

K S INSTITUTE OF TECHNOLOGY

PROGRAM OUTCOMES (POs)	
Engineering Graduates will be able to:	
PO1	Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems
PO2	Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO3	Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO4	Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO5	Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.
PO6	The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
PO7	Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
PO8	Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO9	Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings
PO10	Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
PO11	Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
PO12	Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

PROGRAM SPECIFIC OUTCOMES

PSO1: Ability to understand, analyse problems and implement solutions in Programming languages, as well to apply concepts in core areas of Computer Science in association with professional bodies and clubs.

PSO2: Ability to use computational skills and apply software knowledge to develop effective solutions and data to address real world challenges.

COURSE OUTCOMES

3rd SEMESTER	
Course Name	Engineering Mathematics – III
Course Code	15MAT31
CO1	Utilize Numerical techniques for various finite difference technique problems
CO2	Make use of Fourier series to analyze wave forms of periodic functions
CO3	Identify statistical methods to find correlation and regression lines, also numerical methods to solve transcendental equations.
CO4	Obtain the Fourier and Z - transforms to analyze wave forms of non-periodic functions
CO5	Construct Greens, divergence and Stokes theorems for various engineering applications
CO5	Identify the applications of Synchronous and Asynchronous counters, A/D and D/A Converters
Class	COMPUTER SCIENCE & ENGINEERING
Semester	III
Course Name	Data Structures & Applications
Course Code	17CS33
CO1	Apply the fundamental concepts of data structures and their applications essential for programming/problem solving.
CO2	Make use of stacks to evaluate mathematical expressions and queues for mazing problem.
CO3	Choose linked lists to implement of lists, stacks, queues, polynomials and sparse matrix.
CO4	Construct various types of trees using linked lists and apply tree traversal methods for expressions evaluation.
CO5	Utilize BFS, DFS, searching, sorting, hashing and files concepts to develop various applications.

Course Name	Computer Organization
Course Code	17CS34
CO1	Make use of basic architecture & organization of a computer system, machine instruction formats and addressing modes.
CO2	Select techniques for I/O communication with standard bus interfaces and interrupt service routines.
CO3	Identify different memories and memory mapping techniques.
CO4	Develop different arithmetic operational units.
CO5	Utilize control sequences for hardwired and micro-program control units for both single and multi bus processors
Course Name	UNIX and Shell Programming
Course Code	17CS35
CO1	Identify the commands such as echo, printf, ls, date, passwd cal etc with options. Experimenting with user terminal, displaying characteristics and setting them.
CO2	Organize the unix files by creating a parent child relationship, manipulating PATH, constructing directories, making use of cat, mv, rm, cp wc and od commands, Changing file permissions
CO3	Utilize vi editor with mode commands, navigation and pattern searching, wild cards, regular expressions
CO4	Make use of ordinary and environment variables, read and read only commands, control statements like if while for and case, hard and soft links of a file.
CO5	Create Perl scripts, parent and child processes, applying kill command, arrays with key value functions,, simple and multiple search patterns.
Course Name	Discrete Mathematics Structures
Course Code	17CS36
CO1	Interpret propositional and mathematical logic in knowledge representation and truth verification.
CO2	Demonstrate the properties of integers and fundamental principle of counting in discrete structures.
CO3	Utilize the understandings of relations and functions and be able to determine their properties
CO4	Solve the problems using the concept of graph theory and trees properties
CO5	Solve problems using recurrence relations and Principle of Inclusion and Exclusion
Course Name	Analog & Digital Electronics Laboratory
Course Code	17CSL37
CO1	Utilize Operational Amplifier and timers for different applications also make use of simulation package to design circuits .

CO2	Choose the Combinational Logic circuits for realizing adders, subtractors and multiplexers
CO3	Construct code converters, parity generation and checking circuits
CO4	Design MSJK Flip Flop, synchronous and asynchronous counters also make use of simulation package to design circuits
CO5	Make use of DAC 0800 to generate ramp waveform
Course Name	Data Structures & Applications Laboratory
Course Code	17CSL38
CO1	Experiment with array operations and string application programs.
CO2	Construct the programs to implement stacks, queues and their applications.
CO3	Develop the programs to implement various operations of linked lists and their applications.
CO4	Make use of tree concepts to implement programs for their applications
CO5	Apply DFS/BFS method for graph traversals and linear probing approach for hashing programs.
Course Name	Engineering Mathematics – IV
Course Code	17MAT41
CO1	Apply Numerical methods to obtain the solution of first order and first degree differential equations.
CO2	Make use of probability theory on discrete and continuous random variables to obtain the solution of problems on different distributions and joint probability distribution.
CO3	Identify the problems on sampling distribution and on markov chains in attempting the engineering problems for feasible random events.
CO4	Utilize the Bessel's and Legendre functions for the problems arising in engineering fields.
CO5	Construct the analytic functions. Calculate residues and poles of complex potentials in flow problems.
Course Name	Object Oriented Concepts
Course Code	17CS42
CO1	Learn fundamental features of object oriented language and programming in C++.
CO2	Learn how to set up JDK environment to create, debug and run simple Java programs.
CO3	Create and handle run-time errors using Exception handling mechanism, create and work with packages and interfaces.
CO4	Create multi-threading programs and event handling mechanisms.
CO5	Introduce event driven Graphical User Interface (GUI) programming using Applets.

Course Name	Design and Analysis of Algorithms
Course Code	17CS43
CO1	Describe computational solution to well known problems like searching, sorting etc.
CO2	Estimate the computational complexity of different algorithms
CO3	Devise an algorithm using appropriate design strategies for problem solving.
CO4	Analyze space and time trade offs for algorithms using both approaches
CO5	Develop solutions using Backtracking for some of NP complete problems
Course Name	Micrpprocessors and Microcontrollers
Course Code	17CS44
CO1	Apply the knowledge of architecture of 8086 to learn the assembly language programming.
CO2	Apply the knowledge of arithmetic, logic, string operations to develop assembly language code to solve problems.
CO3	Apply the knowledge of IC 8255 for interfacing with 8086.
CO4	Apply ARM processor architecture concept to the assembly language programming
CO5	Apply ARM processor programming concept to solve complex problem
Course Name	Software Engineering
Course Code	17CS45
CO1	Able to outline the software engineering principles and illustrate the activities involved in building large software and also illustrating the process of requirements, requirements classification.
CO2	Demonstrate Object Orientation Modelling Concepts and Class Modelling .
CO3	Analyze the system models, examine the object oriented design patterns and list out the open source development tools
CO4	To choose the appropriate software testing type, also identify the significance of software maintenance.
CO5	To choose the right software pricing and measurements of software metrics. Also to identify the software quality parameters and standards
Course Name	Data Communication
Course Code	17CS46
CO1	Infer the basic computer networks and demonstrate the working of physical layer
CO2	Make use of different types of transmissions and construct switching model

CO3	Solve the various error detection and correction problems using techniques.
CO4	Apply media access control using wired and wireless networks
CO5	Identify different network layer protocols, Examine the model for network protocol through simulator
Course Name	Design and Analysis of Algorithms Laboratory
Course Code	17CSL47
CO1	Experiment with object oriented concepts of JAVA programming language.
CO2	Construct the JAVA program by using the approach of Divide and Conquer such as Merge Sort, Quick Sort.
CO3	Make use of Greedy method to solve knapsack and minimum cost spanning tree using JAVA programming.
CO4	Apply Dynamic Programming techniques to solve All pair's shortest path (Floyd's algorithm) and Travelling sales person (TSP) problem using JAVA programming.
CO5	Choose the Backtracking techniques to solve Sum of subset problem and Hamiltonian cycles using JAVA programming
Course Name	Micrpprocessors & Microcontroller Laboratory
Course Code	17CSL48
CO1	Develop and execute the following programs using 8086 Assembly Language. Any suitable assembler like MASM/TASM/8086 kit or any equivalent software may be used.
CO2	Program should have suitable comments.
CO3	The board layout and the circuit diagram of the interface are to be provided to the student during the examination.
CO4	Software Required: Open source ARM Development platform, KEIL IDE and Proteus for simulation
Course Name	Consitution of India Professional ethics and Human Rights
Course Code	17CPH49
CO1	Have general knowledge and legal literacy about Indian Constitution and there by it helps to take up competitive examinations & to manage/face complex societal issues in society.
CO2	Understand state and central policies(Union and State Excutive), fundamental Rights & their duties.
CO3	Understand Electoral Process, Amendments and special provisions in Constitution.

CO4	Understand powers and functions of Municipalities, Panchayats and Co-operative Societies, with Human Rights and NHRC.
CO5	Understand Engineering & Professional ethics and responsibilities of Engineers.
Course Name	MANAGEMENT AND ENTREPRENEURSHIP FOR IT INDUSTRY
Course Code	15CS51
CO1	Outline the functional areas of management, evolution of management theories and classifying planning, organizing and staffing
CO2	Classify directing and controlling also interpret the motivational theories and leadership styles
CO3	Utilize the entrepreneurial types, roles and its characteristics in the Indian business and also identify business opportunities in terms of market, technical, financial and social feasibility
CO4	Examine the need of the project. Dissect the significance and content formulation of project report. Classify Enterprise Resource Planning and Supply Chain Management
CO5	Classify the characteristics, steps and policies in establishing micro and small enterprises. Examine the case studies, different intuitional support and importance of IPR
Course Name	COMPUTER NETWORKS
Course Code	15CS52
CO1	Identify the fundamentals of application layer protocols.
CO2	Recognize the transport layer services and infer UDP and TCP protocols.
CO3	Make use of routing algorithm in network layer and classify the routers.
CO4	Organize the wireless and mobile Networks covering IEEE 802.11 standard.
CO5	Plan the Best effort services, Quality of service guarantees for different multimedia network applications.
Course Name	Database Management System
Course Code	15CS53
CO1	Identify the different relational database management systems and its concepts.
CO2	Design entity-relationship diagrams to represent simple database application scenarios. Convert entity-relationship diagrams into relational tables.
CO3	Design and implement a database schema for a given problem-domain

CO4	Apply the concepts of Normalization and design database which possess no anomalies
CO5	Make use of Transaction processing concepts to handle concurrency control, recovery and security.
Course Name	Automata Theory And Computability
Course Code	15CS54
CO1	Understand the basic concepts and Apply them in solving formal languages, automata and grammar types, as well as the use of formal languages and reduction in normal forms
CO2	Construct Finite-State Machines-Deterministic Finite-State Automata, Nondeterministic Finite-State Automata.
CO3	Apply rigorously formal mathematical methods to prove properties of languages, grammars and automata.
CO4	Construct push down automata and Turing machines performing tasks of moderate complexity.
CO5	Understand the concepts and Solve Undecidability and Post's Correspondence problem
Course Name	Advanced JAVA And J2EE
Course Code	15CS553
CO1	Interpret the need for advanced Java concepts like enumerations, auto boxing-unboxing and annotations, in developing concise and efficient programs
CO2	Make use of Java Collection framework to manipulate the group of objects, to build concise and efficient programs
CO3	Make use of String, StringBuffer and StringBuilder Classes to handle mutable and modifiable strings
CO4	Make use of servlets and Java Server Pages (JSP) to generate static and dynamic web pages, to store client information using cookies and sessions.
CO5	Demonstrate the use of JDBC to access database through Java applications and servlets.
Course Name	Artificial Intelligence
Course Code	15CS562
CO1	Summarize key components of AI field and its relation and role in Computer Science.
CO2	Utilize given AI technique to solve concrete problem and also to implement nontrivial AI technique.
CO3	Design various symbolic knowledge representations to specify domain and reasoning agent.
CO4	Identify AI problem based on characteristics ,constraints and compare various learning techniques.

CO5	Make use of different logic formalism and decision taking in planning problem.
Course Name	Dot Net Framework For Application Development
Course Code	15CS564
CO1	Build the applications on Visual Studio .NET platform by understanding the syntax and semantics of C#
CO2	Utilize the concepts of classes and objects and also create value types with enumerations and structures.
CO3	Apply the concepts of inheritance, interfaces and garbage collection.
CO4	Build custom collections and generics in C#
CO5	Construct events and query data using query expressions
Course Name	Computer Network Laboratory
Course Code	15CSL57
CO1	Utilize socket program using TCP & UDP
CO2	Develop security algorithm to provide network security
CO3	Make use of CRC to develop the code for Data link layer protocol
CO4	Develop the performances of Routing protocol
CO5	Build Wired and Wireless network using network simulator
Course Name	DBMS Laboratory With Mini Project
Course Code	15CSL58
CO1	Construct tables with different data types and without constraints.
CO2	Experiment with SQL DML/DDL commands querying a table once it is populated.
CO3	Build SQL queries to extract the data from more than 1 table.
CO4	Create multiple tables by properly specifying the primary keys and the foreign keys to demonstrate on-delete-cascade and on-update-cascade concepts.
CO5	Experiment with querying multiple tables using joins and aggregate functions
Course Name	Cryptograhy Network Scurity and Cyber Law
Course Code	15CS61
CO1	Utilize the basics of Cryptography techniques for enhancing the security.
CO2	Analyze Cryptography algorithms and its need to various applications.
CO3	Apply different Authentication mechanisms and make use of Security protocols.
CO4	Build different security technologies to secure WLAN.
CO5	Identify cyber security and need for cyber law.

Course Name	Computer Graphics and Visualization
Course Code	15CS62
CO1	Design and implement algorithms for 2D graphics primitives and attributes.
CO2	Illustrate Geometric transformations on both 2D and 3D objects.
CO3	Apply concepts of clipping and visible surface detection in 2D and 3D viewing, and Illumination Models.
CO4	Decide suitable hardware and software for developing graphics packages using OpenGL.
CO5	Infer the representation of curves, surfaces, Color and Illumination models.
Course Name	System Software and Compiler Design
Course Code	15CS63
CO1	Make use of the Lexical analyser to generate tokens and parser to generate parse tree
CO2	Utilize different parsers to parse the given input string and assembler to translate the given code
CO3	Construct the target code for any given program from the intermediate representation
CO4	Identify the System Software such as Assemblers, macroprocessors
CO5	Determine the operation of compiler, assembler, loader and linker to create object program and executable program
Course Name	Operating Systems
Course Code	15CS64
CO1	Identify the need and various types of Operating Systems.
CO2	Apply suitable techniques for process scheduling, synchronization and thread management.
CO3	Make use of deadlock and memory management schemes for managing the operating system.
CO4	Determine the need of demand paging, file and directory management.
CO5	Apply suitable technique for disk scheduling and protection in operating system.
Course Name	Operation Research
Course Code	15CS653
CO1	Model the given problem as transportation and assignment problem and Solve.
CO2	Apply game theory for decision support system.
CO3	Make use of the concepts of operation Research and Apply them to solve the linear Programming problems.
CO4	Select and apply optimization techniques for various problems.

CO5	Solve Linear programming problems using another optimization technique (using dual simplex method)
Course Name	Python Application Programming
Course Code	15CS664
CO1	Make use of Python syntax and semantics to work on control statements and functions.
CO2	Utilize the concepts of Strings and File Systems.
CO3	Build Python programs using core data structures like Lists, Dictionaries and use Regular Expressions in python
CO4	Make use of the concepts of Object-Oriented Programming as used in Python.
CO5	Construct exemplary applications related to Network Programming, Web Services and Databases in Python.
Course Name	System Software and Compiler Design Laboratory
Course Code	15CSL67
CO1	Utilize LEX and YACC to execute programs to recognize valid arithmetic expression, evaluation of expression, to recognize strings
CO2	Construct LL(1) parser for given grammar
CO3	Make use of triples to generate machine code
CO4	Develop programs for CPU Scheduling, deadlock detection, page replacement policies
CO5	Choose LEX and YACC to eliminate comment lines and recognize valid identifiers
Course Name	Computer Graphics & Visualization Laboratory
Course Code	15CSL68
CO1	Develop programs using OpenGL Graphics Primitives and attributes.
CO2	Design and implement algorithms for Geometric transformations on 2D objects and 3D objects.
CO3	Make use of line drawing and clipping algorithms using OpenGL functions.
CO4	Construct programs using double buffers for spinning the objects and viewing API to demonstrate lighting and shading concepts.
CO5	Experiment with various OpenGL APIs to develop applications.
Course Name	Web Technology And Its Applications
Course Code	15CS71
CO1	Adapt HTML and CSS syntax and semantics to build web pages.
CO2	Construct and visually format tables and forms using HTML and CSS
CO3	Develop Client-Side Scripts using JavaScript and Server-Side Scripts using PHP to generate and display the contents dynamically.

CO4	Appraise the principles of object oriented development using PHP with CSS, html
CO5	Inspect JavaScript frameworks like jQuery and Backbone which facilitates developer to focus on core features
Course Name	
Advanced Computer Architectures	
Course Code	
15CS72	
CO1	Identify the different parallelism models, network topologies and performance of parallel architecture.
CO2	Utilize various processor technologies and supporting memory hierarchy in context of parallelism
CO3	Make use of the hardware components and Pipelining superscalar technique to improve performance.
CO4	Choose the suitable synchronization mechanism, computer organization and parallel processing architectures.
CO5	Build different parallel programming models and Instruction level Parallelism.
Course Name	
Machine Learning	
Course Code	
15CS73	
CO1	Identify the fundamental concepts of Machine learning and implement Find-S algorithm
CO2	Make use of the fundamental concepts of Machine learning to learn decision tree representation for ID3 algorithm and Perceptrons
CO3	Utilize the neural network, Bayes Classifier and EM algorithm to solve the problems in Machine Learning.
CO4	Examine Candidate elimination algorithm, EM & K- Means algorithm and Instance based Learning for problems appear in Machine Learning
CO5	Inspect Back propagation algorithm, Estimating Hypotheses, and Reinforcement learning
Course Name	
Information And Network Security	
Course Code	
15CS743	
CO1	Identify the various classic symmetric primitives of cryptography.
CO2	Design cryptographic hash functions for digital signatures.
CO3	Construct cryptographic protocols for authentication.
CO4	Determine the need for key management.
CO5	Utilize cryptographic primitives for various applications
Course Name	
Storage Area Networks	
Course Code	
15CS754	
CO1	Illustrate the concept of data center and data protection
CO2	Interpret storage networking technologies IP SAN and FC SAN

CO3	Develop BC technologies and Back up recovery and replication
CO4	Analyze cloud computing characteristics and technologies
CO5	Determine secure storage infrastructure and ILM
Course Name	Machine Learning Lab
Course Code	15CSL76
CO1	Make use of relevant data sets in implementing concept learning algorithms
CO2	Utilize Baye's theorem to classify real world data
CO3	Make use of decision tree and K-nearest neighbour concept to predict the input data
CO4	Examine artificial neural network using back propagation algorithm
CO5	Evaluate regression algorithms for solving problems using machine learning.
Course Name	Web Technology Lab With Mini Project
Course Code	15CSL77
CO1	Apply the concepts of HTML and JavaScript to design and develop dynamic web pages with good aesthetic sense of designing and latest technical know-how's.
CO2	Make use of the concepts of HTML5, JavaScript and CSS to design and develop dynamic web pages.
CO3	Identify the use of Web Application Terminologies, Internet Tools other web services using the concept of XML and CSS style sheets.
CO4	Develop Client-Side Scripts using JavaScript and Server-Side Scripts using PHP to generate and display the contents dynamically.
CO5	Inspect how to link and publish web sites using PHP, HTML5, CSS and SQL.
Course Name	Project Phase I + Seminar
Course Code	15CSP78
CO1	Identify prospective problems encountered in the societal world and define the problem statement accordingly
CO2	Analyze the problem statement by carrying out literature survey
CO3	Plan to accomplish the project by working individual and also as a team
CO4	Develop effective ideas to portray the proposed project with their communication skill
CO4	Identify basic requirements, cost for the proposed project
Course Name	Internet of Things And Applications
Course Code	15CS81
CO1	Interpret propositional and predicate logic in knowledge representation and truth verification.

CO2	Demonstrate the properties of integers and fundamental principle of counting in discrete structures.
CO3	Utilize the understandings of relations and functions and be able to determine their properties
CO4	Solve the problems using the concept of graph theory and trees properties
CO5	Solve problems using recurrence relations and Principle of Inclusion and Exclusion
Course Name	Big Data Analytics
Course Code	15CS82
CO1	Identify the Applications of Business Intelligence, Data Warehousing, Data Mining and Data Visualization.
CO2	Apply the different Data Mining Techniques such Decision Trees, Regression, Artificial Neural Networks, Cluster Analysis and Association Rule.
CO3	Identify the Applications of Text and Web Mining and also Utilize the Machine learning Techniques such as Naïve-Bayes Analysis and Support Vector Machines
CO4	Make use of the basic concepts of Hadoop Distributed File system and Map Reduce programming.
CO5	Utilize the Essential Hadoop Tools and Hadoop administration procedures.
Course Name	User Interface Design
Course Code	15CS832
CO1	Identify characteristics of human, graphical, web user interface and various obstacles in user interface design process.
CO2	Determine the problems in menu creation, window design with colour, text and graphics.
CO3	Make use of the menus and window with its controls in the design process
CO4	Make use of UID principles, feedback and multimedia in design process.
CO5	Utilize control combination and user interfaces over all aspects of technology by various testing methods
Course Name	Internship / Professional Practice
Course Code	15CS84
CO1	Identify, write down and carry out performance objective related to the internship task assigned
CO2	Develop effective management of personal behaviour and ethics.
CO3	Evaluate interest and abilities in their field of study
CO4	Develop communication inter personal and other critical skills in job internal process.

CO5	Discover record of work experience, adopt to the work habits and develop attitude necessary for job success.
Course Name	Project Work Phase II
Course Code	15CSP85
CO1	Design of the system as per proposed specifications.
CO2	Develop and implement the system as per proposed design methodology.
CO3	Compare the findings of proposed system with competing systems using appropriate technology
CO4	Create appropriate technical documentation going in-hand with discipline
CO5	Build team work and communication skills.
Course Name	Seminar
Course Code	15CSS86
CO1	Identify the recent trends and technologies in the area of Computer Science & Engineering and inculcation of discipline, etiquette.
CO2	Construct the problem statement after performing the literature survey using various resources and interpret the gained knowledge
CO3	Develop skills in presentation and discussion of research topics in an open forum
CO4	Apply thinking capabilities to defend the queries through gained knowledge.
CO5	Develop skills to prepare the technical report.
PG Courses	
1st SEMESTER	
Class	COMPUTER SCIENCE & ENGINEERING
Semester	I
Course Name	Mathematics
Course Code	18SCS11
At the end of this course, the student will be able to:	
Course Outcome #	Course Outcome
CO1	Understand the numerical methods to solve and find the roots of the equations.
CO2	Utilize the statistical tools in multi variable distributions.
CO3	Use probability formulations for new predictions with discrete and continuous RV's.
CO4	To understand various graphs in different geometries related to edges.
CO5	Understand vector spaces and related topics arising in magnification and rotation of images.

Class	COMPUTER SCIENCE & ENGINEERING
Semester	I
Course Name	Advances In Operating Systems
Course Code	18SCS12
At the end of this course, the student will be able to:	
Course Outcome #	Course Outcome
CO1	Identify Operating system responsibilities, modern types and process management.
CO2	Make use of threads and virtual memory management concepts.
CO3	Utilize multiprocessor and real time scheduling to improve operating system performance.
CO4	List embedded operating system characteristics, types of security threats and attacks.
CO5	Examine general operating system and windows NT/2000/XP kernel organization aspects.
Class	COMPUTER SCIENCE & ENGINEERING
Semester	I
Course Name	Advances In Data Base Management
Course Code	18SCS13
At the end of this course, the student will be able to:	
Course Outcome #	Course Outcome
CO1	Identify the fundamental concepts of Databases and parallel, distributed databases and its applications
CO2	Make use of the Object oriented Databases and Implementation of related issues for extended type systems.
CO3	Develop the Distributed DBMS architectures and Storing data in a Distributed DBMS
CO4	Obtain effective Implementation techniques for OLAP and Clustering Similarity search over sequences.
CO5	Inspect various Active database concepts, triggers and Deductive Databases
Class	COMPUTER SCIENCE & ENGINEERING
Semester	I
Course Name	Internet Of Things
Course Code	18SCS14
At the end of this course, the student will be able to:	
Course Outcome #	Course Outcome
CO1	Develop schemes for the applications of IOT in real time scenarios.
CO2	Identify IoT Mechanism and Key Technologies.
CO3	Examine the Layered Connectivity and IPV6 Technologies.

CO4	Discover the practical knowledge through different case studies.
CO5	Inspect the data sets received through IoT devices and tools used for analysis.
Class	COMPUTER SCIENCE & ENGINEERING
Semester	I
Course Name	Advances In Computer Networks
Course Code	18SCS151
At the end of this course, the student will be able to:	
Course Outcome #	Course Outcome
CO1	Build the network services, protocols and architectures.
CO2	Choose key Internet applications and their protocols to develop their own applications using the sockets API.
CO3	Develop effective communication mechanisms using techniques like connection establishment, queuing theory and recovery.
CO4	Examine various congestion control techniques.
CO5	Inspect the concept of resource allocation.
Class	COMPUTER SCIENCE & ENGINEERING
Semester	I
Course Name	IoT And ADBMS Lab
Course Code	18SCSL16
CO1	Develop practical knowledge on advance database systems.
CO2	Identify several features of ADBMS to implement its applications.
CO3	Examine the applications of Internet of Things.
CO4	Discover the practical knowledge of communication of motes.
CO5	Inspect the data received through IoT devices to solve real-time issues.
Class	COMPUTER SCIENCE & ENGINEERING
Semester	I
Course Name	Research Methodology And IPR
Course Code	18RMI17
CO1	Understand the overview of the research methodology and explain the technique of defining a research and the functions of the literature review in research.
CO2	Infer from the literature search, its review, Interpret theoretical and conceptual frameworks and writing a review.
CO3	Outline the various research designs and explain the details of sampling designs, and also different methods of data collections.
CO4	Summarize the art of interpretation and the art of writing research reports
CO5	Illustrate the various forms of the intellectual property, its relevance and business impact in the changing global business environment.

Class	COMPUTER SCIENCE & ENGINEERING
Semester	II
Course Name	Managing Big Data
Course Code	18SCS21
CO1	Determine big data and its use cases from selected business domains
CO2	Make Use of NoSQL big data management
CO3	Experiment with Hadoop and HDFS by Installing and configuring.
CO4	Contrast the performance of map-reduce analytics using Hadoop
CO5	Inspect Hadoop related tools such as HBase, Cassandra, Pig, and Hive for big data Analytics
2nd SEMESTER	
Class	COMPUTER SCIENCE & ENGINEERING
Semester	II
Course Name	Advanced Algorithms
Course Code	18SCS22
CO1	Compare the growth functions of different recurrence equations.
CO2	Utilize the different graph algorithms like Bellman – Ford, Johnson’s,etc.
CO3	Make use of the Number theoretic algorithms such as Chinese remainder theorem, RSA cryptosystem , etc.
CO4	Apply String-Matching Algorithms such as Naïve string Matching, Knuth-Morris-Pratt algorithm, Boyer – Moore algorithm.
CO5	Choose Probabilistic and Randomized Algorithms like Monte Carlo and Las Vegas algorithms.
Class	COMPUTER SCIENCE & ENGINEERING
Semester	II
Course Name	Cloud Computing
Course Code	18SCS23
CO1	Compare the strengths and limitations of cloud computing
CO2	Identify the architecture, infrastructure and delivery models of cloud computing
CO3	Apply suitable virtualization concept, Choose the appropriate cloud player
CO4	Identify the core issues of cloud computing such as security, privacy and interoperability
CO5	Design Cloud Services and set a private cloud
Class	COMPUTER SCIENCE & ENGINEERING
Semester	II
Course Name	Advances In Storage Area Network
Course Code	18SCS241

CO1	Identify the need for performance evaluation and the metrics used for it
CO2	Apply the techniques used for data maintenance.
CO3	Realize strong virtualization concepts.
CO4	Develop techniques for evaluating policies for LUN masking, file systems
CO5	Develop techniques with the use of SNMP, CIM and WBEM .
Class	COMPUTER SCIENCE & ENGINEERING
Semester	II
Course Name	Advances In Computer Graphics
Course Code	18SCS251
CO1	Discuss and implement images and objects using 3D representation
CO2	Identify the and OpenGL methodologies.
CO3	Design and develop surface detection using various detection methods.
CO4	Choose various illumination models for provides effective standards of objects.
CO5	Design of develop effective computer animations.
Class	COMPUTER SCIENCE & ENGINEERING
Semester	II
Course Name	Mini Project
Course Code	18SCSL26
CO1	Design of the system as per proposed specifications.
CO2	Develop and implement the system as per proposed design methodology.
CO3	Compare the findings of proposed system with competing systems using appropriate technology
CO4	Create appropriate technical documentation going in-hand with discipline
CO5	Build team work and communication skills.
Class	COMPUTER SCIENCE & ENGINEERING
Semester	II
Course Name	Technical Seminar
Course Code	18SCSL27
CO1	Identify the recent trends and technologies in the area of Computer Science & Engineering and inculcation of discipline, etiquette.
CO2	Construct the problem statement after performing the literature survey using various resources and interpret the gained knowledge
CO3	Develop skills in presentation and discussion of research topics in an open forum
CO4	Apply thinking capabilities to defend the queries through gained knowledge.
CO5	Develop skills to prepare the technical report.

4th SEMESTER	
Class	COMPUTER SCIENCE & ENGINEERING
Semester	IV
Course Name	Machine Learning Techniques
Course Code	17SCS41
CO1	Identify the fundamental concepts of Machine learning and implement Find-S algorithm
CO2	Make use of the fundamental concepts of Machine learning to learn decision tree representation for ID3 algorithm and Perceptrons
CO3	Utilize the neural network and Bayes Classifier to solve the problems in Machine Learning
CO4	CExamine Candidate elimination algorithm, and EM algorithm for problems appear in Machine Learning
CO5	Inspect Back propagation algorithm, Estimating Hypotheses, Instance based Learning and Reinforcement learning
Class	COMPUTER SCIENCE & ENGINEERING
Semester	IV
Course Name	Wireless Network And Mobile Computing
Course Code	17SCS424
CO1	Explain, Analyze and applt therole of SSM, GPRS, 3G and WiMax technologies in wireless networks.
CO2	Apply the principles of mobile computing technologies.
CO3	Identify and learn about traditional and modern network technologies and mobile computing. (Understand Mobile OS, Mobile Computing Environment
CO4	Explain CDMA, GSM, Mobile IP, WiMax and differene Mobile OS.
CO5	Demonstrate program for CDLC, MIDP let model and security concerns.
Class	COMPUTER SCIENCE & ENGINEERING
Semester	IV
Course Name	Evaluation Of Project Phase -2
Course Code	17SCS43
CO1	Design of the system as per proposed specifications.
CO2	Develop and implement the system as per proposed design methodology.
CO3	Compare the findings of proposed system with competing systems using appropriate technology
CO4	Create appropriate technical documentation going in-hand with discipline
CO5	Build team work and communication skills.

DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

PROGRAM SPECIFIC OUTCOMES

PSO1: Graduate should be able to understand the fundamentals in the field of Electronics and Communication and apply the same to various areas like Signal processing, embedded systems, Communication & Semiconductor technology.

PSO2: Graduate will demonstrate the ability to design, develop solutions for Problems in Electronics and Communication Engineering using hardware and software tools with social concerns.

COURSE OUTCOMES

Course code 17MAT31	Course: ENGINEERING MATHS III
17MAT31.1	Make use of Fourier series to analyze wave forms of periodic functions
17MAT31.2	Make use of Fourier transforms and Z - transforms to analyze wave forms of non periodic functions
17MAT31.3	Identify statistical methods to find correlation and regression lines, also numerical methods to solve transcendental equations.
17MAT31.4	Utilize Numerical techniques for various finite difference technique problem.
17MAT31.5	Construct Greens, divergence and Stokes theorems for various engineering applications

Course code 17EC32	Course: ELECTRONIC INSTRUMENTATION
17EC32.1	Make use of the fundamentals of electronic measurements to analyse various parameters of measurement
17EC32.2	Identify the functioning of various types of analog and digital measuring instruments.
17EC32.3	Examine the functioning of various types of oscilloscopes and signal generators.
17EC32.4	Utilize AC and DC bridges for passive component and frequency measurements.
17EC32.5	Analyse different types of transducers in various applications.

Course code 17EC33	Course: ANALOG ELECTRONICS
17EC33.1	Identify the working principle and characteristics of BJT, FET, Single stage, cascaded and feedback amplifiers.

17EC33.2	Construct the Phase shift, Wien bridge, tuned and crystal Oscillators using BJT/FET/UJT.
17EC33.3	Solve for the AC gain and impedance for BJT using r_e and h Parameters models for CE and CC configuration.
17EC33.4	Identify the performance characteristics and parameters of BJT and FET amplifier using small signal model.
17EC33.5	Determine parameters which affect low frequency and high frequency responses of BJT and FET amplifiers. Compare efficiency of Class A and Class B power amplifiers and voltage regulators.

Course code 17EC34	Course: DIGITAL ELECTRONICS
17EC34.1	Apply Boolean algebra and Karnaugh Map to analyze combinational digital circuits.
17EC34.2	Apply Quine Mc-Cluskey technique for minimization of Boolean expression to get minimal SOP and POS Forms.
17EC34.3	Analyze and design combinational digital electronic circuits to meet the given Specifications/Constraints.
17EC34.4	Model Sequential circuit by understanding the working of basic components used in Sequential circuits.
17EC34.5	Analyze and develop state diagram, state table, state equation for Mealy and Moore Finite state machine.

Course code 17EC35	Course: NETWORK ANALYSIS
17EC35.1	Make use of different transformation techniques and Mesh & Nodal nodal analysis to analyse DC and AC electrical circuits.
17EC35.2	Solve for current/voltage in electrical circuits by applying network theorems.
17EC35.3	Make use of Laplace transform to calculate current and voltages for the given circuit under transient conditions.
17EC35.4	Solve for different parameters in resonant circuits.
17EC35.5	Solve the given network using specified two port network parameters.

Course code 17EC36	Course: ENGINEERING ELECTROMAGNETICS
17EC36.1	Interpret the problems on electric field due to point, linear, volume charges by applying conventional methods or by Gauss law.
17EC36.2	Analyze potential and energy with respect to point charge and capacitance using Laplace equation.
17EC36.3	Solve for magnetic field, force, and potential energy of magnetic materials.
17EC36.4	Apply Maxwell's equation for time varying fields, EM waves in free space and conductors.
17EC36.5	Make use of Poynting theorem to find power associated with EM waves.

Course code 17ECL37	Course: ANALOG ELECTRONICS LAB
17ECL37.1	Construct the circuits to identify the working of rectifiers, clipping circuits, clamping circuits and voltage regulators.
17ECL37.2	Identify the characteristics of BJT and FET amplifiers and plot its frequency response.
17ECL37.3	Identify the performance parameters of amplifiers and voltage regulators.
17ECL37.4	Construct the BJT Power amplifier to calculate its efficiency
17ECL37.5	Examine the performance characteristics of oscillators.

Course code 17ECL38	Course: DIGITAL ELECTRONICS LAB
17ECL38.1	Identify the truth table of various expressions and combinational circuits using logic gates.
17ECL38.2	Design and test various combinational circuits such as adders, subtractors, comparators, multiplexers.
17ECL38.3	Develop Boolean expressions using decoders.
17ECL38.4	Construct flips-flops, counters and shift registers
17ECL38.5	Construct full adder and up/down counters

Course code 17MAT41	Course: ENGINEERING MATHS IV
17MAT41.1	Apply Numerical methods to obtain the solution of first order and first degree differential equations.
17MAT41.2	Make use of probability theory on discrete and continuous random variables to obtain the solution of problems on different distributions and joint probability distribution.
17MAT41.3	Identify the problems on sampling distribution and on markov chains in attempting the engineering problems for feasible random events.
17MAT41.4	Utilize the Bessel and Legendre functions for the problems arising in engineering fields.
17MAT41.5	Construct the analytic functions. Calculate residues and poles of complex potentials in flow problems.

Course code 17EC42	Course: SIGNALS AND SYSTEMS
17EC42.1	Identify different types of signals (continuous/discrete, periodic/aperiodic, even /odd, energy/power and deterministic/random signals.)
17EC42.2	Identify the linearity, causality, time-invariance and stability properties of continuous and discrete time systems.
17EC42.3	Solve the response of a Continuous and Discrete LTI system using convolution integral and convolution sum.
17EC42.4	Solve the spectral characteristics of continuous and discrete time signal using Fourier analysis.
17EC42.5	Solve Z-transforms, inverse Z-transforms and transfer functions of complex LTI systems.

Course code 17EC43	Course: CONTROL SYSTEMS
17EC43.1	Develop the mathematical model of mechanical / electrical systems and obtain its transfer function using block reduction method /Signal flow graph method
17EC43.2	Ability to relate transient performance parameters (overshoot, rise time, peak time and settling time) for the given system and to evaluate steady state error.

17EC43.3	Identify various stability criteria and Determine the stability of a system in the time domain using Routh-Hurwitz criterion and Root-locus technique.
17EC43.4	Determine the stability of a system in the frequency domain using Nyquist and bode plots
17EC43.5	Develop a control system model in continuous and discrete time using state variable techniques

Course code 17EC44	Course: PRINCIPLES OF COMMUNICATION SYSTEMS
17EC44.1	Apply the time and frequency domain knowledge for the generation and demodulation of amplitude modulated signals.
17EC44.2	Identify the performance of different generation and detection methodologies of AM, FM and multiplexing.
17EC44.3	Utilize analog signals in time domain as random processes and identify the types of basic Noise
17EC44.4	Identify the influence of noise in receivers of analog modulated signals
17EC44.5	Compare the characteristics of pulse modulation techniques

Course code 17EC45	Course: LINEAR IC's
17EC45.1	Identify Op-amp circuit and parameters including CMRR, PSRR, Input & Output Impedances and Slew Rate.
17EC45.2	Construct Op-amp based AC Amplifiers and Develop circuits for Op-amp based Voltage / Current Sources & Sinks, Current, Instrumentation and Precision Amplifiers.

17EC45.3	Develop circuits for Op Amp based linear and non-linear circuits comprising of limiting, clamping, Sample & Hold, Differentiator / Integrator Circuits, Peak Detectors ,Oscillators and Multiplier & Divider.
17EC45.4	Design first & Second Order Filters and Voltage Regulators.
17EC45.5	Illustrate applications of linear ICs in phase detector, VCO, DAC, ADC and Timer.

Course code 17EC46	Course: MICROPROCESSORS
17EC46.1	Identify the different CPU architectures, 8086 Microprocessor architecture and addressing modes of 8086.
17EC46.2	Make use of the instruction set and addressing modes of 8086 to develop assembly language programs
17EC46.3	Make use of stacks , interrupts to develop programs
17EC46.4	Model the static memory chips, 8255 & 8254, and use of INT 21 DOS interrupt function calls to handle keyboard and display
17EC46.5	Experiment with 8086 Microprocessor the ADC-0808, DAC-0800 and stepper motors using PPI 8255 with 8086.

Course code 17ECL47	Course: MICROPROCESSOR LAB
17ECL47.1	Identify the different CPU architectures, 8086 Microprocessor architecture and addressing modes of 8086.
17ECL47.2	Make use of the instruction set and addressing modes of 8086 to develop assembly language programs
17ECL47.3	Make use of stacks, interrupts to develop programs.
17ECL47.4	Model the static memory chips, 8255 & 8254, and use of INT 21 DOS interrupt function calls to handle keyboard and display
17ECL47.5	Experiment with 8086 Microprocessor to interface the ADC-0808, DAC-0800 and stepper motor using PPI 8255.

Course code 17ECL48	Course: LIC AND COMMUNICATION LAB
17ECL48.1	Inspect the basic analog systems for a given specification using the basic building blocks and ICs.
17ECL48.2	Examine the performance of instrumentation amplifier, LPF, HPF, DAC and oscillators using linear IC.
17ECL48.3	Analyze with Linear ICs for applications like addition, integration, differentiation and 555 timer operations to generate pulses.
17ECL48.4	Test for pulse and flat top sampling techniques.
17ECL48.5	Experiment with Amplitude and Frequency Modulation techniques to find the percentage of modulation and use PLL to synthesize the Frequency.

Course code 15ES51	Course: MANAGEMENT AND ENTREPRENEURSHIP DEVELOPMENT
15ES51.1	Identify the different fundamental concepts of Management and Entrepreneurship.
15ES51.2	Select the best Entrepreneurship model for the required domain of establishment.
15ES51.3	Explain the functions of Managers, Entrepreneurs and their social responsibilities.
15ES51.4	Survey the Institutional support by various state and central government agencies
15ES51.5	Apply the knowledge of Project Formulation and Evaluation Techniques

Course code 15EC52	Course: DIGITAL SIGNAL PROCESSING
15EC52.1	Construct the frequency domain sampling and reconstruction of discrete time signals.
15EC52.2	Make use of the properties and develop efficient algorithms for the computation of DFT.
15EC52.3	Construct FIR and IIR filters in different structural forms.

15EC52.4	Utilize the procedures to design IIR filters from the analog filters using impulse invariance and bilinear transformation.
15EC52.5	Identify the different windows used in the design of FIR filters and design appropriate filters based on the specifications.

Course code 15EC53	Course: VERILOG HDL
15EC53.1	Develop Verilog programs in gate, dataflow (RTL), behavioral and switch modeling levels of Abstraction & simple programs in VHDL in different styles.
15EC53.2	Identify the suitable Abstraction level for a particular digital design. .
15EC53.3	Develop the programs more effectively using Verilog tasks and directives.
15EC53.4	Develop verilog code for timing and delay Simulation
15EC53.5	Develop and verify the functionality of digital circuit/system using test benches.using vhdl and verilog

Course code 15EC54	Course: INFORMATION THEORY AND CODING
15EC54.1	Make use of the concepts of dependent & independent source to measure the information, entropy, rate of information and order of a source.
15EC54.2	Construct the information codes using Shannon Encoding, Shannon Fano, Prefix and Huffman Encoding Algorithms.
15EC54.3	Model the continuous and discrete communication channels using input, output and joint probabilities.
15EC54.4	Develop a codeword comprising of the check bits computed using Linear Block codes, cyclic codes & convolution codes
15EC54.5	Examine the encoding and decoding circuits for Linear Block codes, cyclic codes, convolution codes, BCH and Golay codes.

Course code 15EC553	Course: OPERATING SYSTEMS
15EC553.1	Identify the goals, structure, operation and types of operating systems.

15EC553.2	Utilize process management & scheduling techniques to find performance factors.
15EC553.3	Make use of suitable techniques for contiguous and non-contiguous memory allocation.
15EC553.4	Identify various types of organization of file systems and IOCS.
15EC553.5	Identify various message passing, deadlock detection and prevention methods.

Course code 15EC562	Course: Object Oriented Programming Using C++
15EC562.1	Apply Encapsulation, Inheritance and Polymorphism.
15EC562.2	Utilize Object Oriented approach to solve problems
15EC562.3	Examine problem statements and build object oriented models to solve the problems after analysing the objects that constitute the system.
15EC562.4	Build solutions using function overloading, operator overloading and virtual functions.
15EC562.5	Identify advantages of object oriented programming over procedure oriented programming.

Course code 15ECL57	Course: DSP LAB
15ECL57.1	Apply sampling theorem and effective reconstruction of signal.
15ECL57.2	Compute the DFT for a discrete signal and verification of its properties using MATLAB.
15ECL57.3	Solve difference equations and perform different operations on discrete time signals
15ECL57.4	Design IIR and FIR filters for the given specifications.
15ECL57.5	Build DSP computations on TMS processor and verify the result

Course code 15ECL58	Course: HDL LAB
15ECL58.1	DEVELOP AND Write the Verilog/VHDL programs to simulate Combinational circuits in Dataflow, Behavioral and Gate level Abstractions

15ECL58.2	DEVELOP AND Describe sequential circuits like flip flops and counters in Behavioral description and obtain simulation waveforms
15ECL58.3	DEVELOP AND Synthesize Combinational and Sequential circuits on programmable ICs and test the hardware
15ECL58.4	DEVELOP AND Interface the hardware to the programmable chips and obtain the required output
15ECL58.5	DEVELOP HARDWARE DESCRIPTIVE PROGRAMMES USING Verilog or VHDL for a given Abstraction level

Course code 15EC61	Course: DIGITAL COMMUNICATION
15EC61.1	Develop the concepts of Band pass sampling to well specified signals and channels.
15EC61.2	Compute performance parameters and transfer rates for low pass and bandpass symbol under ideal and corrupted non band limited channels.
15EC61.3	Identify valid symbol processing and performance parameters at the receiver under ideal and corrupted bandlimited channels.
15EC61.4	Identify the bandpass signals when subjected to corruption and distortion during transmission over a bandlimited channel.
15EC61.5	Identify the need for data security using spread spectrum technique and error rate calculation.

Course code 15EC62	Course: ARM MICROCONTROLLER AND EMBEDDED SYSTEM
15EC62.1	Construct the architectural features and instructions of 32 bit microcontroller ARM Cortex M3.
15EC62.2	Make use of the knowledge gained for Programming ARM Cortex M3 for different applications.
15EC62.3	Identify the basic hardware components and their selection method based on the characteristics and attributes of an embedded system.

15EC62.4	Develop the hardware/software co-design and firmware design using ARM Cortex M3.Instruction set.
15EC62.5	Analyze the need of real time operating system for embedded system applications

Course code 15EC63	Course: VLSI DESIGN
15EC63.1	Utilize the concept of basic MOS transistor, CMOS fabrication flow and technology scaling.
15EC63.2	Make use of the knowledge of physical design aspects to make stick and layout diagrams for various gates.
15EC63.3	Identify the concept of Memory elements along with timing considerations with scaling fundamentals
15EC63.4	Experiment with the basic knowledge of FPGA based system design and testability issues in VLSI Design
15EC63.5	Analyze the various CMOS subsystems and architectural issues with the design constraints.

Course code 15EC64	Course: COMPUTER COMMUNICATION NETWORK
15EC64.1	Make use of the layering architecture of computer networks and distinguish between the OSI reference model and TCP/IP protocol suite.
15EC64.2	Identify the protocols and services of Data link layer
15EC64.3	Identify the protocols and functions associated with the transport layer services.
15EC64.4	Construct a network model and determine the routing of packets using different routing algorithms.
15EC64.5	Distinguish the basic network configurations and standards associated with each network.

Course code 15EC651	Course: CELLULAR MOBILE COMMUNICATION
15EC651.1	Identify the statistical characterization of urban mobile channels to compute the performance for simple modulation schemes.

15EC651.2	Identify the functionalities of GSM, GPRS and CDMA to meet high data rate requirements and limited improvements that are needed
15EC651.3	List the call process procedure between a calling number and called number for all scenarios in GSM or CDMA based systems
15EC651.4	Build and validate voice and data call handling for various scenarios in GSM and CDMA systems for national and international interworking situations
15EC651.5	Choose voice and data call handling for various scenarios CDMA systems for national and international interworking situations

Course code 15EC654	Course: DIGITAL SWITCHING SYSTEM
15EC654.1	Identify the basic concepts and parameters of telecommunication networks and services.
15EC654.2	Identify the basic concepts and parameters of telecommunication networks and services.
15EC654.3	Model the traffic flow in lost call systems and queuing systems.
15EC654.4	Organize the digital switching software architecture for various levels of control.
15EC654.5	Identify the software aspects of switching systems and its maintenance.

Course code 15EC663	Course: DIGITAL SYSTEM DESIGN USING VERILOG
15EC663.1	Apply the knowledge of digital fundamentals with combinational and Sequential circuits to design the Digital System
15EC663.2	Identify different semiconductor memory used in application specific digital systems
15EC663.3	Make use of the knowledge of embedded systems in small microcontrollers, larger CPUs/DSPs, or hard or soft processor cores.
15EC663.4	Inspect different types of processor and I/O controllers that are used in embedded system.
15EC663.5	Develop Verilog model for sequential circuits and Inspect the test pattern generation.

Course code 15ECL67	Course: EMBEDDED CONTROLLER LAB
15ECL67.1	Apply the instruction set of 32 bit microcontroller ARM Cortex M3, and the software tool required for programming in Assembly and C language.
15ECL67.2	Develop assembly language programs using ARM Cortex M3 for different applications
15ECL67.3	Develop C language programs to interface external devices and I/O with ARM Cortex M3.
15ECL67.4	Develop C language programs for embedded system applications.
15ECL67.5	Develop C language programs which makes use of library functions for embedded system applications.

Course code 15ECL68	Course: COMPUTER NETWORKS LAB
15ECL68.1	Illustrate the operations of network protocols and algorithms using C programming.
15ECL68.2	Utilize the network simulator for learning and practice of networking algorithms.
15ECL68.3	Build the network with different configurations to measure the performance parameters.
15ECL68.4	Develop the data link and routing protocols using C programming.
15ECL68.5	Develop wired and wireless LAN protocol using network simulator

Course code 15EC71	Course: MICROWAVE AND ANTENNA
15EC71.1	Identify the working of Reflex Klystron by studying the mode curves and also understand transmission lines structure along with its line equations using smiths charts to calculate the reflection coefficient, SWR, input and load impedance

15EC71.2	Solve for Microwave network parameters using S –Matrix also study Passive microwave devices like Connectors, Adapters Attenuators, Tees and phase shifters
15EC71.3	Identify the different types of Strip lines and understand the antenna basics to find various parameters like antenna gain, directivity.
15EC71.4	Classify the point source Isotropic antenna and Electric dipole
15EC71.5	Identify loop, Horn antenna and the Helical antenna by making use of the design considerations

Course code 15EC72	Course: DIGITAL IMAGE PROCESSING
15EC72.1	Identify the elements, components, steps, applications, and basic operations in digital image formation and processing.
15EC72.2	Utilize basic mathematical operations for (Gray/Colour) image enhancement in spatial domain
15EC72.3	Model image restoration techniques and make use of morphological operations in image processing
15EC72.4	Examine application of Fourier Transforms and wavelets in image enhancement and multi-resolution
15EC72.5	Distinguish image analysis techniques for image segmentation, representation and description.

Course code 15EC73	Course: POWER ELECTRONICS
15EC73.1	Identify the basic operation of various power semiconductor devices and their applications.
15EC73.2	Identify the characteristics of SCR and construct commutation and gate triggering circuits for SCR
15EC73.3	Make use of firing circuits model to analyse the AC Voltage controller and rectifier Circuits.
15EC73.4	Analyze applications of Power electronics in Chopper and Static Switching Operation
15EC73.5	Analyze applications of Power electronics for generating PWM in Inverter Circuits.

Course code 15EC744	Course: CRYPTOGRAPHY
15EC744.1	Explain the fundamental concepts, principles and theories of cryptography.
15EC744.2	Make use of the concepts of generating pseudo random numbers required for cryptographic applications.
15EC744.3	Utilize the various concepts of number theory in cryptography.
15EC744.4	Discover the prominent techniques used for public-key cryptosystems and digital signature schemes.
15EC744.5	Assess one way hash functions for data encryption.

Course code 15EC755	Course: SATELLITE COMMUNICATION
15EC755.1	Identify the various applications of satellite orbits and its trajectories and subsystem parameters associated with it.
15EC755.2	Utilize the electronic hardware requirements associated with the satellite subsystem and earth station.
15EC755.3	Make use of the satellite link parameters under various propagation conditions and applications with the different multiple access techniques.
15EC755.4	Develop the knowledge of communication satellite and focus on national satellite system.
15EC755.5	Distinguish applications of satellite in different domains such as remote sensing, weather forecasting and navigation.

Course code 15ECL76	Course: ADVANCED COMMUNICATION LAB
15ECL76.1	Make use of the characteristics and response of microwave devices
15ECL76.2	Utilize the characteristics of microstrip antennas and measurement of its parameters.
15ECL76.3	Construct the digital modulation schemes with the display of waveforms and computation of performance parameters

15ECL76.4	Make use of the characteristics of Optical Fibre Communication and calculate the parameters associated with it.
15ECL76.5	Model different digital communication concepts using simulation

Course code 15ECL77	Course: VLSI LAB
15ECL77.1	Model basic digital circuits, simulate and synthesize using EDA Tool.
15ECL77.2	Make use of logic gates to realize shift registers and adders to meet desired parameters.
15ECL77.3	Construct and generate layout structure for basic CMOS circuits like inverter, common source amplifier and differential amplifier.
15ECL77.4	Experiment with the basic amplifiers to design higher level circuits like operational amplifier and analog/digital converters to meet desired parameters.
15ECL77.5	Inspect concepts of DC Analysis, AC Analysis and Transient Analysis in analog circuits.

Course code 15ECP78	Course: PROJECT WORK PAHSE I
15ECP78.1	Carry out Literature survey in their specific area of interest.
15ECP78.2	Identify the Problem statement and technology used.
15ECP78.3	Formulate specific Objectives and methodology.
15ECP78.4	Develop technical writing and presentation skills.
15ECP78.5	Develop leadership qualities through effective team work.

Course code 15EC81	Course: WIRELESS CELLULAR AND LTE 4G BROADBAND
15EC81.1	Make use of the system architecture and the functional standard specified in LTE 4G.
15EC81.2	Identify the role of the layer of LTE radio interface protocols and EPS Data convergence protocols to set up, reconfigure and release data and voice from users.
15EC81.3	Utilize the UTRAN and EPS handling processes from set up to release including mobility management for a variety of data call scenarios.

15EC81.4	Identify the difference between uplink, down link and the physical layer procedures that provide the services to upper layers.
15EC81.5	Utilize the Performance of resource management and packet data processing and transport algorithms.

Course code 15EC82	Course: FIBER OPTIC NETWORKS
15EC82.1	Classify and explain the working of optical fiber with different modes of signal propagation.
15EC82.2	Utilize the concepts of transmission characteristics to obtain the losses in optical fiber communication.
15EC82.3	Identify the construction and working principle of optical connectors, multiplexers and amplifiers.
15EC82.4	Analyze the constructional features and the characteristics of optical sources and detectors.
15EC82.5	Examine the networking aspects of optical fiber and describe various standards associated with it.

Course code 15EC833	Course: RADAR ENGINEERING
15EC833.1	Identify the fundamentals of radar ,tracking and antennas
15EC833.2	Make use of the radar equation and process digital MTI with its applications
15EC833.3	Utilize principle of Doppler frequency shift and explain tracking radar antennas
15EC833.4	Develop tracking radar and sequential lobbing
15EC833.5	Analyze radar antenna parameters and tracking range

Course code 15EC834	Course: MACHINE LEARNING
15EC834.1	Build the fundamental concepts of Machine learning.
15EC834.2	Make use of the underlying mathematical relationships within and across Machine Learning algorithms.
15EC834.3	Identify the paradigms of supervised and un-supervised learning.

15EC834.4	Develop a real world problem and apply the learned techniques of Machine Learning to solve the problem.
15EC834.5	Inspect Perfect Domain Theories, Inductive-Analytical Approaches and Reinforcement Learning.

Course code 15EC84	Course: INTERNSHIP
15EC84.1	Examine the knowledge and skills acquired in the classroom to a professional context
15EC84.2	Apply the methods for solving the complex problems
15EC84.3	Develop the organizational skills
15EC84.4	Develop the ability to write the report
15EC84.5	Develop the skills for communication and team working

Course code 15ECP85	Course: PROJECT WORK PHASE II
15ECP85.1	Build the block diagram using hardware required for the project.
15ECP85.2	Develop the software required for the project.
15ECP85.3	Test for functionality of the project
15ECP85.4	Develop team work and communication skills
15ECP85.5	Design the project as per the specifications

Course code 15ECS86	Course: SEMINAR
15ECS86.1	Survey the new technologies, methods, hardware and software tools associated with Electronics & Communication Engineering
15ECS86.2	Compare and explain the solutions for problems associated with engineering, society and environment
15ECS86.3	Analyze the study material in depth.
15ECS86.4	Develop the ability to document the study.
15ECS86.5	Develop communication skills.

DEPARTMENT OF MECHANICAL ENGINEERING

PROGRAM SPECIFIC OUTCOMES

PSO1: Ability to apply concept of mechanical engineering to design a system, a component or a process/system to address a real world challenges

PSO2: Ability to develop effective communication, team work, entrepreneurial and computational skills

COURSE OUTCOMES

Course: Engineering Mathematics – III	
17MAT31.1	Utilize Numerical techniques for various finite difference technique problems
17MAT31.2	Make use of Fourier series to analyze wave forms of periodic functions
17MAT31.3	Identify statistical methods to find correlation and regression lines, also numerical methods to solve transcendental equations.
17MAT31.4	Obtain the Fourier and Z - transforms to analyze wave forms of non periodic functions
17MAT31.5	Construct Greens, divergence and Stokes theorems for various engineering applications
Course: Material Science	
17ME32.1	Interpret the basic concepts of crystal structure, concepts of diffusion, mechanical behavior of materials and various modes of failure.
17ME32.2	Classify solid solutions, interpret equilibrium phase diagrams of ferrous and nonferrous alloys and mechanism of solidification.
17ME32.3	Relate suitable heat-treatment process to achieve desired properties of metals and alloys
17ME32.4	Interpret the properties and applications of various materials like ceramics, plastics and Smart materials.
17ME32.5	Identify various composite materials and their processing as well as applications.
Course :Basic Thermodynamics	
17ME33.1	Identify thermodynamic systems, properties, Zeroth law of thermodynamics, temperature scales , work and heat interactions
17ME33.2	Determine heat, work, internal energy, enthalpy for flow & non flow process using First and Second Law of Thermodynamics
17ME33.3	Calculate change in internal energy, change in enthalpy, change in entropy, efficiency and COP for reversible and irreversible process
17ME33.4	Make use of the behaviour of pure substances and its applications to practical problems and also compare the availability and Irreversibility.
17ME33.5	Evaluate the properties of ideal , real gases and air- water mixture.

Course: Mechanics Of Materials	
17ME34.1	Utilize the concept of mechanics to solve the art of state problems on stress & strain
17ME34.2	Make use of the concept of stress and strain to solve compound stress and cylinder problems.
17ME34.3	Construct Shear Force and Bending Moment model of beam application and solve for its stresses
17ME34.4	Utilization of pure torsion & column equations in structural application
17ME34.5	Select theory of failure & strain energy equation for solving engineering problems
Course: Metal Casting and Welding	
17ME35.1	Classify the casting process, different moulding techniques, pattern, Core, and Gating, Riser system and Molding Machines.
17ME35.2	Explain working and parameters of different furnaces and the different casting Techniques.
17ME35.3	Illustrate about the Solidification process in and Casting of ferrous and Non-Ferrous Metals.
17ME35.4	Make use of the knowledge of the welding process used in manufacturing.
17ME35.5	Make use of the Metallurgical aspects in Welding and inspection Methods for the quality assurance of components made of casting and joining process in the manufacturing industry
Course: COMPUTER AIDED MACHINE DRAWING	
17ME36.1	Develop the sectional views of the solids and Draw the orthographic views of the machine components by using CAD software.
17ME36.2	Build the 2D views and 3D drawings of simple machine parts/ Threaded fasteners/ Riveted joints.
17ME36.3	Construct the views of machine elements including keys, Couplings and joints.
17ME36.4	Inspect Limits, Fits, Tolerances and level of surface finish of machine elements.
17ME36.5	Create 2D and 3D models by standard CAD software with manufacturing considerations.
Course: MATERIALS TESTING LAB	
17MEL37.1	Understand & acquire experimentation skills in the field of material testing.
17MEL37.2	Understanding of the mechanical properties of materials by performing experiments.

17MEL37.3	Apply the knowledge to analyze a material failure and determine the failure inducing agent/s.
17MEL37.4	Apply the knowledge of testing methods in related areas.
17MEL37.5	Evaluate how to improve structure/behaviour of materials for various industrial applications.
Course: FOUNDRY AND FORGING LAB	
17MEL38A.1	Analyze and optimize foundry sand, core sand to a particular application.
17MEL38A.2	Build moulds with or without patterns.
17MEL38A.3	Understand casting of ferrous and nonferrous objects.
17MEL38A.4	Develop skills in making forging models manually and also with the use of power hammers.
Course :ENGG. MATHEMATICS – IV	
17MAT41.1	Apply Numerical methods to obtain the solution of first order and first degree differential equations
17MAT41.2	Make use of probability theory on discrete and continuous random variables to obtain the solution of problems on different distributions and joint probability distribution.
17MAT41.3	Identify the problems on sampling distribution and on markov chains in attempting the engineering problems for feasible random events
17MAT41.4	Utilize the Bessel's and Legendre functions for the problems arising in engineering fields.
17MAT41.5	Construct the analytic functions. Calculate residues and poles of complex potentials in flow problems
Course: KINEMATICS OF MACHINERY	
17ME42.1	Understanding the basic terminology of planar mechanisms and their motion study.
17ME42.2	Model displacement diagrams for followers with various types of motions and Cam profile drawing for various followers.
17ME42.3	Evaluating the transmission of power by application of various gears and gear trains.
17ME42.4	Constructing velocity and acceleration diagrams for planar mechanisms by Graphical method
17ME42.5	Inspect velocity and acceleration of planar mechanisms by complex algebra method and kinematic synthesis of four bar and slider crank kinematic chain
Course: Applied Thermodynamics	
17ME43.1	Identify the basic thermodynamic cycles like otto, Diesel, Dual and gas turbine cycles applied in IC engine and gas turbine Applications .

17ME43.2	Apply Basic thermo dynamic cycles used in the steam power plants for power productions based on Rankine cycle .
17ME43.3	Build combustion parameters for correct heat combustion for given air fuel ratio, efficiency calculations along with performance and testing of IC Engines.
17ME43.4	Construct refrigeration systems based on various refrigeration cycles along with air conditioning systems.
17ME43.5	Make use of the basic formulations for reciprocating compressors and steam nozzles for efficiency and effect of friction
Course: Fluid Mechanics	
17ME44.1	Identify the need of the fluid properties used for the analysis of fluid behavior.
17ME44.2	Utilize the knowledge of kinematics and dynamics while addressing problems of fluid flow. Make use of the principles of Bernoulli's theorem to derive an expression for discharge of different flow measuring devices
17ME44.3	Derive an expression for loss of head due to friction in pipes and also an equation of hagen poiseille's for laminar flow through pipe and parallel plates.
17ME44.4	Analyze the development of boundary layer due to the flow over a flat plate and further identify the difference between lift and drag forces for both compressible and incompressible fluid flow.
17ME44.5	Solve the industrial related gas turbine and engines problems using the basic concept of compressible flow and CFD.
Course: Machine Tools and Operations	
17ME45.1	Construction and specifications of different machine tools in order to produce components having different shapes and sizes.
17ME45.2	Enrich the knowledge pertaining to relative motion and mechanics required for various machine tools.
17ME45.3	Identify the importance of cutting tool materials their Nomenclature and role of cutting fluids in maintaining the desired surface finish of jobs and estimation of machining time corresponding to machining parameters.
17ME45.4	Develop the knowledge on mechanics of machining process for Turning, Drilling and Milling process.
17ME45.5	Identify the importance of Economics of machining process corresponding to process parameter on life of the cutting tool.
Course: Mechanical Measurements and Metrology	
17ME46.1	Explain the basic concepts of metrology, standards of measurement and working principles of different comparators.

17ME46.2	Select the limits of size, fits, geometric and position tolerances, gauges and their design and calibration process of instruments such as slip gauges, sine bar, sine center and Autocollimator.
17ME46.3	Interpret the nomenclature and measuring methods of screw threads and gears.
17ME46.4	Illustrate the measurement systems, transducers, intermediate modifying devices and terminating devices.
17ME46.5	Summarize the functioning of force, torque, pressure, strain and temperature measuring devices.
Course: Mechanical Measurements and Metrology lab	
17MEL47.1	Explain calibration of pressure gauge, thermocouple, LVDT, load cell and micrometer
17MEL47.2	Find angle using Sine Center/ Sine Bar/ Bevel Protractor, alignment using Autocollimator/ Roller set.
17MEL47.3	Obtain measurements using Optical Projector/Tool maker microscope, Optical flats.
17MEL47.4	Determine cutting tool forces using Lathe/Drill tool dynamometer.
17MEL47.5	Find Screw thread parameters using 2-Wire or 3-Wire method, gear tooth profile using gear tooth Vernier/Gear tooth micrometer.
Course: Machine Shop Lab	
17MEL48B.1	Perform turning , facing , knurling , thread cutting, tapering , eccentric turning and allied operations, Perform keyways / slots , grooves etc using shaper
17MEL48B.2	Perform gear tooth cutting using milling machine.
17MEL48B.3	Understand the formation of cutting tool parameters of single point cutting tool using bench grinder / tool and cutter grinder
17MEL48B.4	Understand Surface Milling/Slot Milling.
17MEL48B.5	Exhibit interpersonal skills towards working in a team.
MANAGEMENT AND ENGINEERING ECONOMICS(15ME51)	
15ME51.1	Explain the concepts of management and understand the importance of planning, organizing, staffing, directing and controlling in the development of organization.
15ME51.2	Understand comprehensive concepts of engineering and economics and identify the alternative uses of limited resources to select the preferred course of action for decision makers.
15ME51.3	Apply suitable organizational structure, motivation theories with sound communication tools.
15ME51.4	Solve compound interest factors, different economic models such as PWC, FWC, AEC & Rate of return in the process of decision making.
15ME51.5	Calculate the total cost of the products and depreciation of assets using different methods.

DYNAMICS OF MACHINERY(15ME52)	
15ME52.1	Design centrifugal governors and understand the gyroscopic effect on ships, aeroplanes & vehicles
15ME52.2	Build the concept of balancing rotating and reciprocating parts in machinery.
15ME52.3	Identify the effect of static and dynamic equilibrium of forces in planar mechanisms.
15ME52.4	Examine the concept of SHM and interpret natural frequencies of Undamped free vibrations.
15ME52.5	Inspect the nature of damped free vibrations, Forced vibration of single degree freedom systems.
TURBOMACHINES(15ME53)	
15ME53.1	Identify the difference between power generating and power absorbing Turbo machines and utilize this concept to develop and understand the concepts of Hydraulic Turbines
15ME53.2	Make use of the Buckingham's Pi theorem method to develop the non-dimensional numbers of Turbo machines and understand the concept of model similarity.
15ME53.3	Organize the steam turbines as impulse and reaction turbines and compare the performance of single and compounded stage steam turbine
15ME53.4	Identify the difference between single and multi-stage centrifugal pumps and compressors
15ME53.5	Utilize the concept of utilization factor and Degree of reaction for the analysis of axial and radial flow turbines
DESIGN OF MACHINE ELEMENTS-I(15ME54)	
15ME54.1	Identify codes and standards in design process to solve problems on static loading.
15ME54.2	Solve problems on machine components under impact, fatigue loading using failure theories.
15ME54.3	Choose suitable equation to solve the art of state problems on joints and couplings
15ME54.4	Select equation for solving problems on fasteners and riveted joints
15ME54.5	Make use of codes and standards for designing keys, Shafts and welding joints
NON TRADITIONAL MACHINING(15ME554)	
15ME554.1	Explain the needs, advantages, limitations and applications of non-traditional machining process viz; USM, AJM, WJM, ECM, CHM, EDM, PAM, LBM, and EBM.
15ME554.2	Compare the various traditional and non-traditional machining processes and Classify and select the various non-traditional machining processes based on nature of energy employed.
15ME554.3	Explain the constructional features of USM, AJM, WJM, ECM, CHM, EDM, PAM, LBM, and EBM.
15ME554.4	Explain the working principle of USM, AJM, WJM, ECM, CHM, EDM, PAM, LBM, and EBM.
15ME554.5	Make use of process characteristics and parameters to analyze the performance of USM, AJM, WJM, ECM, CHM, EDM, PAM, LBM, and EBM.

ENERGY AND ENVIRONMENT(15ME562)	
15ME562.1	Understand the basic concepts of energy, sources of energy, its distribution, world energy production & distribution and key energy trends in India.
15ME562.2	Understand the role of environment, eco system and need for environmental awareness.
15ME562.3	Interpret the various types of environment pollution and their effects on human beings
15ME562.4	Discuss the social issues of the environment with associated acts.
15ME562.5	Interpret different energy storage systems, energy management, perform energy audit and economic analysis
FLUID MECHANICS AND MACHINES LABORATORY(15MEL57)	
15MEL57.1	Estimate the coefficient of friction and head losses in pipes and forces developed by impact of jet on vanes
15MEL57.2	Experiment with different types of flow measuring devices.
15MEL57.3	Evaluate performance of power generating fluid machines
15MEL57.4	Evaluate performance of power absorbing fluid machines
15MEL57.5	Evaluate the performance of Reciprocating compressor and air blower
FINITE ELEMENT METHOD(15ME61)	
15ME61.1	Identify the basic procedures implemented in FEM along with reduction of execution time and memory requirements for given engineering problem
15ME61.2	Construct the basic algorithms or numerical procedures to solve simple bar and truss problems subjected to axial loading
15ME61.3	Make use of finite element matrix to solve lateral and torsional loaded members confined to regular shapes
15ME61.4	Construct the fundamental numerical procedures required to solve thermal and fluid flow problems confined to simple loading conditions
15ME61.5	Establish a relation between mass and stiffness matrix to solve dynamic problems along with axisymmetric ring elements
COMPUTER INTEGRATED MANUFACTURING(15ME62)	
15ME62.1	Interpret the concept of mathematical models of automation in production systems and automated flow lines, to optimize the process of CAD/CAM/CIM.
15ME62.2	Outline the different transformation methods for entities in computer graphics and process planning of material requirement, quality and shop floor control.
15ME62.3	Explain the applications of Flexible Manufacturing Systems, AS/RS and interpret the automated flow lines to reduce down time and enhance productivity
15ME62.4	Illustrate the part programs for simple jobs on CNC machine tools and robot programming.
15ME62.5	Interpret the concept of mathematical models of automation in production systems and automated flow lines, to optimize the process of CAD/CAM/CIM.

Heat Transfer(15ME63)	
15ME63.1	Identify the three modes of heat transfer and construct conduction heat transfer equations for composite bodies make use of both sizing and rating methods
15ME63.2	Construct the fins to enhance heat transfer from a surface and solve for unsteady heat conduction rate
15ME63.3	Select the type of correlation to be used suitably so as to experiment with convection heat transfer coefficient for various applications
15ME63.4	Utilize the methods, to find the exit temperature of fluid and size of heat exchangers, also identify the effect of cavitation and fouling due to boiling and condensation of fluid
15ME63.5	Analyze two-dimensional heat conduction equations and examine the radiation heat transfer rate from black bodies, real surfaces and thermal shield.

DESIGN OF MACHINE ELEMENTS –II(15ME64)

15ME64.1	Discuss the different types of springs and its corresponding stress induced in them.
15ME64.2	Design spur and helical gears using beam strength or Lewis equation and also analysis gear teeth to dynamic and wear loads.
15ME64.3	Design of bevel and worm gears, the significance of formative number of teeth, efficiency of the worm gears.
15ME64.4	Design of different types of clutches like single and multi plate clutches. Self locking and heat generated in different types of brakes.
15ME64.5	Design of journal bearings using Petroff's equation and Mckee equation, concept of hydrodynamic theory of lubrications. Stress in curved beams.

METAL FORMING(15ME653)

15ME653.1	Utilize the basic and unique characteristics of metals that lead to plastic deformation as a processing strategy in metal working
15ME653.2	Identify the effect of process parameters on the process mechanics during bulk metal forming
15ME653.3	Apply metal forming processes like drawing and Rolling to get the knowledge of manufacturing the product
15ME653.4	Select the approaches to identify steps involved in manufacturing the product by Extrusion & Sheet Metal Forming process
15ME653.5	Identify the methods and applications in High Energy Rate Forming Methods & Powder Metallurgy

Total Quality Management(15ME664)

15ME664.1	Interpret the Principles, Practice, and frame work of TQM. Understand the QMS Functions in the organizations. Interpret different ISO standards and their requirements
15ME664.2	Illustrate the Leadership characteristics and able to describe the contributions of eminent personalities of TQM. And Able showcase the importance of communication and decision making.
15ME664.3	Identify the importance of Customer Satisfaction and Customer Involvement for any successful business. Demonstrate the importance of the employee involvement and techniques to improve the employee involvement.
15ME664.4	Make use of the different Quality Management Tools used for process improvement. Also can able use the Statistical Quality Control (SQC) tools and techniques to

	optimize the process for the successful process outcome.
15ME664.5	Demonstrate the Management Concepts like of Benching marking, environmental management system, and Quality function deployment, quality by design, failure mode and effect analysis, product liability, total productive maintenance.
HEAT TRANSFER LAB(15MEL67)	
15MEL67.1	Perform experiments to determine the thermal conductivity of a metal rod
15MEL67.2	Estimate the effective thermal resistance in composite slabs and efficiency in pin-fin
15MEL67.3	Conduct experiments to determine convective heat transfer coefficient for free and forced convection and correlate with theoretical values
15MEL67.4	Determine surface emissivity of a test plate and Steffan Boltzman Constant
15MEL67.5	Determine LMDT and Effectiveness in a Parallel Flow and Counter Flow Heat Exchangers Estimate performance of a Vapour Compression Refrigeration.
Modelling and Analysis Laboratory(15MEL68)	
15MEL68.1	Understand the basic concepts of representation of engineering problems in to one dimensional modeling and analysis.
15MEL68.2	Solve truss problems using one dimensional concept
15MEL68.3	Solve bending moment and shear force representation for various loading cases. Solve rectangular plate with a circular hole problem under uni-axial loading.
15MEL68.4	Solve thermal problems using one dimensional and two dimensional FEA concepts
15MEL68.5	Solve Dynamic problems through one dimensional FEA concept.
Energy Engineering(15ME71)	
15ME71.1	Summarize the basic concepts of Thermal energy systems, Diesel power plant, Hydel power plant, renewable energy sources and their utilization.
15ME71.2	Understand the basic concepts of solar energy, Green energy, zero energy and energy from alternate sources.
15ME71.3	Apply the basic concepts for Thermal and Hydel power plant.
15ME71.4	Make use of the basic concepts solar and wind energy to analyse it.
15ME71.5	Identify the concepts and applications of Bio mass energy, Green energy and zero energy.
Fluid Power System(15ME72)	
15ME72.1	Identify the components of fluid power system (Hydraulic & Pneumatic) with different types of fluids for industrial applications
15ME72.2	Select the types of pumps and actuators for various applications
15ME72.3	Distinguish the types of control valves used in fluid power system with circuit design
15ME72.4	Compare the pneumatic control valves with the hydraulic system

15ME72.5	Examine an appropriate hydraulic or pneumatic circuit or combination circuit like electro-hydraulics, electro-pneumatics for a given application
Control Engineering(15ME73)	
15ME73.1	Explain concepts of loop systems and different types of controllers.
15ME73.2	Construct mathematical models to understand transfer function of mechanical, electrical and hydraulic control systems with block diagrams and SFG.
15ME73.3	Build the concept of transient and steady state system and solve frequency response analysis.
15ME73.4	Solve Bode plots and Root locus plots for frequency response analysis.
15ME73.5	Develop state equation of linear continuous data for controllability and observability.
MECHATRONICS(15ME753)	
15ME753.1	Explain the concepts of Mechatronics, Transducers, Microprocessor and Microcontrollers.
15ME753.2	Illustrate the architecture of the Microprocessor, Operation of PLC's and Mechanical, Electrical, Pneumatic and Hydraulic Actuation systems.
15ME753.3	Interpret the working principle and application of sensors and Explain the different parts of Industrial Robot components & its functional requirements.
15ME753.4	Apply the concept of ladder diagram and latching for the selection of a PLC.
15ME753.5	Illustrate the working of different types of Pneumatic and Hydraulic actuators and control valves.
DESIGN LABORATORY(15MEL76)	
15MEL76.1	To determine the natural frequency, logarithmic decrement, damping ratio and damping coefficient in a SDOF systems subjected to longitudinal and torsional vibrations.
15MEL76.2	To construct force and couple polygons to balance the rotating masses.
15MEL76.3	To utilize the principles of photo elasticity and determine the fringe constant and stress concentration of photo elastic materials subject to different loads.
15MEL76.4	To calculate equilibrium speed, sensitiveness, power and effort of Porter and Hartnell Governor.
15MEL76.5	To obtain Pressure distribution in Journal bearing and find the critical speed of a rotating shaft.
CIM and Automation LAB(15MEL77)	
15MEL77.1	Explain the concepts of Computer Integrated manufacturing and Classify NC,CNC and DNC systems.
15MEL77.2	Develop manual part programs to perform milling, drilling and turning operations in design, simulation and manufacturing.
15MEL77.3	Analyze the Simulation of Tool Path for different Machining operations of small components using CNC Lathe & CNC Milling Machine.
15MEL77.4	Identify the concepts of flexible manufacturing systems like Automatic storage and Retrieval system and utilize Robot programming language for simple operations such as pick and place, stacking objects using teach pendent and off line programming.

15MEL77.5	Apply the knowledge of pneumatics and hydraulics to demonstrate the related experiments
OPERATION RESEARCH(15MEL81)	
15ME81.1	Understand the concepts of operations research modelling approaches.
15ME81.2	Develop mathematical skills to analyse and solve network models arising from a wide range of applications.
15ME81.3	Solve engineering and managerial situations as Transportation and Assignment problems.
15ME81.4	Analyze and Solve problems of sequencing of production runs , use Game theory to identify the optimal strategies for players and solve problems on queuing theory
15ME81.5	Analyze and solve engineering and managerial situations as LPP
ADDITIVE MANUFACTURING(15MEL82)	
15ME82.1	Understand the different processes of Additive Manufacturing
15ME82.2	Explain system drives and devices and actuators
15ME82.3	Explain the additive manufacturing process by polymerization and powder metallurgy
15ME82.4	Classify nanomaterial and its characterization techniques
15ME82.5	list various NC, CNC machine programming and automation techniques
Product Life Cycle Management(15MEL835)	
15ME835.1	Explain Product Life Cycle Management(PLM) and Product Design Management(PDM) processes, also recognize various views, components, strategies and implementation methods of PLM and PDM
15ME835.2	Understand the concept of Product Design in detail understand the product design process and strategies. Explain modeling and simulation in product
15ME835.3	Recognize the steps involved in new product development, explain how a decision support system is built and illustrate new product financial control measures. Also understand the concept of redesign of product
15ME835.4	Explain the concept of technology forecasting, integration of technological product innovation and product development in business processes within enterprises. Also recognize morphological methods and flow diagram
15ME835.5	Understand Product building and structures. Explain the use of virtual product development tools like 3D CAD systems, digital mock up, model building and model analysis
PROJECT WORK(15MEL85)	
15ME85.1	Interact with various industries and identify real world problem statement / identify problems in engineering and technology in selected field of interest.
15ME85.2	Synthesize and apply the mechanical knowledge of engineering to design and implement solutions to open-ended problems

15ME85.3	Design and Develop the concept with mechanical Engineering practices and standards.
15ME85.4	Use different tools for communication, design, implementation, testing and report writing.
15ME85.5	Analyzing professional issues, including ethical, legal, environmental and safety issues, related to project.
15ME85.6	Develop better interpersonal communication skills, presentation skills, team work and leadership qualities.

DEPARTMENT OF TELECOMMUNICATION ENGINEERING

PROGRAM SPECIFIC OUTCOMES

PSO1: Ability to understand basic concepts, analyze subsystems/modules and apply them in various fields like signal processing, networking and communication.

PSO2: Should be able to associate the learning, understand the published literature and project work effectively

COURSE OUTCOMES

COURSE: ENGG. MATHEMATICS – III		COURSE CODE:
17MAT31		
17MAT31.1	Make use of Fourier series to analyze wave forms of periodic functions	
17MAT31.2	Make use of Fourier transforms and Z - transforms to analyze wave forms of non-periodic functions	
17MAT31.3	Identify statistical methods to find correlation and regression lines, also numerical methods to solve transcendental equations.	
17MAT31.4	Utilize Numerical techniques for various finite difference technique problems	
17MAT31.5	Construct Greens, divergence and Stokes theorems for various engineering applications. Solve the problems on signals and systems, heat conduction, and control; engineering by using various numerical techniques.	
Course: COMPUTER ORGANIZATION AND ARCHITECTURE		
Type: Core	Course Code:18EC35	
18EC35.1	Explain the operations of major subsystems of computer	
18EC35.2	Illustrate Addressing modes and other operations used in assembly language.	
18EC35.3	Discuss interrupts and its service routines for accessing I/O devices	
18EC35.4	Summarize memory hierarchy and concept of virtual memory.	
18EC35.5	Make Use Of instructions for a simple processor organization based on hardwired control and micro programmed control	
Course: Analog Circuits		
Type: Core	Course Code:17EC33	
17EC33.1	Evaluate the working principle, characteristics, DC biasing and AC analysis of BJT using re and h parameters models for CE and CC configuration.	
17EC33.2	Evaluate the working principle and characteristics JFETs and MOSFETs also obtain AC analysis of FET configuration.	
17EC33.3	Determine the parameters which affect the low frequency and high frequency responses of BJT and FET amplifiers, draw the characteristics and also determine the parameters which affect the low frequency and high frequency responses of BJT and FET amplifiers.	
17EC33.4	Evaluate the working principle of feedback concept and design different types of oscillators using BJT/FET/UJT.	
17EC33.5	Evaluate the efficiency of Class A and Class B power amplifiers and analyze voltage regulator circuits.	

Course: Electronic Instrumentation	
Type: Core	Course Code: 17EC32
17EC32.1	Identify the instrument measurement errors and calculate them.
17EC32.2	Identify the operation of analog and digital voltmeters and develop circuits for the same.
17EC32.3	Identify functioning of oscilloscopes, signal generators and transducers.
17EC32.4	Evaluate functional concepts and operation of various analog measuring instruments and utilize AC and DC bridges for measuring various parameters.
17EC32.5	Evaluate transducers, strain gauges, LVDT, photo cell, photo voltaic cell, semiconductor photo diode and transistors.
COURSE: ANALOG ELECTRONICS LAB COURSE CODE: 17ECL37	
17ECL37.1	Design different applications of Diode such as and Test of rectifiers, clipping circuits, clamping circuits and voltage regulators.
17ECL37.2	Analyze the parameters from the characteristics of JFET and MOSFET devices
17ECL37.3	Analyze the Design amplifiers and obtain the frequency response, i/p & o/p impedance and Bandwidth using BJT and FET
17ECL37.4	Test the Designed power amplifier circuit
17ECL37.5	Make use of BJT or FET to design various types of oscillators
COURSE: DIGITAL ELECTRONICS LAB COURSE CODE: 15ECL38	
15ECL38.1	Experiment with design of basic & derived gates using universal gates
15ECL38.2	Solve SOP & POS Expressions using universal gates
15ECL38.3	Analyze various combinational circuits
15ECL38.4	Analyze various sequential circuits
15ECL38.5	Experiment with simulation of combinational& sequential circuits using p-spice
COURSE: ENGG. MATHEMATICS – IV COURSE CODE: 17MAT41	
17MAT41.1	Apply Numerical methods to obtain the solution of fist order and first degree differential equations.
17MAT41.2	Make use of probability theory on discrete and continuous random variables to obtain the solution of problems on different distributions and joint probability distribution.
17MAT41.3	Identify the problems on sampling distribution and on markov chains in attempting the engineering problems for feasible random events.
17MAT41.4	Utilize the Bessel's and Legendre functions for the problems arising in engineering fields.
17MAT41.5	Construct the analytic functions. Calculate residues and poles of complex potentials in flow problems. Solve the problems on electromagnetic theory

	hydrodynamics, heat conduction, optimization of digital circuits, coding theory and stability analysis of the systems
Course: Linear Integrated Circuits	
Type: Core	Course Code: 17EC45
17EC45.1	Explain Op-Amp circuit parameters and design direct coupled Voltage Follower Inverting, Non-inverting, Summing & Difference Amplifier
17EC45.2	Design capacitor coupled Voltage Follower Inverting, Non-inverting, and Summing & Difference Amplifier also Test circuits of Op-Amp based Voltage/ Current Sources & Sinks, Current, Instrumentation and Precision Amplifiers.
17EC45.3	Test circuits of Op-Amp based linear and non-linear circuits comprising of limiting, clamping, Sample & Hold, Differentiator/ Integrator Circuits, Peak Detectors, Oscillators and Multiplier & Divider.
17EC45.4	Design first & second order Low Pass, High Pass, Band Pass, Band Stop Filters and Voltage Regulators using Op-Amps.
17EC45.5	Explain applications of linear ICs in phase detector, VCO, DAC, ADC and Timer.
Course: Signals and Systems	
Type: Core	Course Code:17EC42
17EC42.1	Classify the signals as continuous/discrete, periodic/aperiodic, even /odd, energy/power and deterministic/random signals.
17EC42.2	Identify the linearity, causality, time-invariance and stability properties of continuous and discrete time systems.
17EC42.3	Utilize the response of a Continuous and Discrete LTI system using convolution integral and convolution sum.
17EC42.4	Solve the spectral characteristics of continuous and discrete time signal using Fourier analysis.
17EC42.5	Make use of Z-transforms, inverse Z-transforms and transfer functions to analyze the complex LTI systems

Course: Engineering Electromagnetics	
Type: Core	Course Code: 17EC36
17EC36.1	Interpret the problems on electric field due to point, linear, volume charges by applying conventional methods or by Coulombs law.
17EC36.2	Make use of Gauss law, potential and energy to determine the energy expended and potential difference with respect to point charge.
17EC36.3	Develop the capacitances using Laplace equations and determine the current distributions, Biot-Savart Law, Ampere's Law and Strokes theorem.
17EC36.4	Utilize the concepts of magnetic Forces and Materials to determine magnetic fields, forces, and potential energy.
17EC36.5	Examine time varying fields, EM waves in free space, conductors and power associated with EM waves using Maxwell's equations and Poynting theorem.
Course: CONTROL SYSTEMS	
Type: Core	Course Code: 17EC43
17EC43.1	Determine transfer function of various physical systems using different methods and understand the different types of control systems
17EC43.2	Identify different time response specifications of first and second order systems and understand the types of steady state errors.
17EC43.3	Make use of RH criteria and root locus to study the systems stability
17EC43.4	Make use of frequency domain analysis and study stability of the systems
17EC43.5	Make use of concepts of state, state variables and obtain the state model of the system. Also understand the basics of digital control system

Course: Principles of Communication Systems	
Type: Core	Course Code: 17EC44
17EC44.1	Understand simple systems for generating and demodulating AM, DSB, SSB and VSB signals.
17EC44.2	Applying the concepts in Angle modulation for the design of communication systems.
17EC44.3	Understand the concepts of random process and various types of noise.
17EC44.4	Evaluate the performance of the communication system in presence of noise.
17EC44.5	Obtain the knowledge of pulse modulation and sampling techniques.
COURSE: MICROPROCESSOR LAB COURSE CODE: 17ECL47	
17ECL47.1	Apply knowledge of addressing modes and instruction set to perform arithmetic, logical and bit manipulations.
17ECL47.2	Analyze and implement modular programming concepts using procedures and macros.
17ECL47.3	Illustrate the interaction of user with processor using DOS interrupts.
17ECL47.4	Analyze the applications of processor in controlling various external devices.
17ECL47.5	Analyze program using string, branch and loop instructions.
Course: Microprocessors	
Type: Professional Core	Course Code: 17EC46
17EC46.1	Explain the architecture of 8086 and illustrate the basic instructions of 8086 with example programs.
17EC46.2	Identify 8086 Instructions and make use of assembler directives to write assembly level programs.
17EC46.3	Make use of Stack, Interrupts, macros and procedures and develop some modular programs.
17EC46.4	Construct the circuits using basic peripherals and interfacing with 8086 by applying bus configuration timings.
17EC46.5	Choose appropriate INT 21 DOS interrupt function calls in programming of ADC/DAC and also identify the architecture of 8087/8088.
COURSE: Linear ICs and Communication Lab COURSE CODE: 17ECL48	
17ECL48.1	Illustrate the pulse and flat top sampling techniques using basic circuits.
17ECL48.2	Design and analyze the operation of instrumentation amplifier, DAC and oscillators using linear IC
17ECL48.3	Design and analyze the operation of LPF and HPF using linear IC
17ECL48.4	Analyze addition and integration using linear ICs, and 555 timer operations to generate signals/pulses
17ECL48.5	Demonstrate AM and FM operations and frequency synthesis.
Course: Management and Entrepreneurship Development	

Type: Core	Course Code: 15ES51
15ES51.1	Explain the fundamental concepts of Management and Entrepreneurship
15ES51.2	Develop the components in developing a business plan
15ES51.3	Identify the functions of Managers, Entrepreneurs and their social responsibilities
15ES51.4	Determine a best Entrepreneurship model for the required domain of establishment
15ES51.5	Survey the Institutional support by various state and central government agencies

Course: Digital Signal Processing

Type: Core	Course Code:15EC52
15EC52.1	Develop knowledge on Discrete Fourier transform and its properties
15EC52.2	Analyze Fast Fourier transform (decimation in time and decimation in frequency) algorithms for efficient computation of DFT
15EC52.3	Construct analog IIR filters (butterworth and chebyshev filter) for various specifications
15EC52.4	Develop methods of converting analog filters to digital filters
15EC52.5	Analyze FIR filter using window technique and frequency sampling technique and realization of filter structure using different methods(DF-I, DF-II, Cascade, Parallel etc.

Course: Verilog HDL

Type: CORE	Course Code:17EC53
17EC53.1	Utilize the concept of Hierarchical Modeling and understand the fundamentals of Verilog HDL in designing Digital circuits.
17EC53.2	Identify different types of data types, system tasks, compiler directives in Verilog and utilize them in modeling Verilog code.
17EC53.3	Plan a digital design using gate level modeling and data flow modeling.
17EC53.4	Model Verilog module using behavioral modeling in Verilog and Make use of VHDL concepts in designing Digital circuits.
17EC53.5	Model test benches to Verify the functionality of digital design.

Course: Information Theory & Coding

Type: Core	Course Code:15EC54
15EC54.1	Organize the concept of Dependent & Independent Sources to measure information content of messages, Entropy, and Rate of Information.
15EC54.2	Construct the source encoder using Shannon Encoding, Shannon Fano, Prefix and Huffman Encoding Algorithms.
15EC54.3	Model the continuous and discrete communication channels using input, output and joint probabilities.
15EC54.4	Construct codeword comprising of the check bits computed using Linear Block codes , cyclic codes & construction of second extension of code words

15EC54.5	Construct the encoding and decoding circuits for convolutional codes, BCH and Golay codes.
Course: OPERATING SYSTEMS	
Type: ELECTIVE	Course Code:17EC553
17EC553.1	Identify the services provided by an operating system.
17EC553.2	Analyze how processes are synchronized and scheduled
17EC553.3	Identify different approaches of memory management and virtual memory management.
17EC553.4	Infer the structure and organization of the file system
17EC553.5	Analyze the inter process communication and deadlock situations.
Course: OBJECT ORIENTED PROGRAMMING USING C++	
Type: ELECTIVE	Course Code:17EC562
17EC562.1	Identify basics of OOP concepts used in problem solving
17EC562.2	Solve simple mathematical problems using OOP concepts like class and functions
17EC562.3	Apply the concepts of overloading, Constructors and Destructors in problem solving
17EC562.4	Examine virtual functions, encapsulation, Polymorphism and Inheritance used in problem solving
17EC562.5	Analyze problems and simulate system models that work with streams and files.
COURSE: DSP LAB COURSE CODE: 17ECL57	
17ECL57.1	Analyze the concepts of analog to digital conversion of signals and frequency domain sampling and computation of DFT and IDFT of the signals
17ECL57.2	Develop correlation and convolution between signals.
17ECL57.3	Construct Impulse response, Step response and steady state response of any system
17ECL57.4	Analyze filter specifications(IIR and FIR) and design the same using Matlab
17ECL57.5	Develop knowledge on TMS320C6713 processor and acquire ability to program.
COURSE: HDL Lab COURSE CODE: 15ECL58	
15ECL58.1	Apply Verilog /VHDL programs to simulate Combinational circuits in Dataflow, Behavioral and Gate level Abstractions.
15ECL58.2	Analyze sequential circuits like flip flops and counters in Behavioral description and obtain simulation waveforms.

15ECL58.3	Analyze Combinational and Sequential circuits on programmable ICs and test the hardware.
15ECL58.4	Utilize the hardware to the programmable chips and obtain the required outputs.
15ECL58.5	Test an ALU that checks for all the operations through simulation waveforms.
Course: ARM MICROCONTROLLER AND ES	
Type: Professional Elective-2	Course Code:17EC62
17EC62.1	Develop the architectural features and instruction set of 32 bit microcontroller
17EC62.2	Analyze ARM cortex M3 using various instructions and C language
17EC62.3	Identify the basic hardware components
17EC62.4	Build the software hardware design approaches
17EC62.5	Analyze the need of RTOS for embedded system applications
Course: Digital Communication	
Type: Core	Course Code: 17EC61
17EC61.1	Inspect the various bandpass signals and analyze its characteristics with detail study of lines codes.
17EC61.2	Apply Gram Schmidt procedure and utilize optimum receivers using coherent detection
17EC61.3	Build the various Digital Modulation and demodulation techniques and to study its various parameters.
17EC61.4	Organize Communication through Band limited channels to model the correlative coding
17EC61.5	Illustrate the principles of spread spectrum techniques
Course: Microwave Theory and Antenna	
Type: Core	Course Code: 15TE63
15TE63.1	Identify the characteristic features and working principle of Microwave Tubes and analyze the transmission line characteristics.
15TE63.2	Develop S Parameters and analyze all microwave devices using S Parameters.
15TE63.3	Identify the design concept of Strip lines and antenna basics
15TE63.4	Identify the basic working principle and parameter effects Microwave sources & Point Sources arrays and Electric dipoles
15TE63.5	Analyze the features/parameters of Antennas & Antenna Arrays. Recommend suitable Antennas for various applications.
Course: COMPUTER COMMUNICATION NETWORKS	
Type: Core	Course Code:17EC64
17EC64.1	Identify different network models and different Layer services

	17EC64.2	Identify various protocols and LANs
	17EC64.3	Identify various connecting devices and services in network
	17EC64.4	Analyze various network layer protocols and algorithms
	17EC64.5	Compare services and applications of various protocols
Course: Image Processing		
Type: Professional Elective-2	Course Code:17TE655	
17TE655.1	Identify image formation and the role human visual system plays in perception of gray and color image data.	
17TE655.2	Make use of image processing techniques in spatial domain	
17TE655.3	Make use of image processing techniques in frequency (Fourier) domain and identify various noise models & filtering of noise	
17TE655.4	Identify the concepts of morphological image processing & image segmentation	
17TE655.5	Identify image analysis techniques in the form of image segmentation and to evaluate the Methodologies for segmentation.	
Course: DATA STRUCTURES USING C++		
Type: ELECTIVE	Course Code:17EC661	
17EC661.1	Build fundamentals of data structures and their applications essential for programming. Write C++ code for Linear list data structures using array and vector representations.	
17EC661.2	Develop singly linked lists and chains using C++. Array Representation and Linked Representation of Stacks. Apply the concepts for writing application programs.	
17EC661.3	Identify Array and Linked Representation of Queues, Dictionaries, Linear representation, Hash table representation. Apply the concept for writing the application programs.	
17EC661.4	Analyze Arrays, Matrices, Special matrices, Sparse matrices and write the abstract data type. Explain Trees, Binary trees, Properties and representation of binary trees, Common binary tree operations, Binary tree traversal the ADT binary tree and the class linked binary tree.	
17EC661.5	Examine Priority Queues, Linear lists, Heaps, Binary search trees operations and implementation. Apply the concept for writing application programs	
Course: Digital System Design using Verilog		
Type: Elective	Course Code: 15EC663	
15EC663.1	Construct Combinational and Sequential digital circuits by utilizing the concept of assumptions behind the digital abstraction and its constraints.	
15EC663.2	Identify different types of memories and errors; make use of error correcting and detecting algorithms to model a Verilog module.	

15EC663.3	Make use of the implementation of fabrics and select suitable fabric for the digital design.
15EC663.4	Model a Verilog module for input and output devices for an embedded system design.
15EC663.5	Make use of the design flow and optimization techniques to design test conceptual Verilog module.
Course: EMBEDDED MICROCONTROLLER LAB	
Course Code :15ECL67	
15ECL67.1	Analyze the software tool required for programming in Assembly and C language.
15ECL67.2	Analyze the instruction set of 32 bit microcontroller ARM Cortex M3, for programming in Assembly and C language.
15ECL67.3	Develop assembly language programs using ARM Cortex M3 for different applications.
15ECL67.4	Function external devices and I/O with ARM Cortex M3.
15ECL67.5	Develop C language programs and library functions for embedded system applications.
Course: CRYPTOGRAPHY AND NETWORK SECURITY	
Type: Core	Course Code:17TE71
17TE71.1	Identify foundations of cryptographic algorithms
17TE71.2	Choose the difference between various cryptographic algorithms
17TE71.3	Analyze the concepts of integrity and authentication in data security
17TE71.4	Categorize the basic foundations of network security at various layers
17TE71.5	Inspect use of the basic concept of ciphers in email, IP and network security
Course: IOT AND WSN	
Type: Elective	Course Code: 15EC752
15EC752.1	Model the architecture of WSN and IOT
15EC752.2	Compare the communication protocols which best suits in WSN &IOT
15EC752.3	Design the software for IOT application
15EC752.4	Analyze the design principles for WSN &IOT.
15EC752.5	Design and analyze the cloud computing and prototyping
Course: Multimedia Communication	
Type: Core	Course Code: 15EC741
15EC741.1	Explain the basics of different multimedia networks and applications

15EC741.2	Make use of digitization principle to identify different media types
15EC741.3	Identify compression techniques required to compress text and image and audio
15EC741.4	Identify compression techniques required to compress audio and video and networking terminology
15EC741.5	Obtain the knowledge about DMS and multimedia communication across different networks
COURSE: DC LAB COURSE CODE: 17TEL76	
15ECL78.1	Identify Time Division Multiplexing.
15ECL78.2	Design the Digital Modulation Techniques.
15ECL78.3	Generate Line codes for Signal Transmission and Analyze
15ECL78.4	Analyze the characteristics of an optical communication system.
15ECL78.5	Analyze the Digital Communication concepts, Compute and Display various parameters along with Plots/Figures.
COURSE: CCN LAB COURSE CODE: 15TEL77	
15TEL77.1	Make use of Network Simulator for learning & practice of networking concepts.
15TEL77.2	Model network with different configuration to measure performance parameters & analyze the results.
15TEL77.3	Design a network & animate it, to understand the working of various protocols and analyze the results.
15TEL77.4	Design data-link layer protocols using C/C++ programs.
15TEL77.5	Design networking security concepts, algorithms & protocols using C/C++ programs.
Course: Wireless Cellular and LTE 4G Broadband	
Type: Core	Course Code: 15EC81
15EC81.1	Make use of the system architecture and the functional standard specified in LTE 4G.
15EC81.2	Identify the role of the layer of LTE radio interface protocols and EPS Data convergence protocols to set up, reconfigure and release data and voice from users.
15EC81.3	Establish the UTRAN and EPS handling processes from set up to release including mobility management for a variety of data call scenarios.
15EC81.4	Identify the difference between uplink , down link and the physical layer procedures that provide the services to upper layers.
15EC81.5	Evaluate the Performance of resource management and packet data processing and transport algorithms.

Course: Fiber optics and Networks.	
Type: Core	Course Code: 17EC82
17EC82.1	Make use of optical laws for propagation of light through optical fibers and waveguides
17EC82.2	Analyze various losses in optical fibers
17EC82.3	Analyze the performance of Optical sources, detectors, couplers and connectors in fiber optic communication
17EC82.4	Classify active and passive components, optical amplifiers and networks ,WDM and analyze the performance of the same
17EC82.5	Analyze different protocols, routing networks and switching Networks for optical networks
Course: Machine Learning.	
Type: Elective	Course Code: 15EC834
15EC834.1	Identify the fundamental concepts of Machine learning and implement Find-S algorithm and Candidate elimination algorithm
15EC834.2	Categorize the fundamental concepts of Machine learning to learn decision tree representation and neural network
15EC834.3	Compare the Bayes Classifier and EM algorithm to solve the problems in Machine Learning.
15EC834.4	Examine K- Means algorithm and Instance based Learning for problems appear in Machine Learning and learn about inductive bias
15EC834.5	Inspect Back propagation algorithm, Gibbs Algorithms ,Estimating Hypothesis, and Reinforcement learning
Course: Ad hoc wireless networks	
Type: Core	Course Code: 15TE835
15TE835.1	Organize the unique issues in ad-hoc networks.
15TE835.2	Analyze current technology trends for implementation of ad-hoc wireless networks.
15TE835.3	Discover the challenges in designing MAC,routing and transport protocols for ad-hoc wireless networks.
15TE835.4	Inspect the challenges in designing routing and transport protocols for ad-hoc wireless networks.
15TE835.5	Identify the security and quality of service for ad-hoc networks.
COURSE: PROJECT WORK	
COURSE CODE: 17ECP85	

17ECP85.1	Plan the course of action and hypothesize the project work using literature survey.
17ECP85.2	Formulate the problem statement & invent possible solutions.
17ECP85.3	Prioritize solutions, select best solution & design the working model.
17ECP85.4	Demonstrate the working model and create the report.
17ECP85.5	Organize and coordinate in a team through effective communication.

COURSE: SEMINAR		COURSE CODE: 17ECP86
17ECP86.1	Compare and select seminar topic using literature survey.	
17ECP86.2	Compile & compare the literature & generate report.	
17ECP86.3	Explain the topic and defend the panel question.	
17ECP86.4	Communicate orally and in written format.	
17ECP86.5	Organize and coordinate through effective communication.	

Course: CMOS VLSI	
Type: Core	Course Code: 17TE73
17TE73.1	Analyze MOS transistor theory, nMOS and CMOS fabrication flow and CMOS Inverter characteristics.
17TE73.2	Make use of MOSFETS, concept of design rules for stick diagram and layouts in physical design aspects and identify area capacitances and delays.
17TE73.3	Identify scaling models, scaling factors for device parameters and general considerations in design process.
17TE73.4	Analyze the CMOS subsystems and architectural issues with the design constraints, FPGA based systems and BiCMOS technology.
17TE73.5	Analyze ALU subsystems, different types of Memory elements along with area considerations and utilize testing and testability issues in VLSI design.