile applications using emulators (K5)

Semester :	VI
Sub Code :	CS8611
Sub Name:	MINI PROJECT

1	Use literature to identify the objective, scope and the concept of the work.	k3
2	Apply suitable methods and materials to carry out experiments by conserving eco-system	k3
3	Develop a prototype/experimental set-up necessary to complete the project	k5
4	Discuss the results obtained to derive conclusions	k2
5	Defend the work by preparing a report as per the University format.	k5
6	Compile the experimental information to publish in journals/conference	k6

Semester :	VII
Sub Code :	CS8073
Sub Name:	C# AND .NET PROGRAMMING

1	Understanding the basic of C# language and its advanced features.	
2	Applying the C# language in various application in the .Net Framework	

3	Understanding the concept of windows-based application
4	Creating ADO.NET, ASP.NET, mobile applications using .NET compact framework
5	Applying advanced concepts in data connectivity, WPF, WCF and WWF with C# and .NET.
6	Understanding the working of base class libraries, their operations and manipulation of data using XML

Semester :	VII
Sub Code :	CS8079
Sub Name:	HUMAN COMPUTER INTERACTION

1	To explain the importance of HCI study and principles of user-centered design (UCD) approach.
2	To develop understanding of human factors in HCI design.
3	To discuss various models, paradigms and context of interactions.
4	To design and evaluate effective user-interfaces following a structured and organized user-centered desi
5	To understand and design mobile and web interfaces using tools.
6	To illustrate the real time scenario with HCI concepts.

Semester :	VII
Sub Code :	CS8791
Sub Name:	CLOUD COMPUTING

	On Completion of the course, the students should be able to:	
	1	Articulate the main concepts, key technologies, strengths and limitations of cloud computing.
	2	Explainthe key and enabling technologies that help in the development of cloud.
	3	Demonstrate and use the architecture of compute and storage cloud, service and delivery models.
	4	Illustrate the core issues of cloud computing such as resource management and security.
	5	Install and use current cloud technologies.
	6	Build an cloud application by choosing the appropriate technologies, algorithms and approaches for

Semester :	VII
Sub Code :	CS8792
Sub Name:	Cryptography and Network Security

On Completion of the course, the students should be able to:	
1	Discuss the mechanisms, attacks and services in security using cryptography.
2	Apply basics of mathematics in encryption and authentication algorithms.
3	Review the System security standards in OSI Layers.
4	Evaluate the data integrity using Symmetric Encryption algorithms.
5	Evaluate the data integrity based on Asymmetric Encryption algorithms.
6	Apply Data authentications mechanism for a web based application.

Semester :	VII
Sub Code :	CS8082
Sub Name:	MACHINE LEARNING TECHNIQUES

1	Understand the basic concepts, fundamental issues and challenges of machine learning algorithms	K2
2	Apply problem solving techniques which involve perception, reasoning and learning	K3
3	Understand Genetics and Neural Networks Algorithms	K2
4	Design and implement basic machine learning algorithms using tools.	K3
5	Use various algorithms in machine learnig applications such as Bayesian learning, Computational	K3
6	Apply appropriate machine learning algorithm to the real world problem.	K3

Semester :	VII
Sub Code :	CS8711
Sub Name:	CLOUD COMPUTING LAB

1	Configure various virtualization tools such as Virtual Box, VMware workstation.
2	Design and deploy a web application in a PaaS environment
3	Learn how to simulate a cloud environment to implement new schedulers.
4	Install and use a generic cloud environment that can be used as a private cloud.
5	Manipulate large data sets in a parallel environment.
6	Install a google app engine create a program

Semester :	VII
Sub Code :	IT8761
Sub Name:	Security Lab

1	Implement the classical substitution and transposition techniques
2	Implement the various Symmetric Key Algorithms
3	Implement the various Asymmetric Key Algorithms
4	Evaluate security mechanisms using Hash Functions
5	Implement different Digital signature algorithms
6	Use different open source tools for network security and analysis

	Semester :		VII
	Sub Code :		IT8761
	Sub Name:		Security Lab

1	Implement the classical substitution and transposition techniques
2	Implement the various Symmetric Key Algorithms
3	Implement the various Asymmetric Key Algorithms
4	Evaluate security mechanisms using Hash Functions
5	Implement different Digital signature algorithms
6	Use different open source tools for network security and analysis

Semester :		VIII	
Sub Code :		CS8074	
Sub Name:		CYBER FORENSICS	

1	Understand the basics of Computer Forensics
2	Evaluate the different types of computer forensics technology
3	Analyze and validate forensics data

4	Apply the methods for data recovery, evidence collection and data seizure
5	knowledge on duplication and preservation of digital evidence.
6	Evaluate the different types of computer forensics tools

Semester :	VIII
Sub Code :	CS8078
Sub Name:	GREEN COMPUTING

1	Outline green computing practices to minimize negative impacts on the environment.
2	Apply the energy saving practice skills in Business Processes.
3	Evaluate technology tools that can reduce paper waste and carbon footprint by the stakeholders.
4	Describe the ways to minimize equipment disposal requirements .
5	Analyze the issues related with Green compliance.
6	Apply Green IT Strategies to various sectors

Semester :	VIII
Sub Code :	GE8076
Sub Name:	Professional Ethics in Engineering

1	Describe the human values with regard to the individual life style for the society
2	Explain the role of ethics to the engineering field
3	Describe how engineering is applied in association with ethics based on engineering experimentation
4	Explain the engineering ethics based safety, responsibilities and rights
5	Discuss the global issues of professional ethics in engineering
6	Experiment the professional ethics in engineering based product development

Semester :	VIII
Sub Code :	IT8075
Sub Name:	Software Project Management

1	Understand Project Management principles while developing software.
2	Gain extensive knowledge about the basic project management concepts, framework and the process models.

3	Obtain adequate knowledge about software process models and software effort estimation techniques.
4	Applying the network planning models and estimate the risks involved in various project activities.
5	Define the checkpoints, project reporting structure, project progress and tracking mechanisms using project manage
6	Learn staff selection process and the issues related to people management

Semester :		VIII	
Sub Code :		CS8811	
Sub Name:		PROJECT WORK	

1	State technically and economically feasible problems.
2	Identify and survey the relevant literature for getting exposed to related solutions
3	Analyse, design, and develop adaptable solutions using modern tools
4	Implement and integrate framed solutions of the problem.
5	Evaluate the solutions to trace against the user requirements.
6	Deploy and Demonstrate the solutions for future scope for improvement.

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2017-2021 BATCH

I SEM

COURSE NAME: HS8151- Communicative English

COURSE CODE: **101**

C101.1	Understand the basics of LSRW skills and will able to participate effectively in conversations, to exchange personal information and to express opinions in English.
C101.2	Comprehend reading and listening tasks and also to describe a simple process with a right choice of vocabulary.
C101.3	Articulate ideas coherently and write on general and creative topics using grammatically correct sentences.
C101 .4	Read, comprehend and interpret articles of a general kind in magazines and newspapers and also write informal letters and e-mails in English employing grammatically correct sentences.
C101.5	Speak clearly, confidently and comprehensibly using communicative strategies and write paragraphs and short essays cohesively and coherently.

COURSE NAME: MA8151- ENGINEERING MATHEMATICS I

COURSE CODE: C102

C102.1	Apply various techniques in solving differential equations with constant and variable coefficients.
C102.2	Gain knowledge on limits, continuity and rules of differentiation and apply them to differentiate various functions and solve maxima and minima problems.
C102.3	Understand the concepts of partial differentiation, total derivatives and Jacobian.
C102 .4	Evaluate integrals using both Riemann sums and fundamental theorem of calculus and determine the convergence and divergence of improper integrals.
C102.5	Apply various techniques of integration to compute multiple integrals and find the area and volume using double and triple integrals respectively

COURSE NAME: PH8151- ENGINEERING PHYSICS

COURSE CODE: **C103**

C103.1	Understand the basics of properties of matter and its applications.
C103.2	Acquire knowledge on the concepts of waves and optical devices and their applications in fibre optics.
C103.3	Evaluate the concepts of thermal properties of materials and their applications in expansion joints and heat exchangers.
C103 .4	Get knowledge on advanced physics concepts of quantum theory and its applications in tunneling microscopes.
C103.5	Understand the basics of crystals, their structures and different crystal growth techniques.

COURSE NAME: CY8151-ENGINEERING CHEMISTRY

COURSE CODE: **C104**

C104.1	Identify the origin of water resources and develop innovative methods to produce soft water for industrial use and potable water at cheaper cost.
C104.2	Explore the fundamental concepts in surface chemistry and their application in the field of catalysis.
C104.3	Gain the knowledge about phase diagrams and their applications heterogeneous equilibrium. Emphasis on heat treatment of alloys and applications
C104.4	Understand the chemistry of fuels and combustion and its application in various levels.

C104.5	Acquire the basics of non-conventional sources of energy and understand the principles and the reaction mechanism of batteries and fuel cells.

COURSE NAME: GE8151-Problem Solving and Python Programming
COURSE CODE: **C105**

C105.1	Develop algorithmic solutions to simple computational problems
C105.2	Structure simple Python programs for solving problems.
C105.3	Decompose a Python program into functions.
C105.4	Represent compound data using Python lists, tuples, dictionaries.
C105.5	Read and write data from/to files in Python Programs.

COURSE NAME: GE8152- Engineering Graphics
COURSE CODE: C106

C106.1	Communicate thoughts and ideas graphically in a neat fashion and ability to perform free hand sketching of basic geometrical constructions, curves used in engineering practices, multiple views of objects.
C106.2	Understand the concepts of orthographic projection from lines and plane surfaces
C106.3	Acquire the knowledge of Orthographic projection in three dimensions from solids of basic shapes using change of position and change of reference line method
C106.4	Understand the interior shapes of machine elements and structures through sections of solids and development of lateral surfaces.
C106.5	Understand the three dimensional view of an object using isometric and perspective projections

COURSE NAME: GE8161- PROBLEM SOLVING AND PYTHON PROGRAMMING LABORATORY
COURSE CODE: C107

C107.1	Write, test, and debug simple Python programs.
C107.2	Implement Python programs with conditionals and loops
C107.3	Develop Python programs step-wise by defining functions and calling them
C107.4	Use Python lists, tuples, dictionaries for representing compound data..
C107.5	Read and write data from/to files in Python.

COURSE NAME: BS8161- PHYSICS AND CHEMISTRY LABORATORY
COURSE CODE: C108

C108.1	Apply the principles of Laser for engineering applications.
C108.2	Understand the basic knowledge of elasticity.
C108.3	Know the practical applications of thermal physics.
C108 .4	Acquire practical skills in the determination of water quality parameters through volumetric method
C108.5	Understand the practical knowledge on pH and conductometric titrations.

II SEM
COURSE NAME: HS8251- Technical English
COURSE CODE: **C109**

C109.1	Read, identify the transition in texts and comprehend scientific and technical contexts in an enhanced way.
C109.2	Read and interpret data from graphical representations and charts in an effective way.

C109.3	Write reports effectively using appropriate vocabulary and accurate spelling and grammar.
C109 .4	Draft job application letters with Resume and e-mails in a convincing manner.
C109.5	Describe processes, participate in formal and informal conversations, Group Discussions and make technical presentations effectively

COURSE NAME: MA8251-Engineering Mathematics - II
COURSE CODE: **: C110**

C110.1	Evaluate Eigen values and Eigen vectors and apply them in diagonalization of matrices.
C110.2	Acquire knowledge in the fundamentals and basic concepts in vector calculus.
C110.3	Apply the concept of analyticity in complex functions and evaluate complex derivatives.
C110.4	Recognize the nature of singularities, evaluate residues and contour integrals.
C110.5	Understand the usage of Laplace transforms in mathematics and apply in relevant Situations.

COURSE NAME: PH8253- Physics for Electronics Engineering
COURSE CODE: C111

C111.1	Gain knowledge on classical and quantum electron theories and energy band structures.
C111.2	Acquire knowledge basics of semiconductor physics and its applications in various devices.
C111.3	Get knowledge on magnetic and dielectric properties of materials.
C111.4	Have the necessary understanding on the functioning of optical material for optoelectronics.
C111.5	Understand the basics of quantum structures and their applications in carbon electronics.

COURSE NAME: BE8252- Basic Civil and Mechanical Engineering
COURSE CODE: C112

C112.1	To provide an overview and impart basic knowledge of sub disciplines in civil and mechanical Engineering.
C112.2	To familiarize the materials and measurements used in civil engineering.
C112.3	To Provide exposure on the fundamental elements of building structures and provide ideas on proper selection of building materials.
C112 .4	Inculcate with knowledge of Classification and working principle of Power plants, IC Engines and Boilers.
C112.5	Acquire the knowledge on terminologies & working principle of Refrigeration & Air-Conditioning

COURSE NAME: EE8251- Circuit Theory
COURSE CODE: C113

C113.1	Ability to understand the laws and basic concepts of DC and AC circuits
C113.2	Ability to Analyze the DC and AC electrical circuits using mesh and nodal analysis
C113.3	Ability to apply theorems in AC and DC circuits
C113 .4	Ability to analyze and solve RL,RC and RLC transient circuits.
C113.5	Ability to analyze resonance and coupled circuits.and three phase circuits

COURSE NAME: GE8291-Environmental Science and Engineering
COURSE CODE: C114

C114.1	Understand the basics of Structure and functions of an ecosystem, the values of biodiversity and conservation of biodiversity.
C114.2	Understand the causes, effects and control measures of different pollution and disasters.
C114.3	Remember the importance of natural resources and to know the role of an individual in conservation of natural resources and their case studies.
C114 .4	Gain knowledge about the concept of Sustainable development, Environmental Laws and role of Government and Non- Governmental Organizations (NGO) in Environmental Protection.
C114.5	Learn the importance of family welfare programs, population explosion and Value education.

COURSE NAME: GE8261- Engineering Practices Laboratory
COURSE CODE: C115

C115.1	Able to measure electrical parameters such as voltage, current, resistance and power
C115.2	Able to measure the electrical energy by single phase and three phase energy meters.
C115.3	Able to prepare carpentry components and pipe connections including plumbing works.
C115.4	Able to prepare different types of welding joints, basic machining operations in lathe and drilling, sheet metal works.
C115.5	Elaborate on the components, gates, soldering practices.

COURSE NAME: EE8261-Electric Circuits Laboratory
COURSE CODE: **: C116**

C116.1	Able to understand basic electric circuit concepts in engineering applications
C116.2	Able to apply circuit theorems and concepts in engineering applications
C116.3	Able to understand the simulation of electrical circuits and the verification of circuit theorems.
C116 .4	Able to understand the simulation software for solving RL, RC and RLC networks.
C116.5	Able to analyze three phase power and single phase power measurements.

III SEM

COURSE NAME: MA8353 Transforms and Partial Differential Equations
COURSE CODE: C201

C201.1	Understand the mathematical principles of partial differential equations and formulate the equations.
C201.2	Evaluate the various forms of Fourier series.
C201.3	Apply the Fourier series solution methodology to boundary value problems.
C201.4	Understand the concept of Fourier transform and its properties, as well as to evaluate Fourier transforms of typical functions.
C201.5	Apply Z transform techniques for discrete time signals.

COURSE NAME: EC8353 Electronic Devices and Circuits
COURSE CODE: C202

C202.1	Students are able to understand the Structure and operation of PN junction devices.
C202.2	Students are able to understand the Structure and operation of transistors.
C202.3	Students are able to understand the operation of amplifiers.
C202.4	Students are able to understand the operation of multistage amplifiers and differential amplifiers.
C202.5	Students are able to understand feedback amplifiers and oscillators.

COURSE NAME: EE8351 Digital Logic Circuits
COURSE CODE: C203

C203.1	Ability to study various number systems and simplify the logical expressions using Boolean functions
C203.2	Ability to design combinational and sequential Circuit
C203.3	Ability to design various synchronous and asynchronous circuits.
C203.4	Ability to introduce asynchronous sequential circuits and PLDs
C203.5	To understand the digital simulation for development of application oriented logic circuits.

COURSE NAME: EI8351 ELECTRICAL MEASUREMENTS
COURSE CODE: C204

C204.1	Ability to measure current and voltage. Ability to understand AC & DC measurements.
C204.2	Ability to measure power and calibration of energy meters.
C204.3	Ability to measure current and voltage using potentiometric methods.
C204.4	Ability to understand the resistance measurement
C204.5	Ability to use bridge circuits to measure resistance, inductance and capacitance.

COURSE NAME: EI8352 TRANSDUCER ENGINEERING
COURSE CODE: C205

C205.1	Understand the methods of measurement, classification of transducers and to analyze error.
C205.2	To understand the behavior of transducers under static and dynamic conditions and hence to model the transducer
C205.3	To Get exposed to different types of resistive transducers and their application areas.
C205.4	To acquire knowledge on capacitive and inductive transducers..
C205.5	To gain knowledge on variety of transducers and get introduced to MEMS and Smart transducers.

COURSE NAME: CS8392 Object Oriented Programming
COURSE CODE: C206

C206.1	Develop the Java programs using OOP principles
C206.2	Develop Java programs with the concepts inheritance and interfaces
C206.3	Build java applications using exceptions and I/O streams
C206.4	Develop Java applications with threads and generic classes
C206.5	Develop interactive Java programs using swings

COURSE NAME: EI8361 Measurements and Transducers Laboratory
COURSE CODE: C207

C207.1	Understand the concepts of measurement, error and uncertainty.
C207.2	Understand the static and dynamic characteristics of measuring instruments.
C207.3	Gain knowledge about the principle of operation and characteristics of different types of resistance, capacitance and inductance transducers.
C207.4	Acquire knowledge of analyzing different stages of signal conditioning units.
C207.5	Ability to interpret the results and draw meaningful conclusions.

COURSE NAME: CS8383 Object Oriented Programming Laboratory
COURSE CODE: C208

C208.1	Students are able to understand object-oriented concepts.
C208.2	Students are able to understand object oriented programming through C++
C208.3	Students are able to gain the basic knowledge in Object Oriented concepts.
C208.4	Students are able to develop applications using Object Oriented Programming Concepts.
C208.5	Students are able to implement features of object oriented programming to solve real world problems.

IV SEM

COURSE NAME: MA8491 NUMERICAL METHODS

COURSE CODE: C209

C209.1	Evaluate algebraic, transcendental equations, systems of linear equations and Eigen value problems.
C209.2	Apply the knowledge of Interpolation and approximation aid students in construction of approximate polynomials from large sets of experimental data.
C209.3	Understand differentiation and integration of an empirical function given by tabulated numerical values.
C209.4	Evaluate first order ordinary differential equations using single step methods and multistep methods.
C209.5	Gain knowledge in solving boundary value problems in ODE and PDE by finite difference methods.

COURSE NAME: EI8451 ELECTRICAL MACHINES

COURSE CODE: C210

C210.1	Ability to acquire knowledge to solve problems associated with DC and AC Machines
C210.2	Ability to test and control different machines based on the familiarity of basic concepts and working principle
C210.3	Ability to choose appropriate machines for a given application while carrying out projects
C210.4	Ability to apply the knowledge gained to choose appropriate machines for specific application useful for the society.
C210.5	Ability to know about the latest developments related to machines and to learn their concepts even after the completion of the course and to acquire knowledge of stepper motor

COURSE NAME: EI8452 Industrial Instrumentation - I

COURSE CODE: C211

C211.1	Ability to understand the construction and working of instruments used for measurement of force, torque, speed, acceleration, vibration, density, viscosity, humidity, moisture, temperature.
C211.2	Ability to select instruments according to the application
C211.3	Ability to understand the working of instruments used for measurement of pressure.
C211.4	Ability to measure temperature using fiber optic probe & design signal conditioning circuits and compensation schemes for temperature measuring instruments
C211.5	Ability to understand the concept of calibration of instruments and gain knowledge about temperature measurement devices

COURSE NAME: EE8451- Linear integrated Circuits and Applications

COURSE CODE: C212

C212.1	Acquire knowledge in IC fabrication procedure
C212.2	Analyze the characteristics and basic applications of Op-Amp.

C212.3	Design and acquire knowledge on the Applications of Op-amp.
C212.4	Identify the applications of special ICs like Timers, PLL.
C212.5	Understand the features and applications of regulator circuits.

COURSE NAME: IC8451- Control Systems
COURSE CODE: C213

C213.1	Ability to develop various representations of system based on the knowledge of Mathematics, Science and Engineering fundamentals.
C213.2	Ability to do time domain and frequency domain analysis of various models of linear system.
C213.3	Ability to interpret characteristics of the system to develop mathematical model.
C213.4	Ability to design appropriate compensator for the given specifications
C213.5	Ability to come out with solution for complex control problem

COURSE NAME: EC8395-Communication Engineering
COURSE CODE: C214

C214.1	Apply Analog and digital communication techniques.
C214.2	Understand Data communication techniques
C214.3	Use Pulse communication techniques.
C214.4	Analyze Source and Error control coding.
C214.5	Utilize multi-user radio communication

COURSE NAME: EI8461- Devices and Machines lab
COURSE CODE: C215

C215.1	To simulate using PSPICE/MATLAB and analyze the characteristics of PNJunction Diode, Transistor and FET
C215.2	To simulate using PSPICE/MATLAB and analyze the characteristics of UJT,Phase Shift Oscillators and Multivibrator
C215.3	To simulate using PSPICE/MATLAB and analyze the characteristics of Passive filters and rectifiers.
C215.4	To conduct an experiment on DC generators and analyze the open circuit andload characteristics
C215.5	To conduct an experiment on DC motors and analyze the load characteristicsof DC Shunt motor and induction motors ,and transforemrs

COURSE NAME: EE8461- Linear and Digital integrated Circuits Laboratory
COURSE CODE: C216

C216.1	To understand the working of linear and digital integrated circuits. (K2)
C216.2	To construct linear and digital integrated circuits (K3)
C216.3	To analyse linear and digital integrated circuits (K4)
C216.4	To Evaluate the performance of linear and digital integrated circuits (K5)
C216.5	To Understand the working of different application IC's. (K2)

SEM V
COURSE NAME: EI8551 Analytical Instruments
COURSE CODE: C301

C301.1	To understand the fundamental principles of selective analytical instruments used in medical diagnosis, quality assurance & control and research studies.

C301.2	Assess and suggest a suitable analytical method for a specific purpose, and evaluate sensitivity, important sources of interferences and errors, and also suggest alternative analytical methods for quality assurance.
C301.3	To deduce the relevance with deeper understanding of Gas analyzers and Pollution Monitoring systems
C301.4	To develop critical thinking for interpreting analytical data using Various analyzers
C301.5	To analyze the working principle, types and applications of NMR and Mass spectroscopy
C301.6	To Critically evaluate the strengths and limitations of the various instrumental methods.

COURSE NAME: EI8552 Industrial Instrumentation - II
COURSE CODE: C302

C302.1	To analyze about features, installation and applications variable head type flow meters for compressible and incompressible flow.
C302.2	To evaluate coefficient of discharge of various variable head type flow meters like Orifice plate, Venturi tube, Flow nozzle, Dall tube and Pitot tube.
C302.3	To analyze the features of positive displacement flow meters, Variable area flow meter and Mass flow meter, various electrical flow meters and dynamic weighing method forflow meter calibration
C302.4	To evaluate the different methods of level measurement for a variety of applications
C302.5	To analyze the basic concepts of pneumatic and electronic transmitter
C302.6	To examine the behavior of smart transmitter used in flow, level, pressure, temperaturemeasurement together with its installation and calibration.

COURSE NAME: EI8553 Process Control
COURSE CODE: C303

C303.1	To introduce technical terms and nomenclature associated with Process control domain
C303.2	To provide an overview of the features associated with Industrial type PID controller
C303.3	To elaborate the model parameters and design Specifications of controller
C303.4	To make the students understand the various PID tuning methods and different types of control schemes such as cascade control ,feed-forward control and Model Based control schemes
C303.5	To elaborate different types of PID Implementation Issues
C303.6	To familiarize the students with characteristics, selection, sizing of control valves

COURSE NAME: EE8551 Microprocessors and Microcontrollers
COURSE CODE: C304

C304.1	Demonstrate the detail structure of 8085 processor and 8051 microcontroller
C304.2	Classify the different types of machine cycle and interrupt signals of 8085
C304.3	Illustrate how the different peripherals are interfaced with processor and microcontroller
C304.4	Discuss the various instruction sets and addressing modes of 8085 and 8051
C304.5	Evaluate their practical knowledge by writing the simple assembly language program using various instruction of 8085 and 8051
C304.6	Design a simple application development using the programming of 8085 &8051

COURSE NAME: EI8093 UNIT OPERATION AND CONTROL
COURSE CODE: C305

C305.1	Apply the knowledge on solids & fluids to handle the raw materials

C305.2	Review the basic concepts of solid resizing
C305.3	Apply relevant handling techniques to convert the solids and fluids for specific applications
C305.4	Examine alernate solutions for simple/complex problems in heat transfer and review implementation of concepts applied in heat exchange equipments for different applications such as distillation, boilers,
C305.5	Analyze multidisciplinary projects using heat transfer, mass transfer concepts in advanced unit operaions.
C305.6	Apply new techniques and developments for life long learning in various types of unit operations in industries.

COURSE NAME: OCE551- AIR POLLUTION AND CONTROL ENGINEERING
COURSE CODE: C306

C306.1	an understanding of the nature and characteristics of air pollutants, noise pollution and basic concepts of air quality management
C306.2	ability to identify, formulate and solve air and noise pollution problems
C306.3	ability to design stacks and particulate air pollution control devices to meet applicable standards.
C306.4	ability to select appropriate pollution control equipments.
C306.5	ability to ensure quality, control and preventive measures.
C306.6	ability to identify the methods involved in pollutant transport mechanism

COURSE NAME: EI8561 Industrial Instrumentation Laboratory
COURSE CODE: C307

C307.1	To experimentally measure industrial process parameters such as flow, level.
C307.2	To experimentally measure industrial process parameters such as temperature, pressure.
C307.3	To experimentally measure industrial process parameters such as viscosity.
C307.4	To measure and analyze pH, conductivity.
C307.5	To measure and analyze UV absorbance and transmittance.
C307.6	To measure and analyze physiological parameters such as BP, ECG and pulse rate.

COURSE NAME: EE8681 Microprocessors and Microcontrollers Laboratory
COURSE CODE: C308

C308.1	To understand and apply computing platform and software for engineering problems.
C308.2	To programming logics for code conversion.
C308.3	To understand basics of software simulators
C308.4	To understand basics of serial communication.
C308.5	To understand and impart knowledge in DC and AC motor interfacing.
C308.6	To acquire knowledge on A/D and D/A..

VI SEM
COURSE NAME: : IC8651 ADVANCED CONTROL SYSTEM
COURSE CODE: C309

C309.1	Able to design state feedback controller and state observer.
C309.2	Able to understand and analyse linear and nonlinear systems using phase plane method.
C309.3	Able to understand and analyse nonlinear systems using describing function method.
C309 .4	Able to understand and design optimal controller.
C309.5	Able to understand optimal estimator including Kalman Filter.
C309.6	Ability to apply advanced control strategies to practical engineering problems.

COURSE NAME: EI8651 Logic and Distributed Control System
COURSE CODE: C310

C310.1	Understand all the important components such as PLC, SCADA, I/O modules and field devices of an industrial automation system.
C310.2	Develop PLC programs using relay logic and ladder logic for industrial sequential applications
C310.3	Develop PLC program in different languages like FBD, structured list, sequential function chart for real time industrial applications
C310.4	To have the knowledge on the architecture and local control unit of Distributed Control System (DCS).
C310.5	Ability to gain knowledge on the recent developments in industrial automation and analyze various case studies in the application of SCADA,DCS and PLC.
C310.6	Ability to gain knowledge from studying about case studies.

COURSE NAME: CS8391 Data Structures
COURSE CODE: C311

C311.1	To understand the concepts of ADT.
C311.2	To Learn linear data structures - lists, stacks, and queues
C311.3	To understand sorting, searching and hashing algorithms
C311.4	To apply Tree and Graph structures.
C311.5	To Apply the different linear and non-linear data structures to problem.Solutions
C311.6	To Critically analyze the various sorting algorithms.

COURSE NAME: EI8092 THERMAL POWER PLANT INSTRUMENTATION
COURSE CODE: C312

C312.1	To Understand the basic methods of power generation ,basic electrical measurements, non electrical parameters, temperature measurements, speed measurements, pressure measurement and smoke measurement.
C312.2	To Analyze the working of thermal power plant, oxygen analysers, flue gasanalyzer
C312.3	To analyze the working of pulverizes , draught system, distributed controlsystem in power plants and interlocks in boiler operation
C312.4	To construct the working of boiler processes, Pand I Diagram ,cogenerationand soot blowing operation
C312.5	To Analyze the various controls of furnace, boiler and turbine
C312.6	To compare the various building blocks of thermal power plants with other power plants and its importance. Gain knowledge of measurement , controlling, monitoring Instruments and different parameters

COURSE NAME: EI8074 Computer Networks
COURSE CODE: C313

C313.1	To Understanding the components required to build different types of networks andUnderstand network Interconnections
C313.2	To analyze the required functionality at each layer for given application, RoutingProtocols and Network structure
C313.3	To evaluate solutions for each functionality at each layer and analyze Routingprotocols.
C313.4	To applying connection management information flow tracing from one node to another node in the network and understanding of network traffic for traditional applications
C313.5	To applying various congestion control and Avoidance techniques and Rememberingof Node to Node communication

C313.6	To Understanding the tradition applications and web services and Remembering thenetwork building

COURSE NAME: EI 8072 ADVANCED INSTRUMENTATION SYSTEMS
COURSE CODE: C314

C314.1	To understand the construction, working and calibration of Flow, level, pressure and temperature measuring instruments
C314.2	To Analyze the Selection and Application of Flow, level, pressure and temperature measuring instruments.
C314.3	To understand the working of chromatography, chemical analyzers and pollution monitoring Instruments
C314.4	Ability to understand the role of Safety instrumentation system and instrumentation standards in the industry
C314.5	To Separate and Analyze the different elements of the compound. To Analyze process hazards, Process control system and Safety control system. Also to determine the Safety integrity level of the process
C314.6	To Design, develop and interpret the documents used to define instruments and control Systems for a typical project, including P&IDs, loop diagrams, specification forms, Instrument lists, logic diagrams, installation details, and location plans

COURSE NAME: CS8381 Data Structures Laboratory
COURSE CODE: C315

C315.1	To implement linear and non-linear data structure operations.
C315.2	To Suggest appropriate linear / non-linear data structure operations for solvinga given problem.
C315.3	Appropriately use the linear / non-linear data structure operations for a givenproblem
C315.4	To apply appropriate hash functions that result in a collision free scenario for data storage and retrieval.
C315.5	To implement graph traversal algorithms.
C315.6	To get familiarized to sorting and searching algorithms.

COURSE NAME: EI8661 Process Control Laboratory
COURSE CODE: C316

C316.1	To understand and analyze process control engineering problems.
C316.2	To build dynamic models using input - output data of a process.
C316.3	To work with real time control loops (flow / level / temperature / pressure).
C316.4	To simulation tools such as MATLAB/LABVIEW/ASPEN.
C316.5	to learn and implement simple adaptive and model based control schemes.
C316.6	To get familiarized to sorting and searching algorithms.

COURSE NAME: HS8581 Professional Communication
COURSE CODE: C317

C317.1	To make effective presentations.
C317.2	To enhance the Employability and Career Skills of students.
C317.3	To participate confidently in Group Discussions.
C317.4	To attend job interviews and be successful in them.
C317.5	To develop adequate Soft Skills required for the workplace.

C317.6	To make them Employable Graduates.

VII SEM

COURSE NAME: : EI8751 Industrial Data Networks

COURSE CODE: C401

C401.1	To remember the basic concepts of communication and networking in all networking devices
C401.2	To understand OSI model, various types of communication and networking topologies
C401.3	To apply OSI model, communication and networking topologies for networking devices.
C401.4	To analyze the various networking topology and protocol structures in all networking device
C401.5	To evaluate the functions of various topology, protocol structure and networking devices for various applications
C401.6	To understand the case study related to networking and communication topologies.

COURSE NAME: EI8091 - INSTRUMENTATION IN PETROCHEMICAL INDUSTRIES

COURSE CODE: **C402**

C402.1	To discuss on various oil gas production and seperation process and important unit operations in a refinery
C402.2	To interpret various chemical derivatives from petroleum products such as Propylene and Ethylene
C402.3	To develop a mathematical model of selective process and various parameters to be measured in refinery
C402.4	To classify the various hazardous zone and also to inculcate different type of flame and smoke detectors used in petrleum industry.
C402.5	To classify the various hazardous zone and also to inculcate different type of flame and smoke detectors used in petrleum industry.
C402.6	To develop , analyze and select appropriate control strategy for selective unit operations in a refinery.

COURSE NAME: EC8093 Digital Image Processing

COURSE CODE: C403

C403.1	Learn the digital image fundamentals steps and image aquisition
C403.2	Learn Color image fndamentatls and Processing techniques
C403.3	Apply Image enhancement using filtering Techniqes
C403.4	Apply different types of filters for image restoration and noise models
C403.5	Familarize with basic and advanced image segmnetation techniques for all types of images
C403.6	Familiarize feature extraction techniques through various descriptors

COURSE NAME: EI 8075 -FIBER OPTICS AND LASER INSTRUMENTATION

COURSE CODE: **C404**

C404.1	To analyze about optical fibers, its construction, basic principle using the basic concepts of science and mathematics together with its classification, mechanical and transmission characteristics, working of various optical sources liker laser and detectors.
C404.2	To apply basic concepts of optical fiber sensors to measure various parameters like pressure , temperature, current, voltage, liquid level and strain, attenuation, dispersion, scattering and absorption losses using various methods.
C404.3	To analyze on the different types of lasers based on level, material used ,power produced along with its properties.

C404.4	To discuss the basic concepts of laser using optical fiber in various Industrial applications together with parameter measurements like length, velocity, acceleration, current, voltage
C404.5	To analyze the basic concepts of laser and optical fibers in industry material processing and medical applications of laser
C404.6	To examine the behavior of holography technique with its classification.

COURSE NAME: COMPUTER CONTROL OF PROCESSES

COURSE CODE: **C405**

C405.1	Understand the basic concepts of discrete state variable technique, system identification, z transform, multi loop and multi variable control
C405.2	Apply the concepts like decomposition, least square methods, z transforms, RGA, Tuning methods, Dynamic matrix controller and FLC in computer control of process (K3)
C405.3	Analysis of Controllability, Observability, stability test, parametric and non parametric methods of system identification, Process interaction and pairing in multi variable control.
C405.4	Design the discrete data system from state equation, Dead beat and Dahlin controller
C405.5	Evaluate state transition matrix, state diagram,input output model , modified z transform and pulse transfer function
C405.6	Analyze various case studies of multi loop and multivariable control

COURSE NAME: OAN751 - LOW COST AUTOMATION

COURSE CODE: C406

C406.1	Students can able to do low cost automation systems
C406.2	Students can do some assembly automation
C406.3	Students can understand the concepts of hydraulic systems
C406.4	Students can understand the concepts of Pneumatic systems
C406.5	To design hydraulic systems and do perform analysis
C406.6	To do combinational design using mapping

COURSE NAME: EI8761 Industrial Automation Laboratory

COURSE CODE: C407

C407.1	Understand the basic concepts of PLC, SCADA and DCS
C407.2	Understand the concept of Foundation Fieldbus /IOT/Wireless HART EnabledTransmitter.
C407.3	Apply the Programming of PLC, SCADA and DCS in real time industrial automation (K3)
C407.4	Analyze the interfacing of field devices with PLC and DCS
C407.5	Design of various control schemes in PLC and DCS.
C407.6	Implementation of various control schemes in PLC and DCS

COURSE NAME: EI8762 Instrumentation System Design Laboratory

COURSE CODE: C408

C408.1	To Obtain adequate knowledge in design of various signal conditioning circuitsand Instrumentation systems.
C408.2	To understand and Explain Piping and Instrumentation Diagram, a multi-channel data acquisition system and also prepare documentation of Instrumentation project ,projectscheduling for the case study.
C408.3	To derive and calculate the discharge coefficient of orifice plate and rotameter

C408.4	To Analyze converters ,RPS, linearizing, cold compensation circuits, multi range DPtransmitter and control valve characteristics
C408.5	To Evaluate Electronics and Instrumentation design
C408.6	To Design Active filters ,PID controller and Instrumentation amplifier

VII SEM

COURSE NAME: EI8073- BIOMEDICAL INSTRUMENTATION

COURSE CODE: **C409**

C409.1	To understand the basic medical terminology, relevant for biomedical instrumentation.
C409.2	To understand the different diagnostic measurement methods for identification of human biopotentials and their necessary instrumentation.
C409.3	To understand and measure the electrical and non electrical parameters of biomedical system
C409.4	To understand different imaging techniques and life assisting techniques
C409.5	To Understand the position of biomedical instrumentation in modern hospital care
C409.6	To Analyse different diagnostic measurement methods for different humane variables and their necessary instrumentation

COURSE NAME: MG8591- PRINCIPLES OF MANAGEMENT

COURSE CODE: C410

C410.1	Students will have a clear understanding of different management thoughts and its application in the real world organization
C410.2	Students will be able to have clarity in managerial functions like planning,organizing, staffing
C410.3	Students will be able to have clarity in managerial functions like leading & controlling
C410.4	Students are able to understand the theories, strategies and current trends in management development
C410.5	Students are able to understand the theories, strategies and current trends in communication.
C410.6	Students have the knowledge on international aspects of managemen

COURSE NAME: EI8079- ROBOTICS AND AUTOMATION

COURSE CODE: C411

C411.1	Understand the evolution of robot technology and mathematically represent different types of robot
C411.2	Understand the Power sources, sensors and actuators relevant to robots
C411.3	Understand the design concepts of Manipulators and Grippers and relevant control circuits
C411.4	Study the Concepts of Kinematics and Path planning and create exposutre to robot programming languages
C411.5	Familiarize various control schemes of Robotics control
C411.6	Get exposed to the case studies and design of robot machine interface

COURSE NAME: IC8811 Project Work

COURSE CODE: C412

C412.1	Students can able to solve a specific problem right from its identification.
C412.2	Students are able to understand the literature review till the successful solution.
C412.3	Students are able to design a new process and find out the solution.

C412.4	Students will be in a position to find a solution by formulating proper methodology.
C412.5	Students will be in a position to take up any challenging practical problems.
C412.6	Students will be in a position to give solution to social relevant projects

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING
R2017 - COURSE OUTCOMES

Semester : 02	Course code : C113	EC8251- CIRCUIT ANALYSIS

COURSE OUTCOMES (CO)

Upon completion of the course, the students will be able to

C113.1	Analyze electrical circuits
C113.2	Apply circuit theorems in real time AC and DC circuits
C113.3	Describe the working of resonance and coupled circuits
C113.4	Analyze transient based DC and sinusoidal source
C113.5	Analyze two port networks and their parameters

Semester : 02	Course code : C114	EC8252 – ELECTRONIC DEVICES

COURSE OUTCOMES (CO)

Upon completion of the course, the students will be able to

C114.1	Analyse the operation and characteristics of basic electronic devices.
C114.2	Analyse and compare the equivalent circuits of the transistors.
C114.3	Operate the diodes, transistors (Bipolar and Junction Field Effect), Power devices (LED, LCD) and other electronic devices.
C114.4	Apply and utilize the basic electronics in display and power devices.
C114.5	Identify the applications of basic electronics and its devices.

Semester : 02	Course code : C115	EC8261 –CIRCUITS AND DEVICES LAB

Course Outcomes

Up on completion of the course students should be able to:

C115.1	Analyze the characteristics of basic electronic devices.
C115.2	Design RL and RC circuits.
C115.3	Verify KVL & KCL, Thevinin, Norton and Super Position Theorems.
C115.4	Verify Reciprocity and Maximum Power Transfer Theorem.
C115.5	Analyze the characteristics of Wave shaping circuits and Rectifier.

Semester : 03	Course code : C201	MA8352 - LINEAR ALGEBRA AND PARTIAL DIFFERENTIAL EQUATIONS

COURSE OUTCOMES (CO)

Upon completion of the course, the students will be able to

C201.1	Explain the fundamental concepts of advanced algebra and their role in modern mathematics and applied contexts.
C201.2	Demonstrate accurate and efficient use of advanced algebraic techniques.
C201.3	Demonstrate their mastery by solving non - trivial problems related to the concepts and by proving simple theorems about the statements proven by the text.
C201.4	Able to solve various types of partial differential equations.
C201.5	Able to solve engineering problems using Fourier series.

Semester : 03	Course code : C202	EC8393- FUNDAMENTALS OF DATA STRUCTURES IN C

COURSE OUTCOMES (CO)

Upon completion of the course, the students will be able to

C202.1	Implement linear and non-linear data structure operations using C
C202.2	Suggest appropriate linear / non-linear data structure for any given data set.
C202.3	Apply hashing concepts for a given problem
C202.4	Modify or suggest new data structure for an application
C202.5	Appropriately choose the sorting algorithm for an application

Semester : 03	Course code : C203	EC 8351 - ELECTRONIC CIRCUITS I

COURSE OUTCOMES (CO)

Upon completion of the course, the students will be able to

C203.1	Analyze, Design and Explain the methods of biasing transistors.
C203.2	Design and analyze single stage and multistage amplifier circuits.
C203.3	Analyze and synthesize the frequency response of small signal amplifiers.
C203.4	Design and synthesize the high frequency response of amplifiers.
C203.5	Design, Troubleshoot and fault analysis of power supplies.

Semester : 03	Course code : C204	EC8352 – SIGNALS AND SYSTEMS

COURSE OUTCOMES (CO)

Upon completion of the course, the students will be able to

C204.1	Determine if a given system is linear/causal/stable.
C204.2	Determine the frequency components present in a deterministic signal.
C204.3	Characterize LTI systems in the time domain and frequency domain .
C204.4	Compute the output of LTI system in the time domain .
C204.5	Compute the output of an LTI system in the frequency domain **.**

Semester : 03	Course code : C205	EC8392 - DIGITAL ELECTRONICS

COURSE OUTCOMES (CO)

Upon completion of the course, the students will be able to

C205.1	Implement digital electronics in the present contemporary world.
C205.2	Design various combinational digital circuits using logic gates.
C205.3	Analyze the procedures for synchronous and asynchronous sequential circuits.
C205.4	Examine the semiconductor memories and related technology.
C205.5	Investigate electronic circuits involved in the design of logic gates.

Semester : 03	Course code : C206	EC8391 - CONTROL SYSTEMS ENGINEERING

COURSE OUTCOMES (CO)

Upon completion of the course, the students will be able to

C206.1	Describe the Modeling of Electrical & Mechanical systems & representation of systems.
C206.2	Test the time domain analysis of control systems required for stability analysis.
C206.3	Test the frequency domain analysis & to design the compensation technique that can be used to stabilize control systems.
C206.4	Examine the stability analysis of control systems.
C206.5	Inspect and explore the CT & DT systems in state variable analysis and digital control systems

Semester : 03	Course code : C207	EC8381- FUNDAMENTALS OF DATA STRUCTURES IN C LABORATORY

COURSE OUTCOMES (CO)

Upon completion of the course, the students will be able to

C207.1	Write basic and advanced programs in C.
C207.2	Implement functions and recursive functions in C.
C207.3	Implement data structures using C.
C207.4	Choose appropriate sorting algorithm for an application and implement it in a modularized way .
C207.5	Implementation of algorithm in a modularized way.

Semester : 03	Course code : C208	EC8361 - ANALOG AND DIGITAL CIRCUITS LAB

COURSE OUTCOMES (CO)

Upon completion of the course, the students will be able to

C208.1	Discriminate and judge the characteristics of Cascade and Cascode Amplifier.
C208.2	Appraise the limitation in bandwidth of single Stage Transistor and FET Amplifiers.
C208.3	Examine and interpret Amplifiers characteristics using Spice.
C208.4	Incorporate and demonstrate the characteristics of Combinational Circuits.
C208.5	Incorporate and demonstrate the characteristics of Sequential circuits.

Semester : 03	Course code : C209	HS8381- INTERPERSONAL SKILLS/ LISTENING & SPEAKING

COURSE OUTCOMES (CO)

Upon completion of the course, the students will be able to

C209.1	Comprehend information by listening actively and to give appropriate response
C209.2	Articulate ideas and converse in formal and informal contexts with accuracy and clarity.
C209.3	Initiate conversations, compare and contrast information fluently, using lexical chunks
C209.4	Participate effectively in group discussions and conversations by employing appropriate verbal and non-verbal feedback.
C209.5	Speak clearly and fluently with correct pronunciation, stress and intonation.

Semester : 04	Course code : C210	MA 8451 - PROBABILITY AND RANDOM PROCESSES

COURSE OUTCOMES (CO)

Upon completion of the course, the students will be able to

C210.1	Understand the concepts of probability, discrete and continuous random variables as well as certain special discrete and continuous distributions.
C210.2	Extend the concepts to two-dimensional random variables and to compute various important statistical quantities associated with them.
C210.3	Understand random process and recognize the various types while dealing with signals and communication systems.
C210.4	Appreciate the role of autocorrelation, cross correlation, power spectral density and its importance in communication Engineering.
C210.5	Apply concepts in linear systems and their important variants in practical applications.

Semester : 04	Course code : C211	EC8452- ELECTRONIC CIRCUITS II

COURSE OUTCOMES (CO)

Upon completion of the course, the students will be able to

C211.1	Analyze different types of amplifier, oscillator and multivibrator circuits
C211.2	Design BJT amplifier and oscillator circuits
C211.3	Analyze transistorized amplifier and oscillator circuits
C211.4	Design and analyze feedback amplifiers
C211.5	Design LC and RC oscillators, tuned amplifiers, wave shaping circuits, multivibrators, power amplifier and DC convertors.

Semester : 04	Course code : C212	EC8491- COMMUNICATION THEORY

COURSE OUTCOMES (CO)

Upon completion of the course, the students will be able to

C212.1	Design AM communication systems.
C212.2	Design Angle modulated communication systems.
C212.3	Apply the concepts of Random Process to the design of Communication systems.
C212.4	Analyze the noise performance of AM and FM systems.
C212.5	Interpret the concept of sampling and quantization.

Semester : 04	Course code : C213	EC8451–ELECTROMAGNETIC FIELDS

COURSE OUTCOMES (CO)

Upon completion of the course, the students will be able to

C213.1	Employ the fundamental electromagnetic laws and concepts.
C213.2	Examine how materials affect electric and magnetic fields.
C213.3	Cast Maxwell's equations in integral, differential and phasor forms and interpret their physical meaning.
C213.4	Enunciate electromagnetic wave propagation in lossy and in lossless media
C213.5	Solve simple problems requiring estimation of electric and magnetic field quantities based on these concepts and laws.

Semester : 04	Course code : C214	EC8354– LINEAR INTEGRATED CRICUITS

COURSE OUTCOMES (CO)

Upon completion of the course, the students will be able to

C214.1	To introduce the basic building blocks of linear integrated circuits.
C214.2	To teach the linear and non-linear applications of operational amplifiers.
C214.3	To introduce the theory and applications of analog multipliers and PLL.
C214.4	To teach the theory of ADC and DAC.
C214.5	To introduce the concepts of waveform generation and introduce some special function ICs.

Semester : 04	Course code : C215	GE8291 - ENVIRONMENTAL SCIENCE AND ENGINEERING

COURSE OUTCOMES (CO)

Upon completion of the course, the students will be able to

C215.1	Obtain knowledge about environment, ecosystems and biodiversity.
C215.2	Take control measures of environmental pollution.
C215.3	Gain knowledge about natural resources and energy sources.
C215.4	Find and implement scientific, technological, economic and political solutions to environmental problems.
C215.5	Understand the impact of environment on human population.

Semester : 04	Course code : C216	EC8461 - CIRCUITS DESIGN AND SIMULATION LABORATORY

COURSE OUTCOMES (CO)

Upon completion of the course, the students will be able to

C216.1	Classify various types of feedback amplifiers.
C216.2	Explain oscillators, tuned amplifiers.
C216.3	Construct wave-shaping circuits and multivibrators.
C216.4	Implement and simulate feedback amplifiers, oscillators using SPICE Tool.
C216.5	Construct tuned amplifiers, wave-shaping circuits and multivibrators using SPICE Tool.

Semester : 04	Course code : C217	EC8462 - LINEAR INTEGRATED CIRCUITS LAB

COURSE OUTCOMES (CO)

Upon completion of the course, the students will be able to

C217.1	Design amplifiers, oscillators, D-A converters using operational amplifiers.
C217.2	Design filters using op-amp and performs an experiment on frequency response.
C217.3	Analyze the working of PLL and describe its application as a frequency multiplier.
C217.4	Design DC power supply using ICs.
C217.5	Analyze the performance of filters, multivibrators, A/D converter and analog multiplier using SPICE.

Semester : 05	Course code : C301	EC6501–DIGITAL COMMUNICATION

COURSE OUTCOMES (CO)

Upon completion of the course, the students will be able to

C301.1	Explain the basic concepts of Information theory
C301.2	Compute the source coding techniques such as Shannon Fano and Huffman coding.
C301.3	Illustrate and compare the Encoding schemes such as DPCM, DM, ADPCM, ADM & LPC and different waveform coding schemes.
C301.4	Analyse the baseband transmission and Reception techniques
C301.5	Evaluate the performance of digital modulation schemes such as BPSK, BFSK, QPSK, DPSK & QAM
C301.6	Infer the channel coding theorem and error control coding and decoding schemes like block codes, hamming codes, cyclic codes, convolutional codes and viterbi decoder

Semester : 05	Course code : C302	EC8553 - DISCRETE TIME SIGNAL PROCESSING

COURSE OUTCOMES (CO)

Upon completion of the course, the students will be able to

C302.1	Analyse the signals in frequency domain using DFT and FFT algorithm. (K4)
C302.2	Perform Linear filtering to demonstrate the output response of a system and characterize frequency selective filters. (K3)
C302.3	Design digital IIR and FIR to select specific frequency components present in the signal. (K4)
C302.4	Select appropriate realization structure for various filters and characterize the effects of finite word length in filters. (K4)
C302.5	Analyse the errors due to quantization and realize the architecture of digital signal processors. (K4)
C315.6	Demonstrate their ability to program DSP processors for various signal processing applications. (K3)

Semester : 05	Course code : C303	EC 8552 - COMPUTER ARCHITECTURE AND ORGANIZATION

COURSE OUTCOMES (CO)

Upon completion of the course, the students will be able to

C303.1	Describe the computer organisation,Instruction set and algorithms for arithmetic .(K2)
C303.2	Illustrate the implementation schemes of the control unit and data path design.(K3)
C303.3	Classify the performance of different pipelined processors and interpret parallel processing.(K4)
C303.4	Categorize the memory design,performance improvement techniques and compare the properties of shared memory and multiprocessor systems.(K4)
C303.5	Discuss the concept of input,output organisation and internal communication methodologies.(K4)
C303.6	Explain the knowledge gained in various unconventional computer architectures.(K3)

Semester : 05	Course code : C304	EC 8551 - COMPUTER NETWORKS

COURSE OUTCOMES (CO)

Upon completion of the course, the students will be able to

C304.1	Identify the different components and protocols required to build data communication networks. (K1)
C304.2	Understand the required functionality of each layer for the given application. (K2)
C304.3	Illustrate the data formats of each layer for successful end to end communication. (K2)
C304.4	Analyze and trace the flow of information from one node to another node in the network. (K4)
C304.5	Apply the ideas learnt in developing a computer network. (K3)
C304.6	Design Security aspects at each layer of computer networks. (K4)

Semester : 05	Course code : C306	EC8073 - MEDICAL ELECTRONICS

COURSE OUTCOMES (CO)

Upon completion of the course, the students will be able to

C306.1	Identify the amplitude and frequency of ECG, EEG, EMG & PCG. (K3)
C306.2	Sketch the lead systems and recording setup of ECG, EEG, EMG & PCG for diagnosis. (K2)
C306.3	Describe the measurement techniques for biochemical and non electrical parameters for the purpose of screening.(K2)
C306.4	Illustrate the working of assist devices and application of therapeutic instruments on different diseased conditions.(K2)
C306.5	Explain the functioning of MRI and Ultrasound imaging for diagnosis.(K2)
C306.6	Summarize the working principle of Bio -Telemetry, Tele-medicine and recent trends in various diagnostic equipment.(K2)

Semester : 05	Course code : C315	OIT552 - CLOUD COMPUTING

COURSE OUTCOMES (CO)

Upon completion of the course, the students will be able to

C315.1	Articulate the main concepts, key technologies, strengths and limitations of cloud computing.
C315.2	Learn the key and enabling technologies that help in the development of the cloud.
C315.3	Develop the ability to understand and use the architecture of compute and storage cloud, service and delivery models.
C315.4	Explain the core issues of cloud computing such as resource management and security.
C315.5	Be able to install and use current cloud technologies.
C315.6	Choose the appropriate technologies, algorithms and approaches for implementation and use cloud.

Semester : 05	Course code : C331	ORO551 - RENEWABLE ENERGY SOURCES

COURSE OUTCOMES (CO)

Upon completion of the course, the students will be able to

C331.1	Describe different methods of utilization of renewable energy sources (K1)
C331.2	Classify various energy conversion devices used for renewable energy Utilization (K2).
C331.3	Summarize various energy storage methodologies applicable to renewable energy sources (K2)
C331.4	Interpret the economic aspects of utilization of renewable sources of energy (K2).
C331.5	Apply the knowledge of energy conversion techniques into renewable energy utilization in economically viable practical situations (K3).
C331.6	Integrate the knowledge in capturing and applying various forms of renewable ener sources.(K3).

Semester : 05	Course code : C319	OBT553 - FUNDAMENTALS OF NUTRITION

COURSE OUTCOMES (CO)

Upon completion of the course, the students will be able to

C319.1	Thrive knowledge on basic concept of food chemistry and different nutrients in food
C319.2	Identify and describe nutritional requirement during special conditions and various methods assessing nutritional status
C319.3	Describe the chemical components in foods with the relationship of digestion and absorption process in our body.
C319.4	Emphasis the essential nutrients - the function of carbohydrates and their role in promoting a maintaining optimal health.
C319.5	Illustrate the functions and sources of proteins and lipids and their role in maintenance of go health.
C319.6	Recognize the significance of maintaining body weight & regular exercise for healthy living.

Semester : 05	Course code : C338	EC8562 - DIGITAL SIGNAL PROCESSING LABORATORY

COURSE OUTCOMES (CO)

Upon completion of the course, the students will be able to

C338.1	Analyze discrete time signals & systems using MATLAB
C338.2	Design the digital filters for various applications meeting the requirements
C338.3	Apply programming knowledge in developing projects
C338.4	Develop DSP based applications on DSP processors.
C338.5	Work effectively in as team and individual in doing digital signal processing experime following the safety procedures and ethics
C338.6	Document effectively the digital signal processing experiments carried in the laboratory

Semester : 05	Course code : C339	EC8561 - COMMUNICATION SYSTEMS LABORATORY

COURSE OUTCOMES (CO)

Upon completion of the course, the students will be able to

C339.1	Demonstrate signal sampling and Multiplexing Scheme. (K3)
C339.2	Generate and detect amplitude and frequency modulation. (K3)
C339.3	Implement encoding schemes using PCM and DM techniques. (K3)
C339.4	Demonstrate base band transmission schemes such as ASK, BFSK, BPSK. QPSK, QAM and DPSK. (K3)
C339.5	Apply various channel coding schemes and demonstrate the improvement of noise performance. (K3)
C339.6	Simulate and validate the various functional modules of communication systems.(K4)

Semester : 05	Course code : C340	EC8563 - COMMUNICATION NETWORKS LABORATORY

COURSE OUTCOMES (CO)

Upon completion of the course, the students will be able to

C340.1	Communicate between two desktop computers
C340.2	Implement different Protocols such as Stop & Wait, Go back N/Sliding window & Selecti repeat
C340.3	Study the performance of network with CSMA / CA protocol and compare with CSMA/CD protocols.
C340.4	Program using Sockets –Client server model, Echo/Ping/Talk commands
C340.5	Implement and compare Distance vector and Link state routing algorithms & congestion cont algorithm
C340.6	Use simulation tool such as NS2/OPNET.

Semester : 06	Course code : C341	EC8691 – MICROPROCESSORS AND MICROCONTROLLERS

COURSE OUTCOMES (CO)

Upon completion of the course, the students will be able to

C341.1	Restate the architecture, memory organization of 8086 and 8051.(K2)
C341.2	Identify the different ways of interfacing memory,I/O with 8086 and 8051 (K1)
C341.3	Apply the programming using ALP in 8086 and 8051 for arithmetic logical and real time applications.(K3)
C341.4	Analyze the interfacing concept of different programmable interfacing devices.(K4)
C341.5	Developing programming concepts for various applications.(K6)
C341.6	Design microprocessor and microcontroller based applications.(K6)

Semester : 06	Course code : C342	EC8095 –VLSI DESIGN

COURSE OUTCOMES (CO)

Upon completion of the course, the students will be able to

C342.1	Apply the Fundamentals of CMOS Circuits and its Characteristics. (K3)
C342.2	Design and realize Combinational and Digital Sequential Circuits. (K6)
C342.3	Analyze Power and Timing Issues of CMOS Circuits. (K4)
C342.4	Develop the Architectural Choices and evaluate the performance tradeoff involved in designing and realizing the circuits in CMOS Technology. (k6)
C342.5	Interpret the different FPGA and Memory Architecture. (K2)
C342.6	Examine different techniques for testing of VLSI Circuits. (K4)

Semester : 06	Course code : C343	EC8652 –WIRELESS COMMUNICATION

COURSE OUTCOMES (CO)

Upon completion of the course, the students will be able to

C343.1	Outline the different path loss models and describe the different dispersion parameters
C343.2	Analyze the different multiple access Techniques and evaluate the capacity of the trunking system.
C343.3	Compare and contrast different signalling Techniques
C343.4	Summarize the performance of the Diversity schemes
C343.5	Apply the concept of Equalization techniques and algorithms for multipath mitigation
C343.6	Design the MIMO system and derive the capacity for Fading and Non-fading channels

Semester : 06	Course code : C344	MG8591 –PRINCIPLES OF MANAGEMENT

COURSE OUTCOMES (CO)

Upon completion of the course, the students will be able to

C344.1	Have a clear understanding of different management thoughts and its application in the real world organization.
C344.2	Apply various managerial functions like planning, organizing, staffing, leading & controlling
C344.3	Analyse theories, strategies and current trends in management development and communication.
C344.4	Evaluate the working intricacies of various forms of organization
C344.5	Comply with relevant concepts in order to maintain ethicality in business practices
C344.6	Have insight into recent trends and tools in management

Semester : 06	Course code : C345	EC8651- TRANSMISSION LINES AND RF SYSTEMS

COURSE OUTCOMES (CO)

Upon completion of the course, the students will be able to

C345.1	Explain the fundamentals of transmission line and propagation of signals
C345.2	Analyse signal propagation at Radio frequencies..
C345.3	Evaluate matching networks through smith chart
C345.4	Analyse the Characteristics of TE, TM and TEM Waves
C345.5	Design RF circuit using active components for communication applications
C345.6	Discuss propagation of signals in transmission lines and guided medium

Semester : 06	Course code : C351	EC8004- WIRELESS NETWORKS

COURSE OUTCOMES (CO)

Upon completion of the course, the students will be able to

C351.1	Define various architecture and protocol layers of Wireless LAN, WPAN, Mobile IP and 3G networks.
C351.2	Identify the various standards to connect multiple network components using session based routing and solutions.
C351.3	Explain the implementation of mobile network layer and adhoc routing in wireless networks
C351.4	Summarize the different forms of interconnectivity among homogenous and heterogenous networks.
C351.5	Illustrate the multimode applications for wireless network environment using wireless protocols and standards in 4G
C351.6	Classify the multipoint and multichannel distribution systems for smart antennas with advanced broadband wireless services.

Semester : 06	Course code : C353	EC8681- MICROPROCESSORS AND MICROCONTROLLERS LABORATORY

COURSE OUTCOMES (CO)

Upon completion of the course, the students will be able to

C353.1	Write and execute programs for fixed and floating point arithmetic operations and MASM
C353.2	Execute time delay, passwords, Printer Status, Serial & Parallel Interface
C353.3	To generate waveforms through software with A/D & D/A interface
C353.4	Apply arithmetic, logical operations, square and cube programs through 8051 kits and MASM
C353.5	To unpack BCD to ASCII using 8051 kit and use MASM software to stimulate and emulate
C353.6	To interface traffic light control, stepper motor execute, Digital Clock, Keyboard & Display

Semester : 06	Course code : C354	EC8661- VLSI DESIGN LABORATORY

COURSE OUTCOMES (CO)

Upon completion of the course, the students will be able to

C354.1	Illustrate the syntax of HDL code and design digital integrated circuits by writing codes in HDL. (K3, K6)
C354.2	Interpret the syntax of HDL code and build analog circuits by writing codes in HDL. (K2, K6)
C354.3	Apply the knowledge of Xilinx software and develop and import the logic modules into FPGA boards. (K3,K6)
C354.4	Analyze and synthesize the digital ICs and based on the synthesis done, determine the critical paths and power consumption in analog and digital circuits. (K4, K5)
C354.5	Create the place and route design of digital ICs. (K6)
C354.6	Design, simulate and evaluate the layouts of analog IC Blocks using EDA tools. (K5, K6)

Semester : 06	Course code : C355	EC8611- TECHNICAL SEMINAR

COURSE OUTCOMES (CO)

Upon completion of the course, the students will be able to

C355.1	Present seminar in the recent advancement in electronics and communication engineering discipline.
C355.2	Review and prepare the State-of-art technologies in the present technological developments.
C355.3	Organize the presentation using the concepts of ordering and determining the central, main and supporting ideas.
C355.4	Present any topic in any recent advancement with good communicative skill infront of peers and faculty members.
C355.5	Perform well in placement recruitment drive with good technical skills and communication skills.
C355.6	Handle questions after the presentation with confidence

Semester : 07	Course code : C401	EC8701- ANTENNAS AND MICROWAVE ENGINEERINg

COURSE OUTCOMES (CO)

Upon completion of the course, the students will be able to

C401.1	Discuss the basic concepts of microwave frequency bands and to derive various antenna parameters. (K3)
C401.2	Derive link power budget and analyze receiver noise characterization. (K3)
C401.3	Illustrate the radiation mechanisms of antenna elements and arrays and to derive the antenna parameters. (K3)
C401.4	Examine the design considerations for antennas and arrays. (K3)
C401.5	Demonstrate the working of active and passive microwave components. (K2)
C401.6	Apply the design concepts of the microwave systems for the given specifications.(K3)

Semester : 07	Course code : C402	EC8751- OPTICAL COMMUNICATION

COURSE OUTCOMES (CO)

Upon completion of the course, the students will be able to

C402.1	Recognize and classify the structures of optical fibers and types (K1)
C402.2	Explain the signal degradation factors associated with optical fiber (K2)
C402.3	Illustrate the characteristics optical sources & detectors and their use in optical communication system (K3)
C402.4	Discuss the fundamental receiver operation, pre amplifiers and various parameter measurements & Coupling Techniques (K2)
C402.5	Appraise the knowledge gain on fiber optic systems and networks (K4)

C402.6	Analyze the characteristics of optical fiber and Familiarize with Design considerations of fiber optic systems (K4)

Semester : 07	Course code : C403	EC8791-EMBEDDED AND REAL TIME SYSTEMS

COURSE OUTCOMES (CO)

Upon completion of the course, the students will be able to

C403.1	Discuss the concepts of embedded systems.(K2)
C403.2	Design and demonstrate common applications using embedded systems.(K3)
C403.3	Describe the architecture and programming of ARM processor.(K3)
C403.4	Apply the system design techniques to design the software for embedded systems.(K3
C403.5	Explain the basic concepts of real time operating system design.(K2)
C403.6	Model real-time applications using embedded-system concepts.(K4)

Semester : 07	Course code : C404	EC8702-AD HOC AND WIRELESS SENSOR NETWORKS

COURSE OUTCOMES (CO)

Upon completion of the course, the students will be able to

C404.1	Describe the unique issues in ad-hoc/sensor networks(K1)
C404.2	Explain the working principles of sensor nodes and sensor network architecture (K5)
C404.3	Discuss the challenges in designing MAC and routing protocols for Ad hoc/wireless sensor networks(K3)
C404.4	Examine the challenges and issues in Transport layer protocol(K4)
C404.5	Investigate security issues in wireless sensor networks and also examine the possible solutions.(K4)

C404.6	Comprehend the various sensor network Platforms, tools and applications. (K1)

Semester : 07	**Course code : C408**	**CS8082-MACHINE LEARNING TECHNIQUES**

COURSE OUTCOMES (CO)

Upon completion of the course, the students will be able to

C408.1	Describe learning paradigms ,algorithms and applications of machine learning techniques.(K3)
C408.2	Apply symbolic and logical representation over the hypothesis and analyze the need for inductive bias technique.(K3)
C408.3	Evaluate the need for neural network and Genetic algorithm models.(K4)
C408.4	Classify the data using a computational learning method.(K3)
C408.5	Design and make modifications to existing machine learning algorithms to suit an individ application.(K4)
C408.6	Analyze case studies by applying advanced machine learning algorithm.(K2)

Semester : 07	**Course code : C423**	**OME754 - INDUSTRIAL SAFETY**

COURSE OUTCOMES (CO)

Upon completion of the course, the students will be able to

C423.1	Recognize various types of industrial hazards.
C423.2	Interpret to prevent chemical, environmental mechanical, fire hazard through analysis.
C423.3	Relate proper safety techniques in engineering and management.
C423.4	Correlate appropriate personal protective equipment to overcome disasters.
C423.5	Prioritize analytical skill to understand safety system.

C423.6	Execute safety programs to prevent or mitigate damage or losses

Semester : 07	Course code : C438	EC8711 - EMBEDDED LABORATORY

COURSE OUTCOMES (CO)

Upon completion of the course, the students will be able to

C428.1	Demonstrate skills to write programs in ARM for a specific Application. (K3)
C428.2	Design systems by writing programs for interfacing keyboard, display, motor and sensor. (K6)
C428.3	Analyze the performance of interrupt. (K4)
C428.4	Construct systems using memory, A/D, D/A interface with ARM system. (K6)
C428.5	Evaluate ARM programs for wireless and interprocess communication. (K6)
C428.6	Formulate a mini project using embedded system. (K6)

Semester : 07	Course code : C439	EC8761 -ADVANCED COMMUNICATION LABORATORY

COURSE OUTCOMES (CO)

Upon completion of the course, the students will be able to

C439.1	Analyze the performance of a simple optical link by obtaining the frequency response(analog), eye diagram and BER (digital)
C439.2	Demonstrate the working principle of optical sources, detector, fibers to examine its characteristics and various losses
C439.3	Measure the parameters of active and passive microwave components to understand its characteristics.
C439.4	Design Microwave IC Filter and study its Characteristics.
C439.5	Simulate various wireless channels to investigate the channel performance.

C439.6	Analyze Wireless Transmission and Reception of signals using Software Defined Radio.

Semester : 08	**Course code : C445**	**GE8076 -PROFESSIONAL ETHICS IN ENGINEERING**

COURSE OUTCOMES (CO)

Upon completion of the course, the students will be able to

C445.1	To acquire the basic knowledge of human values, moral, ethics, industrial standards, code of ethics and role of professional ethics in engineering field.
C445.2	To have an awareness of professional rights and responsibilities of an engineer, and to have an understanding for safety and risk benefit analysis.
C445.3	To imbibe the various ethical theories developed and apply them for a professional and societal advancement.
C445.4	To imbibe adequate knowledge about the culture & the value system adopted by MNC's, local business houses and to create an ethical based work environment.
C445.5	To understand and solve the employees' conflict & grievances in an amicable and ethical way.
C445.6	Formulate and provide solutions to overcome ethical issues for win-win outcome.

Semester : 08	**Course code : C448**	**EC8094 -SATELLITE COMMUNICATION**

COURSE OUTCOMES (CO)

Upon completion of the course, the students will be able to

C448.1	To introduce the fundamentals of satellite communication(K1).
C448.2	To distinguish the satellite orbits (K2)
C448.3	To describe the earth segment and space segment (K2)
C448.4	To explain the satellite Link design (K2)
C448.5	To enrich the knowledge about various access and coding methods (K4)

C448.6	To gain knowledge on various satellite applications(K3)

Semester : 08	**Course code : C449**	**CS8086 - SOFT COMPUTING**

COURSE OUTCOMES (CO)

Upon completion of the course, the students will be able to

C449.1	Differentiate the principle behind Soft computing techniques and conventional AI techniques
C449.2	Describe Artificial neural network, fuzzy logic and Genetic algorithm concepts
C449.3	Analyze evolutionary and fuzzy techniques to provide human like expertise.
C449.4	Apply ANN models and Fuzzy logic principles for industrial and societal application
C449.5	Create hybrid soft computing techniques to handle uncertain and imprecise environment
C449.6	Develop soft computing tools to provide solutions to complex real life problems.

Semester : 08	**Course code : C452**	**EC8811 - PROJECT WORK**

COURSE OUTCOMES (CO)

Upon completion of the course, the students will be able to

C452.1	Understand the sustainable Development goals mapping the work done to SDG
C452.2	Technically equip in various domain with relevant tools
C452.3	Improve the presentation skill and build the team work
C452.4	Write the project report based on the findings
C452.5	Convert the project done in to product with good business model

C452.6	Initiate the idea of entrepreneurship and start up

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COURSE OUTCOMES

(2017-Regulations)

IV YEAR/VII SEMESTER

ME8791 MECHATRONICS

S.No	OUTCOMES
1	Discuss the interdisciplinary applications of Electronics, Electrical, Mechanical and Computer Systems for the Control of Mechanical, Electronic Systems and sensor technology.
2	Discuss the architecture of Microprocessor and Microcontroller, Pin Diagram, Addressing Modes of Microprocessor and Microcontroller.
3	Discuss Programmable Peripheral Interface, Architecture of 8255 PPI, and various device interfacing.
4	Explain the architecture, programming and application of programmable logic controllers to problems and challenges in the areas of Mechatronic engineering.
5	Discuss various Actuators and Mechatronics system using the knowledge and skills acquired through the course and also from the given case studies.

GE8077 TOTAL QUALITY MANAGEMENT

S.No	OUTCOMES
1	The student would be able to apply the tools and techniques of quality management to manufacturing and services processes.

ME8098 QUALITY CONTROL AND RELIABILITY ENGINEERING

S.No	OUTCOMES
1	Summarize the concept of Quality and Process control for variables.
2	Apply the process control for attributes.
3	Explain the concept of sampling and to solve problems.
4	Explain the concept of Life testing.
5	Explain the concept Reliability and techniques involved.

OIE751 ROBOTICS

S.No	OUTCOMES
1	Upon completion of this course, the students can able to apply the basic engineering knowledge for the design of robotics.

PR8003 INSTRUMENTATION AND CONTROL

S.No	OUTCOMES
1	Understand the dynamic characteristics of measurement system.
2	Understand the mechanical measurements and industrial instrumentation.
3	Understand the working principle of data display and recording devices.
4	Understand the working principle of control system.
5	Perform Stability Analysis..

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COURSE OUTCOMES

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ME8097 NON DESTRUCTIVE TESTING AND EVALUATION

S.No	OUTCOMES
1	Explain the fundamental concepts of NDT.
2	Discuss the different methods of NDE.
3	Explain the concept of Thermography and Eddy current testing.
4	Explain the concept of Ultrasonic Testing and Acoustic Emission.
5	Explain the concept of Radiography.

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COURSE OUTCOMES

(2017-Regulations)

IV YEAR/VIII SEMESTER

ME8793-PROCESS PLANNING AND COST ESTIMATION

S.No	OUTCOMES
1	Select the process, equipment and tools for various industrial products.
2	Prepare process planning activity chart.
3	Explain the concept of cost estimation.
4	Compute the job order cost for different type of shop floor.
5	Calculate the machining time for various machining operations.

GE8076 - PROFESSIONAL ETHICS IN ENGINEERING

S.No	OUTCOMES
1	To acquire the basic knowledge of human values, moral, ethics, industrial standards, code of ethics and role of professional ethics in engineering field.
2	To have an awareness of professional rights and responsibilities of an engineer, and to have an understanding for safety and risk benefit analysis.
3	To imbibe the various ethical theories developed and apply them for a professional and societal advancement.
4	To imbibe adequate knowledge about the culture & the value system adopted by MNC's, local business houses and to create an ethical based work environment.
5	To understand and solve the employees' conflict & grievances in an amicable and ethical way.
6	Formulate and provide solutions to overcome ethical issues for win-win outcome.

PR8006-ENGINEERING ECONOMICS AND FINANCIAL MANAGEMENT

S.No	OUTCOMES
1	Understand the principles of Engineering Economics.
2	Understand the principles of Engineering Economics.
3	Able to perform Profit analysis.
4	Able to manage the working capital
5	Understand the logic behind the capital budgeting.

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COURSE OUTCOMES

(2017-Regulations)

III YEAR/V SEMESTER

PR8501 ENGINEERING METROLOGY AND MEASUREMENT

S.No	OUTCOMES
1	Define the basic concepts and terminology in measurements..
2	Differentiate the principle, operation of linear and angular measuring instruments.
3	Mathematically define the method of form measurements of screw threads, surface roughness and basic feature form.
4	Explain the applications of laser on dimensional measurements &computer aided inspection.
5	Illustrate the working principles of different measuring instruments for measuring mechanical parameters.

MF8791 METAL FORMING TECHNOLOGY

S.No	OUTCOMES
1	To understand the fundamental mechanics of metal forming processes.
2	To learn the principle, classification, equipment's used and applications of Rolling and Forging Processes.
3	To learn the principle, classification, equipment's used and applications of Extrusion and Drawing Processes.
4	To understand the principle, procedure of various sheet metal forming processes
5	To study about the recent advances in technology for metal forming.

PR8551 DESIGN OF MACHINE ELEMENTS AND TRANSMISSION SYSTEMS

S.No	OUTCOMES
1	To formulate and analyze stresses and strains in machine elements subjected to various loads
2	To analyze and design structural joints such as Riveted joints, welded joints, Bolts
3	To analyze and design the components for power transmission like shaft and couplings
4	To analyze and design different types of gears and belts for engineering applications.
5	To analyze and design mechanical springs and bearings.

PR8502 FOUNDRY TECHNOLOGY

S.No	OUTCOMES
1	To understand of various steps in Casting Process.
2	To analyze Casting Solidification and Castability of metals.
3	To design different casting system and use different Foundry practices.
4	To study of various recent trends in Casting methods.
5	To perform different testing to study the defect in the casting and apply engineering skills to minimise the defects.

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COURSE OUTCOMES

(2017-Regulations)

PR8592 WELDING TECHNOLOGY

S.No	OUTCOMES
1	Understand the construction and working principles of gas and arc welding process.
2	Understand the construction and working principles of resistance welding process.
3	Understand the construction and working principles of various solid state welding process.
4	Understand the construction and working principles of various special welding processes.
5	Understand the concepts on weld joint design, weldability and testing of weldments.

OAT551 AUTOMOTIVE SYSTEMS

S.No	OUTCOMES
1	Upon completion of this course, the students will be able to identify the different Components in automobile engineering.
2	Have clear understanding on different auxiliary and transmission systems usual.

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COURSE OUTCOMES

(2017-Regulations)

III YEAR/VI SEMESTER

PR8072-NEW PRODUCT DEVELOPMENT

S.No	OUTCOMES
1	To develop familiarity with models of innovation and the marketing and technology interface.
2	To learn how to integrate the customer and end-consumer into this process.
3	To learn methods of generating, evaluating and testing product ideas.
4	To identify relevant components and plan a product launch.
5	To Study various manufacturing cost components and learn cost analysis of product design.

PR8602-METAL CUTTING AND CNC MACHINES

S.No	OUTCOMES
1	To apply the principles of metal cutting and mechanics in machining process.
2	To select tool materials based on requirement.
3	To understood the concepts of various gear manufacturing methods.
4	To acquire knowledge on modern material removal process like EDM
5	To perform CNC and APT program for turning and machining centre.

ME8095-DESIGN OF JIGS, FIXTURES AND PRESS TOOLS

S.No	OUTCOMES
1	Summarize the different methods of Locating Jigs and Fixtures and Clamping principles
2	Design and develop jigs and fixtures for given component
3	Discuss the press working terminologies and elements of cutting dies
4	Distinguish between Bending and Drawing dies.
5	Discuss the different types of forming techniques.

PR8601-COMPUTER AIDED PRODUCT DESIGN

S.No	OUTCOMES
1	Will be able to design and develop a system or component systematically in various stages.
2	Have the ability to select suitable hardware and software for particular applications.
3	Have potential to create geometric modelling and assembly modelling based on requirement using computer graphics.
4	Have acquired knowledge to design a component by considering different aspects like manufacturing, assembly, usage etc.
5	Will be able to manage various product data.

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COURSE OUTCOMES

(2017-Regulations)

ME8692-FINITE ELEMENT ANALYSIS

S.No	OUTCOMES
1	Summarize the basics of finite element formulation.
2	Apply finite element formulations to solve one dimensional Problems.
3	Apply finite element formulations to solve two dimensional Problems.
4	Apply finite element method to solve heat transfer and fluid mechanics problems.
5	Apply finite element method to solve problems on dynamic analysis.

IE8693-PRODUCTION PLANNING AND CONTROL

S.No	OUTCOMES
1	Recognize the objectives, applications of PPC and product development
2	Explain method study, work measurement and time study
3	Explain product planning and process planning
4	Explain loading and scheduling, production control systems
5	Explain different inventory control technique, MRP

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COURSE OUTCOMES

(2017-Regulations)

II YEAR/III SEMESTER

MA8353 TRANSFORMS AND PARTIAL DIFFERENTIAL EQUATIONS

S.No	OUTCOMES
1	Understand how to solve the given standard partial differential equations.
2	Solve differential equations using Fourier series analysis which plays a vital role in engineering applications.
3	Appreciate the physical significance of Fourier series techniques in solving one and two dimensional heat flow problems and one dimensional wave equations.
4	Understand the mathematical principles on transforms and partial differential equations would provide them the ability to formulate and solve some of the physical problems of engineering.
5	Use the effective mathematical tools for the solutions of partial differential equations by using Z transform techniques for discrete time systems.

PR8301 BASIC MACHINING PROCESS

S.No	OUTCOMES
1	Understand the constructional features and working principles of Lathe, work holding devices and also understands the concepts of mechanics of metal cutting.
2	Understand the constructional features and working principles of shaper, planer and slotter, work holding devices and various machining operations performed.
3	Understand the constructional features and working principles of drilling machine and its types.
4	Understand the constructional features and working principles of milling machine and its types, work holding devices and various machining operations performed.
5	Understand the constructional features and working principles of grinding machine and its types.

PR8302 THERMODYNAMICS AND THERMAL ENGINEERING

S.No	OUTCOMES
1	To solve the basic problem in thermodynamics and its concepts.
2	To understand the concepts in Internal Combustion engines and Compressor.
3	To understand the basics in Production of Electricity and solve problems based on same.
4	To know the basics in Refrigeration and Air conditioning.
5	To analyze the heat transfer techniques and heat transfer in condensers.

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COURSE OUTCOMES

(2017-Regulations)

CE8395 STRENGTH OF MATERIALS FOR MECHANICAL ENGINEERS

S.No	OUTCOMES
1	Understand the concepts of stress and strain in simple and compound bars, the importance of principal stresses and principal planes.
2	Understand the load transferring mechanism in beams and stress distribution due to shearing force and bending moment.
3	Apply basic equation of simple torsion in designing of shafts and helical spring.
4	Calculate the slope and deflection in beams using different methods.
5	Analyze and design thin and thick shells for the applied internal and external pressures.

CE8394 FLUID MECHANICS AND MACHINERY

S.No	OUTCOMES
1	Apply mathematical knowledge to predict the properties and characteristics of a fluid.
2	Can analyse and calculate major and minor losses associated with pipe flow in piping networks.
3	Can mathematically predict the nature of physical quantities.
4	Can critically analyse the performance of pumps.
5	Can critically analyse the performance of turbines.

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COURSE OUTCOMES

(2017-Regulations)

II YEAR/IV SEMESTER

PR8401-FLUID POWER DRIVES AND CONTROLS

S.No	OUTCOMES
1	To understand the fundamentals of pneumatics and hydraulics and its principles
2	To understand constructional and operational features about the hydraulic and pneumatic drives system
3	To identify pneumatic and hydraulic components and their functions
4	To design basic and advanced pneumatic and hydraulic circuits for industrial applications
5	To understand the basic concepts, elements and functions of Programmable Logic Controller

PR8491-COMPUTER INTEGRATED MANUFACTURING

S.No	OUTCOMES
1	Describe about the classical production system, the components of CIM .
2	Explain the concept of Computer Aided Process Planning (CAPP) and Material Requirements Planning (MRP)
3	Illustrate the cellular manufacturing using Rank order, Clustering and Hollier method
4	Explain Flexible Manufacturing system and applications of Automated Guided Vehicles in the implementation of CIM.
5	Describe the configurations of Industrial Robots, and their part programming.

PR8451-MECHANICS OF MACHINES

S.No	OUTCOMES
1	To understand the principles in the formation of mechanisms and their kinematics.
2	Understand the construction features of Gears and Gear Trains.
3	Understand the effect of friction in different machine elements.
4	Understand the importance of balancing, Governors and Gyroscopic effects.
5	Understand the importance of vibration

ME8491-ENGINEERING METALLURGY

S.No	OUTCOMES
1	Explain alloys and phase diagram, Iron-Iron carbide diagram and steel classification.
2	Explain isothermal transformation, continuous cooling diagrams and different heat treatment processes.
3	Summarize the mechanism of plastic deformation and testing mechanical properties.
4	Clarify the effect of alloying elements on ferrous and non-ferrous metals.
5	Differentiate different non-mettalic materials.

SRI SAIRAM ENGINEERING COLLEGE

DEPARTMENT OF PRODUCTION ENGINEERING

COURSE OUTCOMES

(2017-Regulations)

MA8452-STATISTICS AND NUMERICAL METHODS

S.No	OUTCOMES
1	Apply the concept of testing of hypothesis for small and large samples in real life problems.
2	Apply the basic concepts of classifications of design of experiments in the field of agriculture.
3	Appreciate the numerical techniques of interpolation in various intervals and apply the numerical techniques of differentiation and integration for engineering problems.
4	Understand the knowledge of various techniques and methods for solving first and second order ordinary differential equations.
5	Solve the partial and ordinary differential equations with initial and boundary conditions by using certain techniques with engineering applications.