

K S INSTITUTE OF TECHNOLOGY

| PROGRAM OUTCOMES (POs) | |
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| 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 | |
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| 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 |
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| 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. |
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| 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 |
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| 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. |
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| 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 |
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| 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 . |

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| 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 |
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| 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. |
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| 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. |
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| 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. |

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| 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 |
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| 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 |
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| 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 |
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| 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 |

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| 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 |
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| 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 |
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| 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 |
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| 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. |

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| 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. |
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| 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 |
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| 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. |
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| 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 |

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| 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. |
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| 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 |
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| 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. |
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| 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. |

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| CO5 | Make use of different logic formalism and decision taking in planning problem. |
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| 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 |
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| 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 |
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| 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 |
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| 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. |
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| 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. |
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| 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 |
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| 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. |
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| 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. |

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| CO5 | Solve Linear programming problems using another optimization technique (using dual simplex method) |
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| 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. |
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| 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 |
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| 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. |
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| 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. |

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| 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 |

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| CO3 | Develop BC technologies and Back up recovery and replication |
| CO4 | Analyze cloud computing characteristics and technologies |
| CO5 | Determine secure storage infrastructure and ILM |
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| 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. |
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| 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. |
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| 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 |
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| Course Name | Internet of Things And Applications |
| Course Code | 15CS81 |
| CO1 | Interpret propositional and predicate logic in knowledge representation and truth verification. |

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| 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 |
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| 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. |
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| 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 |
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| 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. |

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| CO5 | Discover record of work experience, adopt to the work habits and develop attitude necessary for job success. |
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| 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. |
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| 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. |
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| 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. |
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| 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 |
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| 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. |

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| CO4 | Discover the practical knowledge through different case studies. |
| CO5 | Inspect the data sets received through IoT devices and tools used for analysis. |
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| 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. |
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| 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. |

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| 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 |

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| 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 . |
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| 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. |
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| 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 | |
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| 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 |
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| 17EC33.1 | Identify the working principle and characteristics of BJT, FET, Single stage, cascaded and feedback amplifiers. |

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| 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. |

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| 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. |

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| 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 |
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| 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 |
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| 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 |
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| 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 |
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| 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. |

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| 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 |

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| 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 |

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| 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. |

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| 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 |
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| 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 |
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| 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 |
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| 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 |
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| 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 |
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| 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. |

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| 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. |

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| 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 |

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| 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. |

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

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| 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. |

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| 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. |

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| 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 |

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| 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 |

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| 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 |

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| 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. |

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| 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. |

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| 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 |

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| 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. |

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| 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. |

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| 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. |

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| 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 |

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| 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. |

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| 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 |
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| 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 |
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| 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 |
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| 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 |

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| 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 |

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| 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. |

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| 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 |
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| 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 |
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| 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 |
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| 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 |

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| 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 |

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| 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. |

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| Course code 15ECP78 | Course: PROJECT WORK PHASE 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. |

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| 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. |

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| 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. |

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| 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. |

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| 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 |

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| 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. |

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| 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. |

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| 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 |

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| 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 |

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| 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 | |
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| 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 | |
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| 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. |

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| 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 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 |
| 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 . |

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| 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. |

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| 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) | |
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| 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. |

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| 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) | |
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| 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)

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| 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)

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| 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)

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| 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 |

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| | 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 |

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| 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. |

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| 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 |

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| 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

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| 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. | |

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| 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 |

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| | 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 |

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| 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 |

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| 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 | |

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| 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

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| 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

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| 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

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| 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 |

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| 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. |

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| 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 |

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| | 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. | |

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| 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 |

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| 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. |

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| 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 | |

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| 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. |

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| 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. | |

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| 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. |