DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

COURSE OUTCOMES R 22 I YEAR

ENGLISH FOR SKILL ENHANCEMENT (D1HSE1)	
Course Outcomes:	
Upon completion of this course the student will be able to:	
1. Develop the skills to build vocabulary and use the words contextually.	L3
2. Experiment with the nature and style of sensible writing and learning how to describe people, objects places, events etc.	L3
3. Distinguish the different types of reading and appropriately identify and rectify grammatical errors.	L4
4. Interpret the meanings of texts and comprehend the style and tone of the writing of authors.	L5
5. Assess the importance of a passage text essay etc based on its moral and ethical values.	L5

LINEAR ALGEBRA AND ORDINARY DIFFERENTIAL EQUATIONS (D1BSM1)	
Course Outcomes:	
Upon completion of this course the student will be able to:	
1. Discuss the matrix representation of a set of linear equations and to analyses the solution of the system of equations.	L4
2. Apply the concept of matrices to reduce the quadratic form to canonical form using orthogonal transformation.	L3
3. Identify whether the given DE of first order is exact or not and utilizes the knowledge of ODE to solve problems on application of ODE.	L3
4. Solve higher order differential equation and apply the concept of differential equation to real World problems.	L3
5. Evaluate double integrals and apply them to compute the areas of regions.	L5

ENGINEERING CHEMISTRY (D1BSEC1)	
Course Outcomes:	
Upon completion of this course the student will be able to:	
1. Applying the concepts of Molecular Orbital Theory for predicting Molecular Orbital Energy level diagrams and Bond strengths.	L3
2. Apply analytical techniques to assess water quality for Industrial and Domestic applications.	L3
3. Student will learn the battery chemistry principles and construction, also learn the concepts of Corrosion and preventive methods.	L3
4. Students will analyze the properties and Calorific value of various fuel	L4
5. Explore Knowledge of Polymer materials and their properties for Engineering applications.	L3

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C PROGRAMMING FOR PROBLEM SOLVING (D1ESCP1)	
Course Outcomes:	
Upon completion of this course the student will be able to:	
1. Develop programs using the taxonomy of C Programming Language: Data types, Operators, Expressions, selection and repetition statements.	L3
2. Utilize arrays, functions, recursion, scope, storage classes in developing C programs, implement stacks and queues and apply search and sorting algorithms on arrays.	L3
3. Construct C programs using pointers and strings.	L3
4. Develop C programs using structures, unions and analyze preprocessor commands and command line arguments.	L4
5. Develop C programs for various applications using file I/O functions.	L3

IT WORKSHOP AND ELEMENTS OF COMPUTER ENGINEERING (D1ESITW1)	
Course Outcomes:	
Upon completion of this course the student will be able to:	
1. Apply knowledge for computer assembling and software installation.	L3
2. Solve the trouble shooting problems.	L4
3. Apply the tools for preparation of PPT, Documentation and budget sheet and Develop Standard documents, research documents and project plans using Latex.	L3

COMPUTER AIDED ENGINEERING GRAPHICS (D1ESCEG)	
Course Outcomes:	
Upon completion of the course the student will be able to	
1. Apply computer-aided drafting tools and conventional methods to create engineering curves.	L3
2. Acquire skills to sketch projections of points, lines and planes.	L3
3. Learn to use computer-aided graphics and conventional drafting methods for drawing projections of solids and auxiliary views.	L3
4. Acquire skills in the development of surfaces for the right regular solids like prisms and pyramids.	L3
5. Learn using computer-aided graphics and conventional methods for drafting Orthographic and Isometric views of lines, planes, and simple and compound solids.	L3

ENGLISH LANGUAGE AND COMMUNICATION SKILLS LAB (D1HSE2)	
Course Outcomes:	
Upon completion of the course the student will be able to:	
1. Build the capability to listen and interpret a text and participate in situational dialogues.	L3
2. Develop the skills to pronounce words appropriately and understand the significance of learning phonetics.	L3
3. Distinguish between wrong and right accent and use intonation in sentences aptly.	L4
4. Compare the differences between spoken and written communication.	L5
5. Assess various skills used to make a presentation effective and also develop confidence in facing interviews.	L5

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ENGINEERING CHEMISTRY LAB (D1BSEC2)	
Course Outcomes	
Upon completion of this course the student will be able to:	
1. Analyze the parameters like hardness in water by complexometric method.	L4
2. The Students will able to calculate the concentration of given solutions by using Instrumentation techniques such as Potentiometry and Conductometry.	L3
3. Determine physical properties such as surface tension and viscosity of various liquids.	L3
4. Synthesis of Bakelite using basic preparatory technique.	L4
5. Determination of Rf value by using Thin layer chromatography technique (TLC).	L3

C PROGRAMMING FOR PROBLEM SOLVING LAB (D1ESCP3)	
Course Outcomes	
Upon completion of this course the student will be able to:	
1. Develop C programs to solve mathematical and scientific problems.	L3
2. Develop C programs to work on files.	L3
3. Construct C programs to understand the memory allocation functions.	L3

BUSINESS ECONOMICS AND FINANCIAL ANALYSIS (DHSBF)	
Course Outcomes:	
Upon completion of this course the student will be able to:	
1. Analyze the total structure of the business and able to identify and classify the Different types of business entities.	L3
2. Assess the demand and supply analyses with the help of various measures and types of Elasticity of demand.	L3
3. Evaluate the knowledge about production and cost analysis for product and services.	L2
4. Interpret the fundamental concepts related to financial accounting	L2
5. Predict the financial position by analyzing the financial statement of the company through various ratios	L3

STATISTICAL METHODS AND VECTOR CALCULUS (D2BSM5)	
Course Outcomes:	
Upon completion of the course this student will be able to:	
1. Apply Statistical logic for solving the problems.	L3
2. Analyse the qualitative & quantitative data.	L4
3. Analyse the time series f or the given data	L4
4. Explain and compute derivatives of vector valued functions, gradient Functions	L5
5. Evaluate the line-surface and volume integrals and converting them from one to another.	L5

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APPLIED PHYSICS (D2BSAP1)	
Course Outcomes:	
Upon completion of this course the student will be able to:	
1. Apply the basic principle of quantum mechanics to understand quantum physics in the field of physics.	L3
2. Classify the materials on the basis of energy gap, by understanding the fundamentals of band theory of solids.	L4
3. Apply the physics behind the semiconductors enables the students to use them in engineering applications.	L3
4. Analyzing the various categories of opto-electronic, dielectric, and display materials to determine how they can be used in different technical and engineering applications.	L4
5. Explore fiber optics and quantum information enables the students to apply them in systems like optical communications and advanced quantum communication.	L4

BASIC ELECTRICAL ENGINEERING (D2ESBEE)	
Course Outcomes:	
Upon completion of this course the student will be able to:	
1. Analyze DC circuits and various theorems.	L4
2. Analyze AC circuits using basic principles.	L4
3. Apply knowledge of transformer principles to understand its characteristics and predict performance in various scenarios.	L4
4. Draw the characteristics and performance metrics of electrical machines to optimize their usage in practical applications.	L4
5. Describe the applications of different electrical installations and analyze their practical implications.	L4

DATA STRUCTURES (D2ESDS)	
Course Outcomes:	
Upon completion of the course the student will be able to:	
1. Analyze time and space complexity of various problems and distinguish various datastructures.	L4
2. Identify various Abstract Data Types and their applications.	L3
3. Utilize concepts and techniques related to Binary Trees, Priority queues, sets and unions ADTs to Solve complex data structure problems.	L3
4. Analyze and implement various kinds of searching and sorting techniques	L4
5. Apply advanced data structures and graph theory concepts to design and implement efficient Solutions for complex problems.	L3

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APPLIED PHYSICS LAB (D2BSAP2)	
Course Outcomes:	
Upon completion of the course the student will be able to:	
1. Illustrate the V-I characteristics of Laser diode.	L3
2. Evaluate the numerical and bending loss of given optical fiber.	L3
3. Analyze the V-I characteristics of LED and photodiode devices.	L4
4. Illustrate the type of semiconductor by using Hall Effect experiment.	L3
5. Calculate the Plank9s constant using Photocell.	L3

BASIC ELECTRICAL AND SIMULATION LAB (D2ESBES)	
Course Outcomes:	
Upon completion of this course the student will be able to:	
1. Assess various laws to solve electrical networks.	L3
2. Design of theorems using MATLAB software	L3
3. Verify network theorems to solve complex electrical networks.	L3
4. Evaluate the performance of different types of Electrical machines and single phase transformer by conducting various tests	L3
5. Design electrical installations using different lamp controlled methods, staircase wiring and different wiring connection	L3

DATA STRUCTURES LAB (D2ESDSL)	
Course Outcomes:	
Upon completion of the course the student will be able to:	
1. Apply various searching and sorting techniques for solving the given problems.	L3
2. Apply various data structures such as stacks, queues, search trees, and hash tables to solve the computing problems.	L3
3. Implement different disjoint set operations and k-d trees.	L3

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

COURSE OUTCOMES- II YEAR R22

PROBABILITY AND STATISTICS (D3BSPS1)	
Course Outcomes:	
Upon completion of the course the student will be able to:	
1. Random variables and various discrete and continuous probability distribution and their properties to solve the problems.	L3
2. Construct interval estimations of Mean and Proportion of large samples.	L3
3. Analyze important decisions s for few samples which are taken from a large data.	L4
4. Test the hypothesis and give the inference to the given data.	L4
5. Applying statistical methods of studying data sample.	L3

SEMICONDUCTOR DEVICES & CIRCUITS (D3ESSD1)	
Course Outcomes:	
Upon completion of the Course, the students will be able to:	
1. Learn and analyze the PN junction behavior at the circuit level and its role in the operation of diodes.	L4
2. Demonstrate the special purpose devices to analyze their behavior for various applications.	L4
3. Design and analyze simple rectifiers and filters using diodes and passive components.	L5
4. Analyze the operation of BJT, classify various configurations and biasing techniques of BJT.	L4
5. Analyze the simple JFET and MOSFET circuits.	L4

PYTHON PROGRAMMING (D3ESPP2)	
Course Outcomes:	
Upon completion of this course the student will be able to:	
1. Apply Python programming concepts to develop functional scripts and analyze the structure, functionality, and efficiency of Python programs to solve real-world problems.	L3
2. Apply various operators, conditional statements and control statements in Python to develop functional programs.	L3
3. Analyze the implementation of Python functions and data structures to ensure proper functionality, readability, and performance.	L4
4. Apply file handling techniques in Python to develop organized and efficient code, and utilize import statements to integrate modules and packages.	L3
5. Analyze object-oriented programming principles and exception handling mechanisms in Python to design robust, maintainable, and error-resistant applications.	L4

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MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE (D53PC1)	
Course Outcomes:	
Upon completion of this course the student will be able to:	
1. Apply mathematical logic to solve problems.	L3
2. Analyze the assertions using predicate logic.	L4
3. Analyze different properties of GCD using Division and Euclidean Algorithm.	L4
4. Analyze the basic terminology of functions, relations, sets and demonstrate knowledge of their associated operations.	L4
5. Analyze the importance of algebraic properties with regard to working within various number systems.	L4

COMPUTER ARCHITECTURE AND ORGANIZATION (D53PC2)	
Course Outcomes:	
Upon completion of this course the student will be able to:	
1. Make use of the concepts of computer organization	L3
2. Design and analyze the hardwired and micro-programmed control units and demonstrate 8086 architecture	L4
3. Analyze the computer arithmetic operations and write 8086 basic Assembly Language Programming.programs	L4
4. Analyze I/O data transfer modes and memory hierarchy.	L4
5. Analyze the concurrent processing	L4

COMPUTER NETWORKS (D53PC3)	
Course Outcomes:	
Upon completion of the course the student will be able to:	
1. Compare and contrast different network models and their significance in networking architecture.	L4
2. Develop elementary protocols by applying the knowledge of principles of framing and error control to Design robust and reliable data link layer protocols.	L4
3. Make use of various routing algorithms and Analyze them to design efficient and scalable network architectures.	L4
4. Analyze and compare the Transmission Control Protocol (TCP) and User Datagram Protocol (UDP) in terms of their features and Evaluate congestion control algorithms.	L4
5. Utilize the knowledge related to application layer protocols to ensure seamless interaction and data exchange in online environment.	L3

PYTHON PROGRAMMING LAB (D3ESPP5)	
Course Outcomes:	
Upon completion of this course the student will be able to:	
1. Apply fundamental programming elements: operators, statements, conditional and control flow statements.	L3
2. Solve python programs by using functions, python modules and data Structures.	L4
3. Apply oops concepts in Python to design and implement effective error and exception handling techniques.	L3

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SEMICONDUCTOR DEVICES AND CIRCUITS LAB (D3ESSD2)	
Course Outcomes	
Upon completion of this course the student will be able to:	
1. Design different electronic circuits for different applications using devices like Diodes, Transistors.	L3
2. Design circuits which can convert AC to DC.	L3
3. Design various transistor biasing circuits.	L3
4. Design different Amplifier Circuits.	L3

OBJECT ORIENTED PROGRAMMING THROUGH JAVA (D54PC4)	
Course Outcomes:	
Upon completion of this course the student will be able to:	
1. Acquire a comprehensive overview of the Java programming language and apply key Java buzzwords, inheritance concepts in practical programming situations.	L3
2. Analyze access protection mechanisms within packages to control visibility and encapsulation and develop programs by read from and write to files using Java's I/O capabilities.	L4
3. Make use of try-catch statements to handle exceptions and thread synchronization mechanisms effectively to write robust and resilient Java programs	L3
4. Analyze the Java Collections Framework for effective data manipulation and utility classes for specific tasks.	L4
5. Develop interactive and user friendly graphical applications using MVC architecture.	L3

DESIGN AND ANALYSIS OF ALGORITHMS (D54PC5)	
Course Outcomes:	
Upon completion of this course the student will be able to:	
1. Apply mathematical analysis methods to analyze the performance of algorithms and apply divide and conquer technique to solve the computing problems.	L3
2. Demonstrate disjoint set operations and apply back tracking technique to solve the computing problems.	L3
3. Apply Greedy method to solve various computing problems.	L3
4. Analyze efficient algorithms in common engineering design situations using dynamic programming technique.	L4
5. Solve complex problems using branch and bound technique and analyze NP hard and NP complete problems.	L4

DATABASE MANAGEMENT SYSTEMS (D54PC6)	
Course Outcomes:	
Upon completion of this course the student will be able to:	
1. Apply database management principles in designing relational databases.	L3
2. Construct ER diagram to design databases to perform operations using Relational Algebra & calculus	L3
3. Apply normalization techniques on a database constructed by using SQL .	L3
4. Implement transaction processing and concurrency control techniques for a given database.	L3
5. Apply indexing techniques to perform data manipulation tasks for a given database.	L3

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SOFTWARE ENGINEERING (D54PC7)	
Upon completion of this course the student will be able to:	
1. Identify common patterns in software development processes and apply different process models to develop software applications.	L3
2. Distinguish the various software requirements, prepare SRS document and analyze them.	L4
3. Identify the required design process or model to develop software applications.	L4
4. Develop test cases by using different testing strategies for software applications.	L3
5. Analyze the importance of quality assurance and risk strategies associated for a defined software development life cycle.	L4

WEB TECHNOLOGIES (D54PC8)	
Course Outcomes:	
Upon completion of the course, the student will be able to,	
1. Develop the practical skills and competencies to build web applications using PHP.	L3
2. Experiment with creating user defined tags using XML for data representation, will be Proficient in parsing XML data using DOM and SAX parsers.	L3
3. Develop dynamic web applications by using the concepts of servlets to integrate with Database.	L3
4. Utilize JSP features effectively to build robust and maintainable web applications.	L3
5. Analyse and Construct JavaScript solutions for client-side scripting tasks, including form Validation and AJAX-based interactions.	L4

DATABASE MANAGEMENT SYSTEMS LAB (D54PC9)	
Course Outcomes:	
Upon completion of this course the students will be able to :	
1. Design and Develop a database schema for a given problem and to construct queries using SQL DML/DDL/DCL commands.	L3
2. Apply the normalization techniques for development of application software to realistic problems.	L3
3. Develop application programs using PL/SQL.	L3

OBJECT ORIENTED PROGRAMMING THROUGH JAVA LAB (D54PC10)	
Course Outcomes	
Upon completion of this course the students will be able to :	
1. Apply file system operations, sorting techniques and data structures for efficient data Management and retrieval and to develop Java programs that utilize multithreading for concurrent execution.	L3
2. Develop interactive applications with event-driven programming.	L3
3. Apply inheritance concepts to create subclasses (Rectangle, Triangle, Circle) that extend the abstract class Shape.	L3

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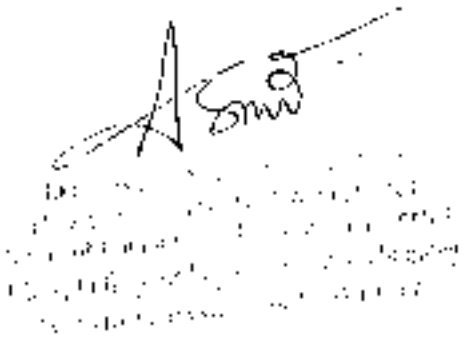
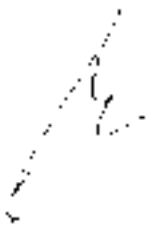
WEB TECHNOLOGIES LAB (IT54PC11)	
Course Outcomes:	
Upon completing of this course the students will be able to :	
1. Determine the fundamental concepts and syntax of HTML, JavaScript, and XML to build basic web applications	L3
2. Develop web applications for handle user inputs and provide appropriate responses at client-server interaction and data manipulation	L3
3. Apply the concept of programming constructs and (PHP, JavaServlets, JSP, AJAX) to develop interactive web applications, demonstrate and practical utilization and to develop XML documents validating them against a Document Type Definition (DTD) and representing them using DOM and SAX parsers	L3





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COURSE OUTCOMES R 20 III YEAR

OBJECT ORIENTED ANALYSIS AND DESIGN -C55PC1	
Course Outcomes:	
Upon completion of Course the students will be able to:	
1. List the importance and use of basic principles in object-oriented modeling.	L4
2. Develop pictorial representation by making use of basic structural modeling concepts for any application development.	L4
3. Distinguish different system behavioral modeling techniques.	L4
4. Categorize advanced behavioral modeling for visualizing flow control of objects and activities.	L4
5. Develop and design a document using UML for simple and complex scenarios of the unified Library System.	L6

PYTHON PROGRAMMING	
Course Outcomes:	
Upon completion of Course the students will be able to:	
1. Apply different data types for solving problems.	L3
2. Apply operators & develop Expressions & analyze the control flow structures.	L4
3. Analyze the scope of variables in functions ,global and local variable usage.	L4
4. Implement Packages and create modules by applying the concepts of importing, name spacing.	L3
5. Implement OOP principles - classes, methods, inheritance, overriding, and data hiding in Python.	L3

COMPUTER NETWORKS (C55PC3)	
Course Outcomes:	
Upon completion of the course the student will be able to:	
1. Compare and contrast different network models and their significance in networking architecture.	L4
2 Develop elementary protocols by applying the knowledge of principles of framing and error control to design robust and reliable data link layer protocols.	L4
3. Make use of various routing algorithms and analyze them to design efficient and scalable network architectures.	L4

4. Analyze and compare the Transmission Control Protocol (TCP) and User Datagram Protocol (UDP) in terms of their features and evaluate congestion control algorithms.	L4
5. Utilize the knowledge on how to address and resolve issues related to application layer protocols, ensuring seamless interaction and data exchange in online environment.	L3

COMPILER DESIGN (C55PC4)	
Course Outcomes:	
Upon completion of course the student will be able to:	
1. Analyze and comprehend the lexical analyzer generator specifying rules and patterns for token recognition.	L4
2. Develop top-down and bottom-up parser for a programming language with a specific context-free grammar.	L6
3. Assess the complexities involved in generation of various SDDs during intermediate code generation.	L5
4. Frame and apply dynamic programming code generation techniques.	L3
5. Evaluate the effectiveness of machine-independent optimization techniques in application scenarios.	L5

DISTRIBUTED DATABASES (C55PE5A)	
Course Outcomes:	
Upon completion of the Course, the student will be able to:	
1. Distinguish and articulate potential challenges and problems from the insights gained to frame a Distributed Database Systems.	L4
2. Utilize query decomposition techniques and demonstrate their ability to Effectively optimize distributed queries, improving query performance within distributed database systems.	L3
3. Analyze and evaluate distributed concurrency control mechanisms and algorithms, including time-stamped and optimistic approaches.	L4
4. Apply the knowledge to describe the principles of fault tolerance in distributed systems and explain site failures and network partitioning.	L4
5. Analyze the concepts of distributed object database management systems(OODBMS) and thekey architectural issues involved.	L4

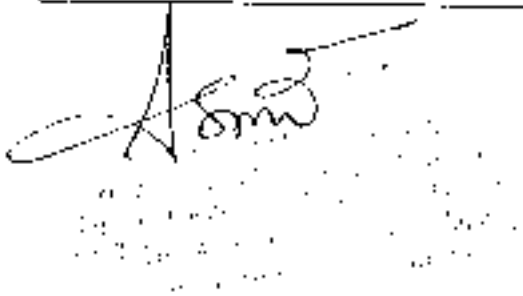
DISTRIBUTED COMPUTING (C55PE5B)	
Course Outcomes:	
Upon completion of the course, the student will be able to:	
1. Analyze distributed system and computing paradigms.	L4
2. Apply the inter process communication concepts to develop socket APIs.	L3
3. Develop client server paradigms and imply to build group communication.	L5
4. Illustrate the phenomenon of distributed objects, internet applications.	L3
5. Categorization of the Grid generations.	L5

NETWORK PROTOCOLS (C55PE5C)	
Course Outcomes:	
Upon completion of the course, the students will be able to:	
1. Compare & contras the different network architectures and protocols.	L4
2. Design different TCP / IP protocols.	L5
3. Demonstrate various network security technologies and protocols.	L3
4. Understand and organize wan protocols.	L5
5. Analyze various LAN protocols.	L4

INFORMATION THEORY AND CODING (C55PE5D)	
Course Outcomes:	
Upon completion of the course, the student will:	
1. Understand the concept to information and entropy.	L2
2. Demonstrate the properties of codes and understand Shannon's theorem for coding.	L3
3. Compute channel capacity and apply mechanism for sharing mutual information.	L3
4. Compare the finite geometric codes.	L4
5. Analysis of Convolutional Codes.	L4

SOFTWARE PROCESS AND PROJECT MANAGEMENT (C55PE5E)	
Course Outcomes:	
Upon completion of the course, the student will be able to:	
1. Compare The waterfall model , RAD model, Iterative model, Spiral model, Prototype model and COCOMO model.	L4
2. Analyze principles of moderns of ware management and improving software economics.	L4
3. Demonstrate life cycle phases and model based software architectures.	L4
4. Analyze work flows of the process and Line-of-Business organization.	L4
5. Develop future software project management, project control, process instrumentation and various case studies.	L5

ARTIFICIAL INTELLIGENCE (C55PE5F)	
Course Outcomes:	
Upon completion of the course, the student will be able to:	
1. Gain Knowledge on AI Phenomenon, and make use of state space representations, apply heuristic techniques to solve problems.	L3
2. Apply knowledge representation issues to build Predicate logic and Knowledge rules.	L3
3. Utilize the effectiveness of statistical reasoning methods, including Bayesian networks and fuzzy logic in specific contexts.	L3
4. Compare and contrast different slot-and-filler structures for representing Knowledge.	L4
5. Implement hierarchical planning techniques to model and solve multi-level planning scenarios.	L4



EMBEDDED SYSTEMS DESIGN (C055OE6)	
COURSE OUTCOMES:	
Upon completion of the course, the student will be able to:	
1. Understands the Embedded Systems Vs. General Computing Systems.	L4
2. Formulates typical Embedded System.	L6
3. Model the trends in Embedded Industry.	L3
4. Make use of the concepts of RTOS based Embedded System Design.	L3
5. Analyze Task Communication in RTOS.	L4

OBJECT-ORIENTED ANALYSIS AND DESIGN LAB (C55PC7)	
Course Outcomes:	
Upon completion of Course the students will be able to:	
1. Understand the functioning of the Rational Rose or Umbrello software. L4	L4
2. Design the UML diagrams for the E- Ticketing System. L6	L6
3. Develop the various UML diagrams for any real time applications. L6	L6

PYTHON PROGRAMMING LAB (C55PC8)	
Course Outcomes:	
After completion of course the student will be able to:	
1. Evaluate the outcomes of using different operators in specific scenarios.	L5
2. Analyze the differences in usage, capabilities, and limitations between various predefined functions available.	L4
3. Analyze and compare the suitability of different Python modules and data structures for solving specific types of computing problems	L4
4. Evaluate the effectiveness and efficiency of OOP in Python by assessing code readability, reusability, and maintainability compared to non-OOP approaches for solving programming problems.	L5

DATA WAREHOUSING AND DATA MINING (C56PC1)	
Course Outcomes:	
Upon completion of Course the students will be able to:	
1. Analyze fundamental concepts, key characteristics, architecture, logical data modeling, and various analysis techniques, encompassing OLAP concepts and server architectures.	L4
2. Apply foundational knowledge in Data Mining, and use in Data preprocessing techniques and demonstrate understanding of Data Transformation and apply proficiency in exploring measures of similarity and Dissimilarity for analyzing data.	L3

3. Apply a comprehensive understanding to define problems, utilize APRIORI principles for generating frequent item sets, focusing in compact representations like maximal and closed frequent item sets.	L3
4. Analyze problem definitions, employ general strategies for solving classification problems, and assess classifier performance and various classification techniques including their characteristics.	L4
5. Analysis of clustering algorithms, addressing key issues and techniques and conducting a thorough analysis of strengths and weaknesses.	L4

WEB TECHNOLOGIES (CS6PC2)	
Course Outcomes:	
Upon completion of the subject the student will be able to:	
1. Develop a web application using PHP and MySQL to Recall and reproduce PHP syntax and Identify different data types in PHP and explain the purpose and use of control structures, role of functions in PHP to handle file permissions, error checking, and security considerations when working with file operations in PHP.	L3
2. Make use of XML and their concepts to store, navigate, transport, manipulate, and parse the content and Implement XML parsing using DOM and SAX parsers in Java.	L3
3. Identify the components of the Servlet API. Recall the basic concepts of servlets, such as the servlet lifecycle and deployment and Apply knowledge of servlet parameters to read and process client data, initialization parameters in servlets. Analyze HTTP request and response handling in servlets.	L3
4. Develop JSP pages with appropriate declarations, directives, and expressions and implement database connectivity in JSP using JDBC.	L3
5. Apply knowledge of JavaScript to create and use functions, create a simple AJAX application dynamically update web page content Implement event handlers for various user interactions on web pages.	L3

ADVANCED DATABASES (CS6PE3A)	
Course Outcomes:	
Upon completion of the course, the student will:	
1. Analyze the impact and performance of database.	L4
2. Compare and contrast Object –oriented databases with Object –Relational data bases to implement storage strategies for XML data and understand its applications in a database system	L4
3. Analyze the usability and effectiveness of directory-based information retrieval systems.	L4
4. Analyze the impact of standardization on collaboration, code maintance, and over all software quality.	L4
5. Make use of statistical methods for detecting and preventing security breaches. L3	L3

MOBILE COMPUTING (C56PE3B)

Course Outcomes:

Upon completion of the course, the student will:

1. Identify mobile communications and limitations of mobile devices.	L3
2. Illustrate the architecture of GSM protocol and MAC layer.	L3
3. Compare and contrast various mobile IP network layer and mobile transport layer.	L4
4. Demonstrate database hoarding techniques and data dissemination for broadcasting.	L3
5. Compare & contrast the Adhoc networks and related concepts.	L4

WIRELESS NETWORKS (C56PE3C)

Course Outcomes:

On successful completion of the course the students will be able to:

1. Identify the various issues and applications of Adhoc wireless networks.	L3
2. Analyze the working of MAC protocols for Ad-hoc wireless networks.	L4
3. Compare and contrast the working of various On-Demand Routing protocols.	L4
4. Analyze the challenges in designing Transport layer Protocols for Ad-hoc networks , Compare and contrast the working of Transport protocols.	L4
5. Design the issues in designing Security Protocols for Ad-hoc networks focusing on the working performance of various security protocols.	L5

CRYPTOGRAPHY (C56PE3D)

Course Outcomes:

Upon completion of the Course, the student will be able to:

1. Analyze Number Theory, Finite Fields and various algorithms.	L4
2. Apply techniques to generate pseudo random sequences, use stream ciphers to for eencrypting and decrypting the data.	L3
3. Design and analysis of stream ciphers.	L4
4. Identify the algorithms of Public-Key Cryptosystems.	L3
5. Analyze various algorithms developed for hashing functions.	L4

SOFTWARE REQUIREMENTS ESTIMATION (C56PE3E)

Course Outcomes:

Upon completion of the Course, the student will:

1. Able to build a software using good practices of engineering.	L3
2. Analyze the developed models for a software.	L4
3. Illustrate make estimations. across modules of a software.	L3
4. Apply cost estimations based on schedule and effort for developing efficient software modules.	L3
5. Design various tools that exist for software estimation.	L5

MACHINE LEARNING (C56PE3F)	
Course Outcomes:	
Upon completion of the Course, the student will:	
1. Apply the concepts of concept learning to solve well posed problems.	L3
2. Apply decision tree learning, Artificial Neural Networks and evaluation hypothesis for the machine learning problems.	L3
3. Compare and contrast Bayesian, Computational Instance-based learning techniques.	L3
4. Choose correct Learning set of rules for machine learning problems using analytical learning.	L3
5. Apply inductive and analytical approaches to learn reinforcement learning and Q learning.	L3

INTRODUCTION TO ANALYTICS (C56PE4A)	
Course Outcomes:	
On completion of course the student will be able to:	
1. Utilize the concepts of Big Data, Data Science, and Descriptive Statistics for comprehensive Understanding.	L3
2. Assess complex multivariate datasets. ensure data quality, and effectively reduce dimensionality for more manageable and meaningful analyses.	L5
3. Select appropriate techniques and models for different scenarios such as clustering,regression analysis.	L5
4. Interpret advanced understanding of predictive modeling techniques, including both traditionaland cutting-edge methods, while addressing complex challenges in various domains.	L5
5. Analyze and extract insights from text, web, and social media data, while considering ethical considerations and staying informed about the latest trends in the field.	L4

CLOUD COMPUTING (C56PE4B)	
Course Outcomes:	
Upon completion of the course, the student will be able to:	
1. Analyze Challenges and Risks in cloud computing while migrating the applications into the cloud.	L4
2. Apply the principles of Integration as a Service (IaaS) to address the challenges of SaaS paradigms and identify business drivers for enterprise cloud adoption, including the cloud supply chain.	L3
3. Make use of infrastructure as a service(IAAS) ,Platform and software as a service.	L3
4. Apply architectural principles to design and manage federated cloud computing environments,including SLA management and performance prediction for HPC on clouds.	L3
5. Identify the strategies for organizational readiness and change management in the cloud era, addressing data security, legal issues, and achieving production readiness for cloud service through practical case studies.	L3

MOBILE ADHOC NETWORKS (C56PE4C)

Course Outcomes:

Upon completion of the course, the student will:

1. Analyze the applications of Mobile Adhoc Networks.	L4
2. Illustrate addressing the design issues of MAC protocols.	L3
3. Analyze the challenges of transmission control protocols and compare its performance over other protocols.	L4
4. Apply different protocols to develop energy management system.	L3
5. Create optimize and integrate cross layer design issues.	L5

NETWORK SECURITY (C56PE4D)

Course Outcomes:

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

1. Apply security mechanisms across transport layer.	L3
2. Understand and Evaluate the security mechanism involved across a wireless network.	L5
3. Compare and contrast intruders, malicious software ,and viruses.	L4
4. Illustrate the need and significance of firewall and its types.	L3
5. Identify the basic concepts of Network Management System, legal and ethical aspects of establishing a network.	L3

DESIGN PATTERNS (C56PE4E)

Course Outcomes:

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

1. Explain effectively solve design problems, and proficiently utilize design patterns in practical software development scenarios.	L5
2. Design principles to address Document Editor challenges, demonstrate Proficiency in problem-solving.	L6
3. Make Use of the adapter, bridge, composite, decorator, facade, flyweight, and proxy structural patterns in real-world situations.	L3
4. Apply and implement various Behavioral Patterns (Chain of Responsibility, Command, Interpreter, Iterator, Mediator, Memento, and Observer) in practical applications	L3
5. Utilize the Visitor, State, Strategy, and Template Method patterns; talk about the uses and advantages of different behavioral patterns	L3

DEEP LEARNING (C56PE4F)	
Course Outcomes:	
Upon completion of the coursenthe student will be able to:	
1. Apply knowledge of deep feed forward networks and regularization techniques fora given problem scenario.	L3
2. Use various optimization strategies to train deep models for a given problem and illustrate convolution operations, variants of basic convolution function.	L3
3. Choose Recursive neural networks for a given sequence modeling task and explain deep learning applications.	L3
4. Identify auto encoders for a given problem. Illustrate different types of representation learning.	L3
5. List and explain the ways to structured probabilistic models for deep learning.	L4

DATA WAREHOUSING AND DATA MINING LAB (C56PC5)	
Course Outcomes:	
Upon completion of Course the students will be able to:	
1. Analyze data from files and other sources.	L4
2. Apply various data manipulation tasks on various datasets.	L3
3. Apply data mining techniques on real time data sets.	L3

WEB TECHNOLOGIES LAB (C56PC6)	
Course Outcomes:	
Upon completion of the subject the student will be able to:	
1. Develop and build interactive web pages using HTML and JavaScript and implement basic JavaScript functions for user interactions and data manipulation.	L6
2. Develop and create XML documents and validate them against a given Document Type Definition (DTD) or XML Schema and Construct the structure of an XML document and represent it using a DOM tree and SAX.	L6
3. Develop a registration form in PHP that adds user information to the XML file and the data stored in the XML file	L3
4. Develop and Implement a database connection in a web application using a server-side scripting language (e.g., PHP, Java)	L3
5. Analyze the structure and content of cookies stored in the browser.	L4

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

COURSE OUTCOMES R 20 IV YEAR

LINUX PROGRAMMING (C57PC1)	
Course Outcomes:	
After completion of the course the student will be able to:	
1 Examine the fundamental commands within the Linux operating system and shell scripts to assess their functionality and relevance.	L4
2. Analyze file system concepts and directories to understand their structure and Unix penalty.	L4
3. Develop and Analyze skills essential for system programming encompassing file system programming, process and signal management, as well as Inter Process Communication using pipes and signals.	L4
4 Utilize semaphores, shared memory, and message queues for advanced inter-process communication and synchronization.	L3
5 Construct network programs utilizing socket-based communication, demonstrating proficiency in their development and implementation.	L3

INFORMATION SECURITY (C57PC2)	
Course Outcomes:	
Upon completion of the course the student will be able to:	
1. Identify the need and approaches to Information Security implementation	L3
2. Analyze legal, ethical, professional issues, standards, policies and practices involved in securing the information.	L4
3. Distinguish risk management issues evolved during planning for securing the information	L4
4 Examine Encryption mechanisms, technical and nontechnical aspects for information security.	L4
5 Examine security management maintenance models and the technologies that are used for securing the information.	L4

BIG DATA ANALYTICS (C57PE3A)	
Course Outcomes:	
Upon completion of the course the student will able to:	
1 Apply the introductory concepts of big data, methodologies used for setting up big data	L3
2 Analyze different NoSQL databases and select the most appropriate one for specific use cases.	L4
3. Analyze data acquisition and data storage for managing large-scale data environments.	L4
4. Implement MapReduce programs for basic data processing tasks.	L3
5. Analyze relational and non-relational databases and a case study involving the development of a Django application for viewing weather data	L4

SOFT COMPUTING (CS7PE3B)

Course Outcomes:

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

1. Analyze and implement supervised learning approaches across a neural network.	L4
2. Associate patterns by training algorithms and build various associative memory networks.	L3
3. Analyze and implement unsupervised learning approaches across a neural network.	L4
4. Develop fuzzy logic to handle uncertainty problems.	L3
5. Apply principles and methods of membership functions, fuzzification, defuzzification, and associated computational techniques to solve real world problems involving uncertainty and imprecision.	L5

STORAGE AREA NETWORKS (CS7PE4C)

Course Outcomes:

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

1. Apply the knowledge of information storage principles and data center infrastructure to design and manage efficient storage solutions.	L4
2. Apply the principles of Storage Area Network (SAN) architectures and Fiber Channel technologies to design, implement, and manage SAN solutions in an enterprise environment.	L4
3. Apply the concepts and technologies of Network-Attached Storage (NAS) and unified storage solutions to effectively deploy and optimize file and object storage systems in diverse IT environments.	L3
4. Apply business continuity and backup strategies to develop and implement implement effective information availability and Archive using local and remote replication concepts.	L3
5. Apply security and management frameworks to safeguard and optimize storage infrastructure in various IT environments.	L3

CYBER SECURITY (CS7PE4D)

Course Outcomes:

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

1. Analyze the phenomenon of cybercrime based on classification of laws in Indian regulations. Learn the essence of various cyber offenses and criminal plans.	L4
2. Identify the challenges posed by mobile and wireless devices in terms of attacks and policies framed for handling mobile and wireless devices.	L3
3. Analyze the tools and methods used for committing cybercrimes.	L4
4. Identify the legal perspectives with respect to the phenomenon of cyber crimes and cyber security acts.	L3
5. Identify the organizational implications caused in view of cybercrimes and understand the causes of cyber terrorism like psychology, Mind-set and skill of Hackers, role of social, political, ethical, and intellectual property in the cyberspace.	L3

SOFTWARE QUALITY ASSURANCE (CS7PE3E)	
Course Outcomes:	
Upon completion of course, the student will be able to:	
1. Apply quality assurance principles for defect prevention and reduction and evaluate the role of verification and validation in software processes.	L3
2. Apply root cause analysis and tailoring techniques for defect prevention and evaluate formal verification methods and their effectiveness in software quality assurance	L3
3. Analyze quality assurance techniques and principles, fault tolerance and failure Containment	L4
4. Analyze Models for Quality Assessment, Generalized Models, Product-Specific Models	L4
5. Compare various risk identification, software reliability techniques for defects to improve quality and reliability.	L4

MOBILE APPLICATION DEVELOPMENT (CS7PE3F)	
Course Outcomes:	
Upon completion of the course, the student will be able to:	
1 Analyze the concepts related to Android OS design, development framework, application components, and its lifecycle.	L4
2. Apply various UI components to implement effective event handling strategies and proficiently manage fragments to develop multi screen Activities.	L3
3 Utilize Intents, Broadcast Receivers, Notifications and Toasts in Android application development	L3
4 Analyze and construct solutions using different forms of persistent storage in android application development	L4
5 Apply iOS programming concepts and practices using Objective-C for iOS app development	L3

PREDICTIVE ANALYTICS (CS7PE4A)	
Course Outcomes:	
Upon completion of the course the student will be able to:	
1. Apply predictive analytics and linear regression techniques, including data modeling, variable transformation, and least squares estimation, to solve business problems and create effective models	L3
2. Apply logistic regression techniques and decision tree methodologies, including model fit statistics, overfitting management, and tree pruning, to address various business analytics challenges.	L3
3. Analyze and develop effective segmentation strategies and decision tree models, including handling overfitting and pruning techniques, and evaluate training and development policies to enhance knowledge, skills, and competencies in organizational settings.	L4
4 Analyze time series forecasting methods and feature extraction techniques, such as ARIMA and STL, and evaluate the accuracy of forecasts by extracting and interpreting features like height, average, and energy from generated models	L4
5 Analyze and develop various types of documents, including case studies, technical reports, and standard operating procedures, while evaluating document preparation tools and practices for effective knowledge sharing and version control	L4

PERVASIVE COMPUTING (C57PE4B)

Course Outcomes:

Upon completion of the course, the student will:

1. Classify and analyze the structure and elements of pervasive computing systems, including infrastructure and middleware and apply resource management techniques such as efficient of location and task migration in pervasive computing.	L4
2. Analyze the methods for efficient resource allocation, ICU Service Selection and ICU migration framework	L4
3. Compare various pervasive mobile applications	L4
4. Illustrate User Preferences and Recommendations.	L3
5. Design and develop pervasive application systems	L3

SEMANTIC WEB (C57PE4C)

Course Outcomes:

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

1. Understand the concepts of semantic web, modelling, ontologies and knowledge representation	L2
2. Describe the web resources	L2
3. Develop queries using basics of SPARQL.	L5
4. Understand web ontology language	L2
5. Develop logic and inference rules	L5

COMPUTER FORENSICS (C57PE4D)

Course Outcomes:

Upon completion of course the student will be able to

1. Learn fundamentals of computer forensics till data recovery solutions	L2
2. Gather evidences and identify the types of evidences, implement data acquire techniques.	L3
3. Understand the methods used for computer forensic analysis and validation	L2
4. Use various tools for detecting cybercrimes caused using computers, mobile devices	L3
5. Use windows and DOS operating systems to avoid cyber attacks.	L3

SOFTWARE TESTING METHODOLOGIES (C57PE4E)

Course Outcomes:

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

1. Analyze various types of bugs and their consequences, the apply flow graph and path testing techniques, including path sensitizing and instrumentation, to effectively identify and manage achievable paths in software testing.	L4
2. Analyze the process involved in testing transaction flow and data flow scenarios.	L4
3. Apply domain testing techniques to evaluate and enhance the testability of Software interfaces.	L3
4. Analyze the reduction procedures and flow anomaly detection using regular expressions, and apply logic based testing techniques, including decision tables and path expressions, to create comprehensive test coverage	L4
5. Utilize graph matrices, state, state graphs, transition testing methods, and tools like Test Director or Bad Boy for practical applications in testing.	L3

INTERNET OF THINGS (CS7PEAE)	
Course Outcomes:	
Upon completion of this course students will be able to:	
1. Apply foundational concepts of the Internet of Things (IoT), including its physical and logical design, communication models, enabling technologies, and deployment templates, to implement basic IoT solutions and applications	L3
2. Apply knowledge of IoT and M2M communication,SDN, NFV, and NETCONF-YANG to manage and differentiate between IoT and M2M systems effectively.	L3
3. Apply various IoT networking concepts and connectivity technologies, including IEEE 802.15.4, ZigBee, 6LoWPAN, and others, to implement effective IoT Network and wireless sensor networks (WSNs).	L3
4. Analyze the features and components of Arduino and Raspberry Pi, evaluate their programming environments and architectures, and design effective IoT solutions based on these platforms.	L4
5. Analyze and build IoT solutions using various cloud platforms and storage models, including WAMP AutoBahn, Xively, and Amazon Web Services, to meet specific project requirements	L4

LINUX PROGRAMMING LAB (CS7PC6)	
Course Outcomes:	
After completion of course the students will be able to,	
1. Develop shell scripts to perform tasks such as file extraction, word counting, common file operations, file manipulation etc.	L3
2. Develop programs to implement process management techniques , IPC mechanisms including named pipes, message queues, and sockets.	L3
3. Develop C programs to implement Unix commands, system calls, file handling and process management techniques	L3

INFORMATION SECURITY LAB (CS7PC7)	
Course Outcomes:	
At the end of this course students will be able to,	
1. Implement various cryptographic algorithms by applying Caesar Cipher, Substitution Cipher and Hill Cipher for text encryption and decryption in both Java and C to ensure secure data transmission	L3
2. Apply XOR and AND bitwise operations to string manipulation in C and Examining the effects of these operations on character data	L3
3. Implement advanced encryption standards by applying DES, Blowfish, and Rijndle algorithms in Java/C, and compare the effectiveness of different cryptographic techniques, and their practical application in secure communications.	L3

DATA SCIENCE (CS8PEEA)	
Course Outcomes:	
Upon completion of the course the student will be able to.	
1. Apply data science concepts and statistical inference techniques using exploratory data analysis tools and The data science process to interpret and model data effectively.	L3
2. Apply basic machine learning algorithms and data wrangling techniques to preprocess and analyze data effectively	L3
3. Apply feature generation and selection techniques to extract meaningful insights from data, and utilize these methods to address practical applications such as user retention.	L3

4 Analyze and develop recommendation systems by analyzing algorithmic components and to create effective user-facing data products	L4
5 Analyze and design data-driven solutions by mining social-network graphs and to create effective data visualizations of complex datasets and apply various machine learning algorithms and tools in practical case studies.	L4

QUANTUM COMPUTING (CSBPE13)	
Course Outcomes:	
After completion of this course, the student will be able to:	
1 Understand the concepts of quantum computing	L2
2 Explain the concepts of quantum model of computation	L2
3 Analyze Quantum algorithms I	L4
4 Analyze the Quantum algorithms II	L4
5 Able to apply computational complexity methods and error detection codes.	L3

SOCIAL NETWORKS (CSBPE14)	
Course Outcomes:	
Upon completion of the course, the student will be able to:	
1. Know the parameters for establishment of social networks	L2
2. Learn to extract and mine the information in various social networks.	L2
3. Develop communities based on social network infrastructures.	L5
4. Understand the prediction of human behavior and identify the privacy issues in social networks	L2
5 Gain the insights of visualizing the social networks and apply the same to develop digitalization of the social networks	L3

BLOCKCHAIN TECHNOLOGY (CSBPE15)	
Course Outcome:	
Upon completion of the course, the student will be able to:	
1. Know the aspects and learn to recognize the potential need of block chain by understanding the ownership, by spending money twice.	L2
2. Learn to protect user accounts created during planning of block chain connection documenting ownership, authorizing and storing transaction data	L2
3 Gain knowledge to use, store and protect data among peers; to add transactions using the history of transactions by paying for integrity and bringing peers together	L3
4 Understand the limitations and possibilities to overcome them using the block chain and smart city	L2
5. Compare and contrast between different currencies and understand the various Challenges of business, public, government and personal records	L4

AGILE SOFTWARE DEVELOPMENT (CS82EE)

Course Outcomes:

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

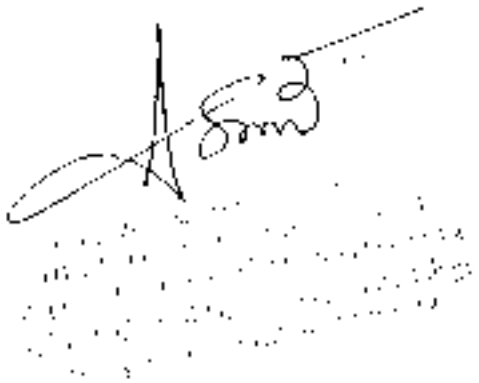
1. Understand the concept of development agility and the Agile Manifesto	L2
2. Analyze each of the major agile development methods underscoring their strengths and weaknesses.	L4
3. Understand to manage an agile environment even with a structured organizational approach	L2
4. Orchestrate the architecture vision on team velocity and software quality. Release and sprints planning to parallel software development	L2
5. Demonstrate team sprint, agile and scrum	L3

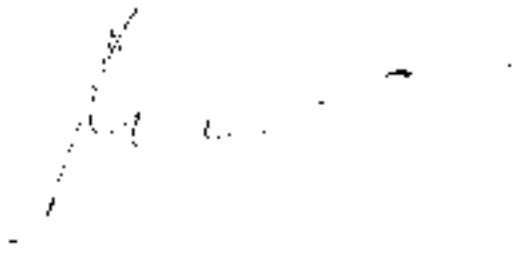
STACK TECHNOLOGIES (CS82EE4)

Course Outcomes:

Upon completion of this course students can able to

1. Understood that how to use Jetbrains to develop web applications	L2
2. Build spring web applications by connecting to databases with spring and JDBC. REST APIs with spring MVC	L5
3. Explain Spring Boot basics, MVC, Data Access.	L2
4. Use ReactJS in web application development	L3
5. Analyze Micro Services and Simple Spring Boot micro services application.	L4





DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING
2023-24

PROGRAM OUTCOMES (POs):

Engineering Graduates will be able to:

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

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

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DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING
2023-24

PROGRAM SPECIFIC OUTCOMES (PSOs):

PSO1: Ability to apply the acquired knowledge of Electronics and Communication Engineering in design and development, in areas of VLSI and Image Processing.

PSO2: Analyze and solve the complex Electronics and Communication Engineering problems using state of art hardware and software tools.

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DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

2023-24

Subject Name: Linear Algebra, Calculus & Ordinary Differential Equations — Subject Code: D1BSM1

Course Outcomes:

After learning the contents of this course the student must be able to

1. Discuss the matrix representation of asset of linear equations and to analyses the solution of the system of equations.
2. Reduce the quadratic form to canonical form using orthogonal transformation.
3. Identify whether the given DE of first order is exact or not.
4. Can find applications of first order ODE.
5. Solve higher differential equation and apply the concept of differential equation to real world problems.
6. Evaluating double integrals and applying them to compute the areas of regions.

Subject Name: Engineering physics — Subject Code: D1BSEP1

Course Outcomes:

On completion of the course student will able to

1. Analyze the concepts of quantum mechanics and visualize the difference between conductor, semiconductor, and un insulated ruby classification of solids.
2. Identify the role of semiconductor devices in science and engineering applications.
3. Explore the fundamental properties of dielectric and energy materials for their applications.
4. Knowing the concepts related to magnetic and super conducting materials for different engineering applications.
5. Explore the various aspects of lasers and optical fiber and their applications in diverse fields.

Subject Name: Fundamentals of Electrical Engineering — Subject Code: D1ESFEE

Course Outcomes:

After this course, the student will be able to

1. Understand and analyze DC, AC circuits using basic principles.
2. Analyze and evaluate electrical circuits using various theorems.
3. Understand the characteristics and performance of Electrical Machines and Transformers.
4. Understand the applications of various electrical installations.

Subject Name: C Programming For Problem Solving — Subject Code: D1ESCP1

Course Outcomes:

After this course, the student will be able to

1. Learn the taxonomy of computers and C fundamentals
2. Demonstrate arrays and functions to write c programming
3. Write C programs using pointers and string
4. Analyze and write C programs using structures and unions
5. Develop C programs for various applications using file I/O functions.

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DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

2023-24

Subject Name: Engineering Physics Lab Subject Code: D1BSEP2

Course Outcomes:

After this course, the student will be able to

1. Identify the V-I characteristics of Laser diode.
2. Evaluate the numerical aperture and bending loss of a given optical fibre.
3. Analyze the V-I characteristics of LED and photo diode devices.
4. Identify the type of semiconductor by using Hall Effect experiment.
5. Measure the Plank's constant using Photocell.

Subject Name: Fundamentals of Electrical Engineering Lab Subject Code: D1ESFEL

Course Outcomes:

After this course, the student will be able to

1. Apply various laws to solve electrical networks.
2. Apply network theorems to solve complex electrical networks.
3. Analyze single phase AC circuits.
4. Evaluate the performance of different types of Electrical machines and single phase transformer by conducting various tests.
5. Understand and analyze electrical installations using different lamp controlled methods, stair case wiring a different wiring connection.

Subject Name: C Programming For Problem Solving Lab Subject Code: D1ESCP3

Course Outcomes:

After this course, the student will be able to

1. Design and test programs to solve mathematical and scientific problems.
2. Writes structured programs using control structures and functions.

Subject Name: IT Workshop Subject Code: D1ESITW

Course Outcomes:

After this course, the student will be able to

1. Apply knowledge for computer assembling and software installation.
2. Solve the trouble shooting problems.
3. Apply the tools for preparation of PPT, Documentation and budget sheet
4. Create standard documents and research documents using Latex.
5. Create project plans.

Subject Name: Engineering Workshop Subject Code: D1ESEW1

Course Outcomes:

After this course, the student will be able to

1. Design and model different prototypes in the carpentry trade such as Cross lap joint, Dovetail joint.
2. Develop and model various basic prototypes in the trade of fitting such as Straight and L fit.

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3. Construct various basic prototypes in the trade of Tin smithy such as rectangular tray, Scoop.
4. Inspect various basic house wiring techniques such as connecting one lamp with one switch,
5. Connecting two lamps with one switch, Series wiring.
6. Build various basic prototypes in the trade of Welding such as Lap joint, Butt joint.

Subject Name: Mathematical Transforms Subject Code: D2BSM3

Course Outcomes:

After this course, the student will be able to

1. Select and use the appropriate shift theorems in finding Laplace and inverse Laplace transforms.
2. Use Laplace transforms techniques for solving differential equations.
3. One will be able to find the expansion of a given function by Fourier series.
4. Evaluating any periodic function in term of sines and cosines.
5. Evaluating a non-periodic function in terms of sine and cosine transforms.
6. Understanding and apply Z-transforms, Inverse Z-transforms to solve Difference equations.

Subject Name: Engineering Chemistry Subject Code: D2BSEC1

Course Outcomes:

After this course, the student will be able to

1. Students will acquire the basic knowledge of conductance in Metals and Bond Structures.
2. The students are able to understand the basic properties of water and its usage in domestic and industrial purposes.
3. They will acquire the Knowledge of chemistry in Batteries.
4. They can learn the fundamentals and general properties of polymers and other engineering materials.
5. They can predict potential applications of chemistry and practical utility in order to become good engineers and entrepreneurs

Subject Name: Electronic Devices & Circuits Subject Code: D2ESED1

Course Outcomes:

After this course, the student will be able to

1. Acquire the knowledge in semiconductor materials and knows the complete internal structure of PN junction its capacitances and resistances.
2. Design the circuits for the conversion of AC to DC Voltages.
3. Acquire knowledge in the structure of Transistor (different types, operation, characteristics and applications)
4. Analyze the dc bias circuitry of BJT.
5. Acquire knowledge in the structure of, FET, MOS (different types, operation, characteristics and applications)

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DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

2023-24

Subject Name: English For Skill Enhancement Subject Code: D2HSE1

Course Outcomes:

After this course, the student will be able to

1. Understand the importance of vocabulary and sentence structures.
2. Choose appropriate vocabulary and sentence structures for their oral and written communication.
3. Demonstrate their understanding of the rules of functional grammar.
4. Develop comprehension skills from the known and unknown passages.
5. Take an active part in drafting paragraphs, letters, essays, abstracts, précis and reports in various contexts.
6. Acquire basic proficiency in reading and writing modules of English.

Subject Name: Computer Aided Engineering Graphics Subject Code: D2ESCEG

Course Outcomes:

After this course, the student will be able to

1. Apply computer aided drafting tools to create 2D and 3D objects
2. Sketch conics and different types of solids
3. Appreciate the need of Sectional views of solids and Development of surfaces of solids
4. Read and interpreting engineering drawings
5. Conversion of orthographic projection in to isometric view and vice versa manually and by using computer aided drafting

Subject Name: Engineering Chemistry Lab Subject Code: D2EBSEC2

Course Outcomes:

After this course, the student will be able to

1. The concepts of error and its analysis and can also develop the skills to tabulate the experimental data and derive valid conclusions.
2. Hands on experience in performing the electro-analytical techniques such as conductometry, potentiometry and pH metry.
3. The ability to prepare polymers.
4. Estimation of Surface tension and viscosity of Lubricant oil.

Subject Name: Electronic Devices & Circuits Lab Subject Code: D2ESED2

Course Outcomes:

After this course, the student will be able to

1. Design different electronic circuits for different applications using devices like Diodes, Transistors, etc.
2. Design circuits which can convert AC to DC.
3. Design various transistor biasing circuits.

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DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

2023-24

Subject Name: English Language & Communication Skills Lab Subject Code: D2HSE2

Course Outcomes:

After this course, the student will be able to

1. Understand the nuances of English language through audio- visual experience and group activities.
2. Neutralize their accent for intelligibility.
3. Speak with clarity and confidence which in turn enhances their employability skills.

Subject Name: Applied Python Programming Lab Subject Code: D2ESPP4

Course Outcomes:

After this course, the student will be able to

1. Build basic programs using fundamental programming constructs
2. Write and execute python codes for different applications
3. Capable to implement on hardware boards

Subject Name: Complex Analysis and Vector Calculus Subject Code: D3BSM4

Course Outcomes:

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

1. Analyze the complex functions with reference to their analyticity.
2. Integration using Cauchy's integral theorem, formula and finding the Taylor and Laurent's series expansion of complex functions.
3. Solve problems on Residues using different methods.
4. Evaluation of real integrals.
5. Compute derivatives of vector valued functions, gradient functions.
6. Evaluate the line-surface and volume integrals and converting them from one to another.

Subject Name: Digital Logic Design Subject Code: D3ESDLD

Course Outcomes:

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

1. Convert numeric information in different forms, e.g. different bases, signed integers, various codes such as ASCII, Gray, and BCD.
2. Realize simple Boolean expressions using the theorems and postulates of Boolean algebra and to minimize combinational functions.
3. Design and analyze of small combinational circuits and to use standard combinational functions/building blocks to build larger more complex circuits.
4. Design of sequential logic circuits and synthesizing of threshold functions.
5. Design and analyze small sequential circuits and devices and to use standard sequential functions/building blocks to build larger more complex circuits.

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DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

2023-24

Subject Name: Network Theory Subject Code: D3ESNT

Course Outcomes:

After this course, the student will be able to

1. Obtain the transient and steady-state response of electrical circuits.
2. Analyze circuit analysis using Laplace transform.
3. Discuss about two port networks.
4. Design network filters.

Subject Name: Electronic Circuit Analysis Subject Code: D43PC1

Course Outcomes:

Upon completion of the Course, the student's will be able to:

1. Design and analyze BJT small signal amplifier circuits and applying the biasing techniques learnt earlier.
2. Obtain the required over all specifications like Gain, Bandwidth, etc. analyze the transistor at very high frequencies.
3. Design and analyze small signal amplifier circuits applying the FET biasing techniques.
4. Utilize the Concepts of negative feedback to improve the stability of amplifiers and Positive feedback to generate sustained oscillations.
5. Design and realize different classes of Power Amplifiers and tuned amplifiers use able for audio and Radio applications.

Subject Name: Signals and Systems Subject Code: D43PC2

Course Outcomes:

At the end of this course students will be able to

1. Acquire the knowledge about types of signals, classification of signals & systems, orthogonality.
2. Analyze Fourier Representation of Continuous Time periodic and aperiodic signals.
3. Analyze waveform synthesis using Laplace transforms, Sampling and Reconstruction of signals.
4. Investigate the convolution and correlation of signals.
5. Realizes the system reliability, transfer function using state space.

Subject Name: Digital Logic Design Lab Subject Code: D3ESDLL

Course Outcomes:

On completion of this lab course the students will be able to:

1. Acquires the knowledge of 74XX IC's.
2. Design various combinational & sequential circuits using various Digital ICs.
3. Acquires the knowledge of differentiating between Linear and Digital IC's.
4. Acquires the knowledge of demonstrating by designing digital circuits.
5. Acquires the knowledge of Synchronous and asynchronous digital circuits

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DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

2023-24

Subject Name: Electronic Circuit Design Lab Subject Code: D43PC3

Course Outcomes:

Upon completion of the subject, students will be able to

1. Design of Single & Multi stage amplifiers.
2. Design of Power and Tuned amplifiers.
3. Design of Feedback and Oscillator circuits.
4. Analyze the different types of FET Amplifiers.

Subject Name: Electronic Circuit Simulation Lab Subject Code: D43PC4

Course Outcomes:

Upon completion of the subject, students will be able to

1. Analyze Single & Multi stage amplifiers.
2. Analyze Power and Tuned amplifiers.
3. Analyze Feedback and Oscillator circuits.
4. Analyze the different types of FET Amplifiers.

Subject Name: Basic Simulation Lab Subject Code: D43PC5

Course Outcomes:

1. Understanding of MATLAB tool.
2. To analyze various signals and sequences in MATLAB including operations.
3. To verify Wiener-Khintchine Relations and Sampling Theorem.

Subject Name: Probability Theory and Stochastic Processes Subject Code: D44PC6

Course Outcomes:

Upon completing this course, the student will be able to

1. Define probability and interpret probability by modeling sample spaces.
2. Construct the probability distribution of a random variable, based on a real-world situation, and use it to compute expectation and variance.
3. Compute the problems involving multiple random variables
4. Apply the principles of random process in system concepts
5. Determine the Spectral and Temporal characteristics of random signal.

Subject Name: Analog and Digital Communications Subject Code: D43PC7

Course Outcomes:

After completion of this course the student is able to:

1. Design and analyze various Analog and Digital Modulation and Demodulation techniques.
2. Model the noise present in continuous wave Modulation techniques.
3. Implement the Super heterodyne Receiver concept and Pulse Modulation Techniques in various applications
4. Analyze and design the base band Transmission model.

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DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

2023-24

Subject Name: Pulse and Digital Circuits Subject Code: D43PC8

Course Outcomes:

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

1. Learn the concepts and applications of RC and RLC circuits.
2. Understand the applications of clipping and clamping circuits.
3. Learn various switching devices such as diode, transistor and to design various time base generators.
4. Design Multivibrators for various applications
5. Realizing logic gates and sampling gates using diodes and transistors.

Subject Name: Linear and Digital IC Applications Subject Code: D43PC9

Course Outcomes:

Upon completion of the subject, students will be able to:

1. Understand Operational Amplifiers with Linear Integrated Circuits.
2. Design circuits using Operational Amplifiers for various Applications.
3. Design different ADC's and DAC's.
4. Understand different families of Digital Integrated Circuits and their Characteristics.
5. Design Combinational and Sequential circuits using IC's.

Subject Name: Electromagnetic Theory and Transmission Lines Subject Code: D43PC10

Course Outcomes:

Upon completion of the Course, the students will be able to:

1. Analyze the electric fields due to different charge distributions and analyze the electric fields indifferent mediums.
2. Distinguish between the static and time-varying fields, establish the corresponding sets of Maxwell's Equations and Boundary Conditions, and use them for solving engineering problems.
3. Analyze the EM wave propagation and attenuation in various media and analyze the importance of pointing theorem.
4. Determine the Transmission Line parameters for different lines characterize the distortions and estimate the characteristics for different lines.
5. Choose smith chart to design transmission lines, to find the reflection coefficient for given impedance and vice versa.

Subject Name: Analog and Digital Communications Lab Subject Code: D43PC13

Course Outcomes:

Upon completion of the lab, students will be able to:

1. Design and implement various Analog modulation and demodulation Techniques and observe the time and frequency domain characteristics.
2. Design and implement various Pulse modulation and demodulation Techniques and observe the time and frequency domain characteristics.
3. Apply different types of Sampling with various Sampling rates and duty Cycles.

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4. Design and implement various Digital modulation and demodulation Techniques and observe the waveforms of these modulated Signals practically.

Subject Name: Pulse and Digital Circuits Lab Subject Code: D43PC12

Course Outcomes:

Upon completion of the Lab, students will be able to:

1. Design RC circuits.
2. Design Multivibrators for various Applications.
3. Design Time Base Generators and Relaxation Oscillators.
4. Design different types of Digital Circuits by using Logic Gates and Flip-Flops

Subject Name: Linear and Digital IC Applications Lab Subject Code: D43PC13

Course Outcomes:

Upon the completion of Lab, student will be able to:

1. Understand various applications using operational amplifier (741).
2. Design circuits using IC 555, IC 565 for various applications and voltage regulators. Acquires the knowledge of 74X IC's.
3. Design various combinational & sequential circuits using various Digital ICs.
4. Acquires the knowledge of differentiating between Linear and Digital IC's.

Subject Name: Business Economics and Financial Analysis Subject Code: CHSM1

Course Outcomes:

After learning the contents of this course the student must be able to

1. Analyze the total structure of the business and able to identify and classify the Different types of business entities.
2. Asses the demand and supply analyses with the help of various measures and types of Elasticity of demand.
3. Infer the knowledge about production and cost analysis for product and services.
4. Interpret the fundamental concepts related to financial accounting.
5. Predict the financial position by analyzing the financial statement of the company through various ratios.

Subject Name: Control Systems Subject Code: C45PC1

Course Outcomes:

After learning the contents of this Course the student must be able to

1. Understand the System performance by selecting a suitable Controller and/or a Compensator for a specific application
2. Apply various Time Domain techniques to assess the system performance
3. Apply various Frequency Domain techniques to assess the system performance
4. Apply various control strategies to different applications
5. Test system Controllability and Observability using State space representation and applications of state space representation to various systems.

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DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

2023-24

Subject Name: Digital Communications Subject Code: C45PC2

Course Outcomes:

After learning the contents of this course the student must be able to

1. Analyze the basic digital modulation techniques such as PCM, DM etc., and understand the concepts of sampling.
2. Explain the concepts of different Shift Keying techniques.
3. Classify the basics of information theory and analyze the error performance, design optimum receivers for digital modulation techniques.
4. Interpret about different error detection and correcting codes like block codes, cyclic codes and convolution codes.
5. Analyze the performance of Spread Spectrum and Noise

Subject Name: Microprocessor and Microcontrollers Subject Code: C45PC3

Course Outcomes:

After learning the contents of this course the student must be able to

1. Acquire the knowledge of internal architecture, organization of 8086 processor and can develop assembly language programming.
2. Analyze internal architecture, memory organization of 8051 controller and can develop programming.
3. Construct interfacing techniques to 8086 and 8051 and define various serial communication standards.
4. Interpret the internal architecture and organization of ARM processor, and can develop programming.
5. Build the knowledge of the internal architecture and organization of advanced ARM Processors.

Subject Name: Digital Design through Verilog HDL Subject Code: C45PE5-1

Course Outcomes:

After learning the contents of this course the student must be able to

1. Describe, design, simulate, and synthesize computer hardware using the Verilog hardware description language.
2. Describe the role of hardware description language (HDL) in design flows for FPGA and ASIC with a historical development of the Verilog HDL.
3. Develop program codes for structural, behavioral and data flow modeling of combinational and sequential logic using Verilog HDL in any problem identification formulation and solution.
4. Complete tasks and assignments effectively as instructed with the use of modern technology through research and case studies.
5. Interpret and Implement designs using the advanced features of Verilog HDL and be able to write code effectively.

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DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

2023-24

Subject Name: Image Processing & Pattern Recognition Subject Code: C45PE5-II

Course Outcomes:

Upon completion of this course, the students should be able to

1. Understand Basics of image formation and transformation using sampling and quantization. Analyzes image enhancement techniques in both spatial and frequency domains.
2. Estimate how to restore the degraded image and finds tradeoffs between various filters to image restoration techniques. Apart from that evaluates the need for image compression also to evaluate the basic compression algorithms.
3. Ability to analyze image using different morphological techniques also understands the concepts of various Image segmentation.
4. Recognizes various representation and description techniques used in image processing.
5. Understands the fundamentals of Pattern recognition and classification methods to choose an appropriate features

Subject Name: Introduction to Embedded Systems Subject Code: C45PE5-III

Course Outcomes:

After learning the contents of this course the student must be able to

1. Identify the constraints and challenges of an Embedded System design
2. Understand the custom single purpose processors
3. Understand the general purpose processors
4. Get familiarized with state machines and models
5. Develop simple examples of embedded system

Subject Name: Optical Fiber Communications Subject Code: C45PE5-IV

Course Outcomes:

After learning the contents of this course the student must be able to

1. Summarize the importance, introductions and the basic elements, of optical fiber transmission link, fiber modes configurations and structures.
2. Interpret the different kind of losses, signal distortion in optical wave guides and other signal degradation factors.
3. Demonstrate the ability to design a system, with the knowledge of optical components as per needs and specifications.
4. Co-relate various Optical detectors and its performance.
5. Design Optical System and measure its characteristics.

Subject Name: Digital Communications Lab Subject Code: C45PC6

Course Outcomes:

After learning the contents of this course the student must be able to

1. Understand basic theories of Digital communication system in practical.
2. Design and implement different Pulse modulation and demodulation techniques.
3. Analyze digital modulation techniques.

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4. Identify and describe different techniques in modern digital communications, in particular source coding techniques.
5. Perform different multiplexing techniques

Subject Name: Microprocessor and Microcontrollers Lab Subject Code: C45PC7
Course Outcomes:
After learning the contents of this course the student must be able to

1. Apply the fundamentals of assembly level programming for microprocessors/ microcontrollers.
2. Develop programs on a microprocessor using instruction set of 8086.
3. Develop the assembly level programming using 8051 instruction set.
4. Able to understand how different I/O devices can be interfaced to microprocessor and microcontroller.
5. Develop programs using instruction set of ARM.

Subject Name: Fundamentals of Management Subject Code: CHSM2
Course Outcomes:
After learning the contents of this course the student must be able to

1. Infer the basic knowledge of management functions, levels and evolution of Management.
2. Ensure the students in decision making problem solving for the issues in corporate in the organization.
3. Acquire the knowledge of entire organization design and structure.
4. Perceive the strategically decision in selection, requirement training and development.
5. Enact and impose the qualities of a leader, mentor and coach.

Subject Name: Antennas and Wave Propagation Subject Code: C46PC1
Course Outcomes:
After learning the contents of this course the student must be able to

1. Explain the mechanism of radiation, distinguish between different antenna characteristic parameters, establish their mathematical relations, and estimate them for different practical cases.
2. Establish the radiation patterns of folded dipole, Yagi-Uda Antenna, Helical Antennas, Horn Antennas, and to acquire the knowledge of their analysis, design and development.
3. Analyze a micro strip rectangular patch antenna and a parabolic reflector antenna.
4. Carry out the Linear Array Analysis, Binomial Arrays and Planar arrays and specify the requirements for microwave measurements.
5. Classify the different wave propagation mechanisms.

Subject Name: Digital Signal Processing Subject Code: C46PC2
Course Outcomes:
After learning the contents of this course the student must be able to

1. Necessity and use of digital signal processing and its application.

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2. Analyze Discrete Fourier transform
3. Analyze FIR and IIR digital filters.
4. Applications of Multirate digital signal processing.
5. Acquaintance of DSP processor and its architecture.

Subject Name: Digital IC Design Subject Code: C46PE3-I

Course Outcomes:

After learning the contents of this course the student must be able to

1. Understand the various issues in digital integrated circuits.
2. Acquire knowledge of static and dynamic CMOS inverter.
3. Design of CMOS static and dynamic logics.
4. Acquire knowledge of static and dynamic latches and registers behavior.
5. Design arithmetic building blocks and various memories using CMOS.

Subject Name: Color Image Processing Subject Code: C46PE3-II

Course Outcomes:

After learning the contents of this course the student must be able to

1. Analyze the fundamentals of Color and its applications.
2. Understands different types of color image processing and transformations techniques involved in color images
3. Acquires the knowledge about color image enhancement techniques.
4. Ability to understand the concepts of various color image and edge-base segmentation
5. Understands color image compression procedures.

Subject Name: Advanced Microcontrollers Subject Code: C46PE3-III

Course Outcomes:

Upon completion of the course, student will able to understand

1. The Intel microcontroller architecture and its components
2. The basics of Motorola and PIC controllers
3. The basics of ARM processors
4. The detailed instruction sets of ARM and Thumb.
5. Microcontroller application development tools.

Subject Name: Telecommunication Switching Systems and Networks Subject Code C46PE3-IV

Course Outcomes:

After learning the contents of this course the student must be able to

1. Analyze different switching methodologies.
2. Differentiate between signaling methods used in Telecommunication Networks
3. Exhibit a good knowledge on data communication networks and ISDN and be able to differentiate LAN, MAN, WAN.
4. Demonstrate an ability to work on various Telecommunication Network concepts.
5. Demonstrate knowledge on modern telecommunication concepts like DSL & SONET.

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DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

2023-24

Subject Name: VLSI Design Subject Code: C46PC4

Course Outcomes:

After learning the contents of this course the student must be able to

1. Acquire qualitative knowledge about the fabrication of MOS transistors.
2. Design layout of any logic circuit with proper design rules.
3. Implement transistor level circuits for equivalent logic circuits.
4. Design sub systems like data, control and memory modules.
5. Implement any logic circuit using various Programmable Logic Devices.

Subject Name: Digital Signal Processing Lab Subject Code: C46PC6

Course Outcomes:

After learning the contents of this course the student must be able to

1. Illustrate various signal processing algorithms.
2. Analyze FIR Filter with specific magnitude and phase requirements.
3. Analyze IIR Filter with specific magnitude and phase requirements.
4. Illustrate the basics of Multi rate signal processing.
5. Analyze digital filters on DSP processors

Subject Name: VLSI Design Lab Subject Code: C46PC7

Course Outcomes:

After learning the contents of this course the student must be able to

1. Simulate various digital circuits.
2. Simulate and synthesize various CMOS circuits.
3. Understand the layout design rules for both static CMOS and dynamic clocked CMOS Circuits.
4. Develop an ability of designing of analog and digital CMOS circuits.
5. Design of Digital VLSI Circuits, stick diagram of circuits.
6. Design Entry & simulation of combinational circuits with test bench & functional verification.
7. Generation of configuration/fuse files for combinational circuits & implementation of the hardware using FPGA.
8. Design a schematic and simple layout for CMOS circuits, parasitic extraction.
9. Be able to complete a significant VLSI design project having a set of objective criteria and design constraints.

Subject Name: Microwave Engineering Subject Code: C47PC1

Course Outcomes:

Having gone through this course covering different aspects of microwave theory and techniques, the students would be able to

1. Analyze completely the rectangular waveguides, their mode characteristics, and design waveguides for solving practical microwave transmission line problems.

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2. Distinguish between the different types of waveguide and ferrite components, explain their functioning and select proper components for engineering applications.
3. Distinguish between the methods of power generation at microwave frequencies, derive the performance characteristics of 2-Cavity and Reflex Klystrons, Magnetrons, TWTs and estimate their efficiency levels, and solve related numerical problems.
4. Realize the need for solid state microwave sources, understand the concepts of TEDs, RWH Theory and explain the salient features of Gunn Diodes and ATT Devices.
5. Establish the properties of Scattering Matrix, formulate the S-Matrix for various microwave junctions, and understand the utility of S-parameters in microwave component design.

Subject Name: Analog IC Design Subject Code: C47PE2-I

Course Outcome:

After studying the course, each student is expected to be able to

1. Design basic building blocks of CMOS analog ICs.
2. Design of single and two stage operational amplifiers and voltage references.
3. Determine the device dimensions of each MOSFET's involved.
4. Design various amplifiers like differential, current and operational amplifiers.
5. Design of different type of comparators using Op-Amp circuits for the given specifications

Subject Name: Computer Vision Subject Code: C47PE2-II

Course Outcome:

Upon completion of this course, the students should be able to

1. Implement fundamental image processing techniques required for computer vision.
2. Perform shape analysis & Implement boundary tracking techniques.
3. Apply chain codes and other region descriptors & Apply 3D vision techniques.
4. Apply Hough Transform for line, circle, and ellipse detections & Implement motion related techniques.
5. Develop applications using computer vision techniques.

Subject Name: Embedded System Design Subject Code: C47PE2-III

Course Outcome:

On completion of the course, student will able to

1. Un Outline the basics of an embedded system
2. Understand types of processors, memory, various circuits and their interfacing
3. Acquire knowledge about devices and buses used in embedded networking
4. Formulate embedded firmware design approaches and development languages
5. Acquire knowledge about Life cycle of embedded design and identify the design constraints and challenges of an embedded system with case studies.

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DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

2023-24

Subject Name: Cellular Mobile Communications Subject Code: C47PE2-IV

Course Outcome:

By the end of the course, the student will be able to:

1. Understand mobile cellular system and impairments due to multipath fading channel.
2. Understand the fundamental techniques to overcome the different fading effects.
3. Understand Co-channel and Non Co-channel interferences
4. Familiar with cell coverage for signal and traffic, diversity techniques and mobile antennas.
5. Understand of frequency management, Channel assignment, and types of handoff.

Subject Name: Microwave Engineering Lab Subject Code: C47PC5

Course Outcomes:

1. Gain knowledge and understanding of microwave analysis methods.
2. Be able to apply analysis methods to determine circuit properties of passive/active microwave devices.
3. Know how to model and determine the performance characteristics of a microwave circuit or system using computer aided design methods.
4. Have knowledge of how transmission and waveguide structures and how they are used as elements in impedance matching and filter circuits.

Subject Name: Advanced Technologies Lab Subject Code: C47PC6

Course Outcomes:

1. Understanding and learning of basic Linux commands.
2. Able to learn different programs using python.
3. Develop applications using basic sensors.
4. Design various IOT applications using Raspberry Pi and Node MCU.

Subject Name: Low Power VLSI Design Subject Code: C48PE1-I

Course Outcomes:

On Completion of course students are able to

1. Infer about the second order effects of MOS transistor characteristics.
2. Analyze and implement various CMOS static logic circuits.
3. Learn the design techniques low voltage and low power CMOS circuits for various applications.
4. Learn the different types of memory circuits and their design.
5. Design and implementation of various structures for low power applications

Subject Name: Digital Signal Processing & Architecture Subject Code: C48PE1-II

Course Outcomes:

On completion of this course student will be able to

1. Design and implement a filter which is optimum for the given specifications.

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2. Design a Mutirate system for the needed sampling rate and can implement the same using Polyphase filter structures of the needed order.
3. Estimate the power spectrum of signal corrupted by noise through a choice of estimation methods: Parametric or Non Parametric.
4. Can calculate the output Noise power of different filters.
5. Also they can decide the stability of the system by studying the effect due to coefficient quantization while implementing different filters and transforms.

Subject Name: Programming 8051 Microcontroller using Assembly Language — Subject Code: C48PE1-III

Course Outcomes:

On completion of the course, student will able to understand

1. Outline the 8051 architecture, assembly language programming concepts.
2. Understand implementation of Timers, Serial port and Interrupts using Assembly language programming.
3. Formulate programming memory interfacing and 8051 interfacing with the 8255.
4. Cognize implementation of LCD, Keyboard, ADC and DAC using Assembly language programming.
5. Understand Assembly language programming for Relays and Stepper motor.

Subject Name: Radar Engineering — Subject Code: C48PE1-IV

Course Outcomes:

Upon the completion of course the students would be able to:

1. Explain the working principle of a pulse radar and establish the complete radar range equation, identifying the significance and choice of all parameters involved, and solve numerical problems to establish the radar characteristics.
2. Account for the need and functioning of CW, FM-CW and MTI radars, identifying the complete block diagrams and establishing their characteristics.
3. Illustrate the DLC characteristics, account for the range gated Doppler filter bank, and estimate the MTI radar performance characteristics and limitations.
4. Distinguish between Sequential Lobing, Conical Scan, and Monopoles type of Tracking Radars, specify their requirements and compare their characteristic features.
5. Derive the matched filter response characteristics for radar applications and account for correlation receivers; to distinguish between different radar displays and duplexers.

Subject Name: Memory Technologies — Subject Code: C48PE2-I

Course Outcomes:

Upon the completion of this course, students will demonstrate the ability to:

1. Apprehend SRAM, DRAM and Nonvolatile Memory Architectures
2. Understand Memory Fault Modeling, Testing, and Memory Design for Testability.
3. Understand design trade-off in Memory design.
4. Summarize RAM Failure Modes and Mechanism.
5. Demonstrate Experimental Memory Devices.

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DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

2023-24

Subject Name: Neural Networks Subject Code: C48PE2-II

Course Outcomes:

By completing this course the student will be able to:

1. Create different neural networks of various architectures both feed forward and feed backward.
2. Perform the training of neural networks using various learning rules.
3. Perform the testing of neural networks and do the perform analysis of these networks for various pattern recognition applications.

Subject Name: Embedded Real Time Operating Systems Subject Code: C48PE2-III

Course Outcomes:

On completion of the course, student will able to

1. Outline the basics of Embedded systems, OS and RTOS.
2. Imparts knowledge in various processor scheduling algorithms.
3. Understands the key concepts of Inter Process Communication.
4. Analyze the practical aspects of embedded systems in industry.
5. Construe Embedded System Design case studies.

Subject Name: Satellite Communications Subject Code: C48PE2-IV

Course Outcomes:

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

1. Understand the historical background, basic concepts and frequency allocations for satellite communication.
2. Demonstrate orbital mechanics, launch vehicles and launchers.
3. Demonstrate the design of satellite links for specified C/N with system design examples.
4. Visualize satellite sub systems like Telemetry, tracking, command and monitoring power systems etc.
5. Understand the various multiple access systems for satellite communication systems and satellite packet communications.

Subject Name: CPLD and FPGA Architectures and Applications Subject Code: C48PE3-I

Course Outcomes:

After completion of course the student will be able to

1. Understand the concept of programming logic devices and its applications.
2. Acquire knowledge of various programming methods in FPGA.
3. Design anti-fuse FPGA based architectures.
4. Familiarize with SRAM based FPGA architectures.
5. Design CPLD and FPGA architectures for real time applications.

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DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

2023-24

Subject Name: Biomedical Signal Processing Subject Code: C48PE3-II

Course Outcomes:

By the end of this course, students should be able to:

1. Explain the basic signal processing techniques.
2. Develop basic mathematical, scientific and computational skills necessary to analyze Biomedical signals.
3. Formulate problems in biomedical signals.
4. Design analysis tools for biological signals.
5. Explain the complexity of biological signals and the impact, promise of biomedical Engineering in understanding these signals.

Subject Name: Embedded C Subject Code: C48PE3-III

Course Outcomes:

On completion of the course, student will able to

1. Outlines the significance of Programming using Embedded C and to gain knowledge on 8051 microcontroller.
2. Understands programming the integrated peripherals using Keil software.
3. Analyze adding structure to code.
4. Design of real time timers with various constraints.
5. Gains knowledge on Intruder Alarm System.

Subject Name: Wireless Communications and Networks Subject Code: C48PE3-IV

Course Outcomes:

Upon Completion of course the student will be able to

1. Understand the examples of wireless communication systems, wireless local area networks.
2. Understand the concepts of frequency reuse, channel assignment strategies, handoff strategies, Improving coverage and capacity, cell splitting, TDMA, FDMA, CDMA, SDMA.
3. Understand the difference between wireless and fixed telephone networks, development of wireless networks.
4. Understand the wireless home networking IEEE 802.11 the physical layer, MAC layer.
5. Understand the concepts of Bluetooth technology and IEEE 802.15.

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R20 CO Attainment

S.No	Code	Course	90 % of CO DirectAttainment	10% of CO IndirectAttainment	100% of CO OverallAttainment
1	*CBSM7*	*Linear Algebra & Applied Calculus*	1.97	0.3	2.27
2	*CHSE1*	*English*	2.66	0.29	2.94
3	*CBSC3*	*Engineering Chemistry*	2.22	0.3	2.51
4	*CESBE2*	*Basic Electrical Engineering*	2.05	0.29	2.34
5	*CHSE2*	*English Language & Communication Skills Lab*	2.7	0.29	2.99
6	*CBSC4*	*Engineering Chemistry Lab*	2.7	0.29	2.99
7	*CESBE3*	*Basic Electrical Engineering Lab*	2.52	0.29	2.81
8	*CESBW1*	*Basic Workshop*	2.7	0.29	2.99
9	*CBSM11*	*"Ordinary Differential Equations,Transforms & Vector Calculus"*	1.73	0.3	2.03
10	*CBSP1*	*Applied Physics*	2.04	0.3	2.33
11	*CESEG1*	*Engineering Graphics*	1.51	0.29	1.8
12	*CESSD1*	*Semi-Conductor Devices & Circuits*	1.95	0.29	2.24
13	*CESCP1*	*C Programming for Problem Solving*	1.31	0.3	1.6

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14	*CBSP2*	*Applied Physics Lab*	2.69	0.29	2.98
15	*CESCP2*	*C Programming for Problem Solving Lab*	2.7	0.29	2.99
16	*CBSM12*	*Probability, Numerical Methods and Complex Analysis*	2.49	0.3	2.79
17	*C23PC1*	*Electrical Circuit Analysis*	1.97	0.3	2.27
18	*C23PC2*	*Analog Electronics*	1.38	0.3	1.68
19	*C23PC3*	*Electrical Machines-I*	2.41	0.29	2.7
20	*C23PC4*	*Electro Magnetic Fields*	2.12	0.29	2.41
21	C23PC5	*Analog Electronics Lab*	2.62	0.3	2.92
22	*C23PC6*	*Electrical Machines Lab-I*	2.68	0.22	2.9
23	*C23PC7*	*Electrical Circuit Analysis Lab*	2.65	0.29	2.94
24	CESEM1	*Engineering Mechanics*	2.28	0.29	2.57
25	C24PC1	*Digital Electronics*	1.9	0.3	2.2
26	*C24PC2*	*Electrical Machines-II*	2.06	0.3	2.35
27	*C24PC3*	*Control Systems*	2.03	0.28	2.32

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28	*C24PC4*	*Power System-I*	2.3	0.29	2.59
29	*C24PC5*	*Digital Electronics Lab*	2.62	0.28	2.91
30	C24PC6	*Electrical Machines Lab –II*	2.7	0.29	2.99
31	*C24PC7*	*Control Systems Lab*	2.7	0.24	2.94
32	*C25PC1*	*Power Electronics*	1.95	0.29	2.24
33	*C25PC2*	*Electrical Measurements and Instrumentation*	1.99	0.3	2.29
34	C25PE3	*Electrical Machine Design (Professional Elective-I)*	2.3	0.3	2.87
35	C25PC4	*Power System-II*	2.24	0.29	2.54
36	*C25OE5*	*Smart Grid Technologies (Open Elective-I)*	2.19	0.29	2.48
37	*C25PC6*	*Electrical Systems Simulation Lab*	2.7	0.29	2.99
38	*C25PC7*	*Power Electronics Lab*	2.66	0.28	2.94
39	CHSE3	*Advanced English Communication Skills Lab*	2.7	0.24	2.94
40	*C25PC8*	*Electrical Measurements and Instrumentation Lab*	2.66	0.29	2.95
41	*CHSM1*	*Business Economics and Financial Analysis*	2.47	0.3	2.76

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42	*C26PC1*	*Power System Protection*	2.37	0.29	2.66
43	*C26PC2*	*Power System Operation and Control*	2.08	0.29	2.37
44	*C26PC3*	*Microprocessors & Microcontrollers*	1.94	0.3	2.24
45	*C26PE4*	*Line-Commutated and Active Rectifiers (Professional Elective-II)*	2.33	0.3	2.62
46	*C26OE5*	*Renewable Energy Sources (Open Elective-II)*	2.15	0.3	2.44
47	C26PC6	Power System Lab	2.7	0.29	2.99
48	C26PC7	Microprocessors & Microcontrollers Lab	2.7	0.3	3
49	C26ES8	Python Programming Lab	2.7	0.29	2.99
50	CHSM2	Fundamentals of Management	1.84	0.3	2.13
51	C27PE1	Hybrid Electrical Vehicles	2.3	0.29	2.59
52	C27PE2	HVDC Transmission Systems	1.8	0.3	2.1
53	C27OE3	Operating System	1.69	0.3	1.99
54	C27PC4	Electrical & Electronics Design Lab	2.7	0.29	2.99
55	C27PW6	Major Project Phase I	2.7	0.29	2.99

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56	C28OE1	Cloud Computing	2.16	0.3	2.46
57	C28PE2	Electrical Distribution Systems	1.99	0.29	2.28
58	C28PE3	Utilization of Electrical Energy	2.17	0.3	2.47
59	C28PW4	Major Project Phase II	2.7	0.29	2.99
60	C27PW5	Comprehensive Viva/Test	2.70	0.29	2.99

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DEPARTMENT OF CSE (ARTIFICIAL INTELLIGENCE & MACHINE LEARNING)

COURSE OUTCOMES (2023-24)

SUBJECT NAME: ENGLISH FOR SKILL ENHANCEMENT
SUBJECT CODE: D1HSE1

COURSE OUTCOMES:

After learning the contents of this course, the student must be able to

1. Understand the importance of vocabulary and sentence structures.
2. Choose appropriate vocabulary and sentence structures for their oral and written communication.
3. Demonstrate their understanding of the rules of functional grammar.
4. Develop comprehension skills from the known and unknown passages.
5. Take an active part in drafting paragraphs, letters, essays, abstracts, précis and reports in various contexts.
6. Acquire basic proficiency in reading and writing modules of English..

SUBJECT NAME: ENGINEERING CHEMISTRY
SUBJECT CODE: D1BSEC1
COURSE OUTCOMES:

After completion of course the student will be able to

1. Students will acquire the basic knowledge of conductance in Metals and Bond Structures.
2. The students are able to understand the basic properties of water and its usage in domestic and industrial purposes.
3. They will acquire the Knowledge of chemistry in Batteries.
4. They can learn the fundamentals and general properties of polymers and other engineering materials.
5. They can predict potential applications of chemistry and practical utility in order to become good engineers and entrepreneurs.

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SUBJECT NAME: LINEAR ALGEBRA AND ORDINARY DIFFERENTIAL EQUATIONS
SUBJECT CODE: D1BSM1

COURSE OUTCOMES:
After completion of course the student will be able to

1. Discuss the matrix representation of a set of linear equations and to analyses the solution of the system of equations.
2. Reduce the quadratic form to canonical form using orthogonal transformation
3. Identify whether the given DE of first order is exact or not.
4. Can find applications of first order ODE.
5. Solve higher differential equation and apply the concept of differential equation to real world problems.
6. Evaluating double integrals and applying them to compute the areas of regions.

SUBJECT NAME: C PROGRAMMING FOR PROBLEM SOLVING
SUBJECT CODE: D1ESCP1
COURSE OUTCOMES:
After completion of course the student will be able to

1. Learn the taxonomy of computers and C fundamentals (L2)
2. Demonstrate arrays and functions to write c programming (L3)
3. Write C programs using pointers and strings (L3)
4. Analyze and write C programs using structures and unions (L4)
5. Develop C programs for various applications using file I/O functions. (L5)

SUBJECT NAME: IT WORKSHOP AND ELEMENTS OF COMPUTER ENGINEERING
SUBJECT CODE: D1ESITW1

COURSE OUTCOMES:

1. Apply knowledge for computer assembling and software installation. (L3)
2. Solve the trouble shooting problems. (L4)
3. Apply the tools for preparation of PPT, Documentation and budget sheet (L3)
4. Create standard documents and research documents using Latex. (L5)
5. Create project plans. (L5)

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SUBJECT NAME: COMPUTER AIDED ENGINEERING GRAPHICS
SUBJECT CODE: D1ESCEG

COURSE OUTCOMES:

1. Apply computer aided drafting tools to create 2D and 3D objects
2. Sketch conics and different types of solids
3. Appreciate the need of Sectional views of solids and Development of surfaces of solids
4. Read and interpret engineering drawings
5. Conversion of orthographic projection into isometric view and vice versa manually and by using computer aided drafting

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SUBJECT NAME: ENGLISH LANGUAGE AND COMMUNICATION SKILLS LAB
SUBJECT CODE: D1HSE2

COURSE OUTCOMES:

1. Understand the nuances of English language through audio- visual experience and group activities.
2. Neutralize their accent for intelligibility
3. Speak with clarity and confidence which in turn enhances their employability skills

SUBJECT NAME: ENGINEERING CHEMISTRY LAB
SUBJECT CODE: D1BSEC2

COURSE OUTCOMES:

1. The concepts of error and its analysis and can also develop the skills to tabulate the experimental data and derive valid conclusions.
2. Hands on experience in performing the electro-analytical techniques such as conductometry, potentiometry and pH metry
3. The ability to prepare polymers.
4. Estimation of Surface tension and viscosity of Lubricant oil.

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SUBJECT NAME: BUSINESS ECONOMICS AND FINANCIAL ANALYSIS
SUBJECT CODE: D2HSBF

COURSE OUTCOMES:

1. Analyze the total structure of the business and able to identify and classify the different types of business entities.
2. Asses the demand and supply analyses with the help of various measures and types of elasticity of demand
3. Infer the knowledge about production and cost analysis for product and services
4. Interpret the fundamental concepts related to financial accounting.
5. Predict the financial position by analyzing the financial statement of the company through various ratios.

SUBJECT NAME: APPLIED PHYSICS
SUBJECT CODE: D2HSBF

COURSE OUTCOMES:

1. Summarize the fundamentals of quantum mechanics to understand the quantum physics in the physical world,
2. By understand the fundamentals of band theory of solids; students will be able to classify the materials on the basis of energy gap.
3. Knowing the physics behind the semiconductors, enables the students to use them in different engineering applications
4. Establishing a strong foundation on the different kinds of opto-electronic, dielectric and display materials and paves a way for them to use in at various technical and engineering applications
5. Knowledge on fiber optics and quantum information enables the students to apply them in systems like optical communications and advanced quantum communication.

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SUBJECT NAME: STATISTICAL METHODS AND VECTOR CALCULUS
SUBJECT CODE: D2BSM5

COURSE OUTCOMES:

Upon completion, of course the Students will be able to:

1. Apply Statistical logic for solving the problems.
2. Analyze the qualitative & quantitative data.
3. Analyze the time series for the given data
4. Explain and compute derivatives of vector valued functions, gradient functions
5. Evaluate the line- surface and volume integrals and converting them from one to another.

SUBJECT NAME: BASIC ELECTRICAL ENGINEERING **SUBJECT CODE:** D2ESBEE

COURSE OUTCOMES:

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

1. Understand and analyze DC, AC circuits using basic principles.
2. Analyze and evaluate electrical circuits using various theorems
3. Understand the characteristics and performance of Electrical Machines and Transformers.
4. Understand the applications of various electrical installations.

SUBJECT NAME: DATA STRUCTURES **SUBJECT CODE:** D2ESDS

COURSE OUTCOMES:

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

1. Analyze time and space complexity of various problems and distinguish various data structures.L4
2. Demonstrate various Abstract Data Types. L3
3. Analyze the Binary tree and Disjoint set ADT L4
4. Analyze and implement various kinds of searching and sorting techniques L4
5. Design programs using a variety of data structures such as graphs and search trees L5

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SUBJECT NAME: APPLIED PHYSICS LAB **SUBJECT CODE:** D2BSAP2

COURSE OUTCOMES:

Upon completion, of course the student will be able to

1. Identify the V-I characteristics of Laser diode.
2. Evaluate the numerical and bending loss of given optical fiber.
3. Analyze the V-I characteristics of LED and photodiode devices.
4. Identify the type of semiconductor by using Hall Effect experiment.
5. Calculate the Plank's constant using Photocell.

SUBJECT NAME: BASIC ELECTRICAL AND SIMULATION LAB
SUBJECT CODE: D2ESBES

COURSE OUTCOMES:

Students will be able to:

1. Apply various laws to solve electrical networks.
2. Apply network theorems to solve complex electrical networks.
3. Evaluate the performance of different types of Electrical machines and single phase transformer by conducting various tests
4. Understand and analyze electrical installations using different lamp controlled methods, stair case wiring and different wiring connection

SUBJECT NAME: DATA STRUCTURS LAB **SUBJECT CODE:** D2ESDSL

COURSE OUTCOMES:

After learning the contents of this course, the student will be able to

1. Identify the appropriate data structures and algorithms for solving real world problems. L2
2. Apply various searching and sorting techniques for solving the given problems L3
3. Apply various data structures such as stacks, queues, search trees, and hash tables to solve the computing problems.L3
4. Implement different disjoint set operations and k-d trees.L3

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SUBJECT NAME: PROBABILITY AND STATISTICS **SUBJECT CODE:** D3BSPS1

COURSE OUTCOMES:

After learning the contents of this the student must be able to learn the concept of

1. Random variables and various discrete and continuous probability distribution and their properties.
2. Calculate interval estimations of Mean and Proportion of large samples.
3. Make important decisions s for few samples which are taken from a large data.
4. Calculate Mean and Proportion and to make important decisions from large samples which are taken from normal populations.
5. Test the hypothesis and give the inference to the given data.
6. The statistical methods of studying data sample.

SUBJECT NAME: PYTHON PROGRAMMING **SUBJECT CODE:** D3ESPP2

COURSE OUTCOMES:

After completion of course the student will be able to

1. Understand the basic concepts of python programming-L2
2. Illustrate operators, conditional statements, loops in python –L3
3. Construct code and test small python programs using functions and data structures –L3
4. Develop different programs using file concept modules of python – L5
5. Apply the concepts of object – oriented programming in python- L3

SUBJECT NAME: SEMICONDUCTOR DEVICES AND CIRCUITS
SUBJECT CODE: D3ESSD1

COURSE OUTCOMES:

After this course, the student will be able to

1. Acquire the knowledge in semiconductor materials and knows the complete internal structure of PN junction its capacitances, resistances
2. Acquire the knowledge of different types of diodes including their modes of operation, etc.
3. Design the circuits for the conversion of AC to DC Voltages.
4. Gain knowledge in the structure of Transistor, FET,MOS (different types, operation, characteristics and applications)
5. Acquire knowledge in the dc bias circuitry of BJT.

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SUBJECT NAME: MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE
SUBJECT CODE: D73PC1

COURSE OUTCOMES:

After learning the contents of this course, the student must be able to

1. Apply mathematical logic to solve problems.
2. Analyze the assertions using predicate logic.
3. Analyze different properties of GCD.
4. Find the GCD using Division and Euclidean Algorithm.
5. Illustrate the basic terminology of functions, relations, sets and demonstrate knowledge of their associated operations.
6. Understand the importance of algebraic properties with regard to working within various number systems.

SUBJECT NAME: COMPUTER ARCHITECTURE AND ORGANIZATION
SUBJECT CODE: D73PC2

COURSE OUTCOMES:

After learning the contents of this course, the student will be able to

1. Understand the basic computer organization and design L2
2. Design the hardwired and micro-programmed control units and demonstrate 8086 architecture L3
3. Analyze the computer arithmetic operations and write 8086 basic ALP programs L4
4. Analyze I/O data transfer modes and memory hierarchy. L4
5. Analyze the concurrent processing L4

SUBJECT NAME: COMPUTER NETWORKS SUBJECT CODE: D73PC3

COURSE OUTCOMES:

Upon completion of the course the student will be able:

1. To understand the protocol layering and physical level communication.
2. To analyze the performance of a network.
3. To understand the various components required to build different networks.
4. To learn the functions of the network layer and the various routing protocols.
5. To understand the functions and protocols of the Transport layer.

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SUBJECT NAME: PYTHON PROGRAMMING LAB SUBJECT CODE: D3ESPP5

COURSE OUTCOMES:

After completion of course the student will be able to

1. Use fundamental programming elements : operators ,statements, conditional and control flow statements-L3
2. Compare & contrast predefined functions and build functions- L4
3. Solve various computing problems using python modules and data structures –L4
4. Apply oops concepts using python –L3

SUBJECT NAME: SEMICONDUCTOR DEVICES AND CIRCUITS LAB
SUBJECT CODE: D3ESSD2

COURSE OUTCOMES:

After the completion of the lab student can be able to:

1. Design different electronic circuits for different applications using devices like Diodes, Transistors, etc.
2. Design circuits which can convert AC to DC.
3. Design various transistor biasing circuits.
4. Design different Amplifier Circuits.

SUBJECT NAME: OBJECT ORIENTED PROGRAMMING THROUGH JAVA
SUBJECT CODE: D74PC4

COURSE OUTCOMES:

After learning the contents of this course, the student will be able to

1. Demonstrate the concepts of object oriented programmingL3
2. Develop programs using java packages, interfaces and stream based I/O. L5
3. Analyze Handling of errors and concurrency using JAVA. L3
4. Analyze the collection frameworks L3
5. Develop applets for web applications and GUI based applicationsL5

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SUBJECT NAME: DESIGN AND ANALYSIS OF ALGORITHMS
SUBJECT CODE: D74PC5

COURSE OUTCOMES:

After learning the contents of this course, the student will be able to

1. Apply mathematical analysis methods to analyze the performance of algorithms and apply divide and conquer technique to solve the computing problems. L3
2. Demonstrate disjoint set operations and apply back tracking technique to solve the computing problems.L3
3. Apply Greedy method to solve various computing problems. – L3
4. Synthesize efficient algorithms in common engineering design situations using dynamic programming technique. L5
5. Solve complex problems using branch and bound technique and analyze NP hard and NP complete problems - L4

SUBJECT NAME: DATABASE MANAGEMENT SYSTEMS
SUBJECT CODE: D74PC6

COURSE OUTCOMES:

After learning the contents of this course, the student will be able to

1. Demonstrate the basic elements of a relational database management system and identify the data models for relevant problems. L3
2. Design entity relationship model and convert entity relationship diagrams into RDBMS L5
3. Formulate SQL queries for the given data base and apply the normalization techniques to the development of application software L5
4. Analyze the transaction management and concurrency control L4
5. Compare and contrast indexing and Hash based indexing L4

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SUBJECT NAME: SOFTWARE ENGINEERING **SUBJECT CODE: D74PC7**

COURSE OUTCOMES:

1. Ability to translate end-user requirements into system and software requirements, using e.g. UML, and structure the requirements in a Software Requirements Document (SRD).
2. Identify and apply appropriate software architectures and patterns to carry out high level design of a system and be able to critically compare alternative choices.
3. Will have experience and/or awareness of testing problems and will be able to develop a simple testing report

SUBJECT NAME: WEB TECHNOLOGIES **SUBJECT CODE: D74PC8**

COURSE OUTCOMES:

Upon completion of the course, the student will

1. Understand basics of server side scripting using PHP – L2
2. Illustrate well-formed XML programs and how to parse, use XML data with JAVA – L3
3. Design server side programming applications with servlets– L5
4. Develop programs using JSP for various applications –L5
5. Write programs with knowledge of client side scripting , validation of forms and AJAX programs – L4

SUBJECT NAME: DATABASE MANAGEMENT SYSTEMS LAB
SUBJECT CODE: D74PC9

COURSE OUTCOMES:

After learning the contents of this course, the student will be able to

1. Design and implement a database schema for a given problem. L5
2. Apply the normalization techniques for development of application software to realistic problems. L3
3. Formulate queries using SQL DML/DDL/DCL commands. L5
4. Develop application programs using PL/SQL. L5

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SUBJECT NAME OBJECT ORIENTED PROGRAMMING THROUGH JAVA LAB
SUBJECT CODE: D74PC10

COURSE OUTCOMES:

After completion of course, the student will be able to

1. Write programs for problems, using java collection frame work and abstract classesL3
2. Design and develop programs using objects and inheritance in Java language.L5
3. Write multithreaded programs. L3

SUBJECT NAME WEB TECCNOLOGIES LAB SUBJECT CODE: D74PC11

COURSE OUTCOMES:

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

1. Use LAMP Stack for web applications
2. Use Tomcat Server for Servlets and JSPs
3. Write simple applications with Technologies like HTML, Javascript, AJAX, PHP, Servlets, and JSPs, Parse XML files using Java (DOM and SAX parsers)
4. Connect to Database and get results.

SUBJECT NAME: ENVIRONMENTAL SCIENCE

COURSE OUTCOMES:

1. Ability to understand the scientific and economical solutions to environmental problems affecting the natural resources and the biodiversity.
2. Ability to associate with social issues, human population and its environment.
3. Ability to apply the techniques to solve pollution problems and to preserve the natural resources which in turn helps in sustainable development.
4. Ability to analyse the social issues and its impact on environment and the human world.

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SUBJECT NAME: Introduction to AI & Neural Networks **SUBJECT CODE:** C75PC1

COURSE OUTCOMES:

1. To gain basic knowledge on understanding the AI phenomenon, use state space representations and apply heuristic techniques
2. To apply knowledge representation issues to build predicate logic and knowledge rules.
3. To understand the uncertainty measures for symbolic reasoning, learn how neural networks are modelled.
4. To develop a learning process based on supervised and unsupervised mechanism.
5. To develop unconstrained optimization techniques, for single layer perceptron, derive output for multilayer perceptron, using decision rule, Feature detection, Back Propagation and differentiation, Hessian Matrix.

SUBJECT NAME: Python Programming **SUBJECT CODE:** C75PC2

COURSE OUTCOMES:

1. Understand the usage of procedural statements assignments, conditional statements, loops, method calls and different data structures.
2. Design code, and test small python programs.
3. Understand the concepts of object oriented programming as used in Python: classes, subclasses, properties, inheritance and overriding.

SUBJECT NAME: Natural Language Processing **SUBJECT CODE:** C75PC3

COURSE OUTCOMES:

1. To develop sensitivity to linguistic phenomena and an ability to model them with formal grammars.
2. To understand and carry out proper experimental methodology for training and evaluating empirical NLP systems.
3. To design, implement and analyse Natural Language Processing Algorithms.
4. To design different language modelling techniques.

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SUBJECT NAME: Introduction to Machine Learning **SUBJECT CODE:** C75PC4

COURSE OUTCOMES:

1. Know how to, design a learning system based on well-posed problems, study perspectives issues in machine learning. Understand how to imply concept learning in general to specific ordering.
2. Implement learning mechanism using decision trees. Understand the basic phenomenon of artificial neural networks and infer the evaluation hypothesis mechanism for learning mechanism.
3. Gain insights how to apply bayes theory, computational theory and instance base on learning mechanism. Classify the learnt information based on hypothesis for predicting probabilities.
4. Learn to apply set of rules and analyse the learning mechanism with perfect domain theories like PROLOG-EGB
5. Know in brief how to combine inductive and Analytical learning approaches.

SUBJECT NAME: Distributed Databases **SUBJECT CODE:** C75PE5A

COURSE OUTCOMES:

1. Know the necessity of distributed database concepts, through architecture and design.
2. Learn to process queries, decompose and to optimize them.
3. Understand the control mechanisms and algorithms that are implied through transaction management.
4. Identify issues like reliability, parallelism, associated in developing distributed database system.
5. Understand and relate the concepts of Object oriented design paradigm to Distributed Databases.

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SUBJECT NAME: Smart Grid Technologies **SUBJECT CODE:** C25OE5

COURSE OUTCOMES:

1. Appreciate the difference between smart grid & conventional grid
2. Apply smart metering concepts to industrial and commercial installations
3. Formulate solutions in the areas of smart substations, distributed generation and wide area measurements
4. Come up with smart grid solutions using modern communication technologies

SUBJECT NAME: ML Lab Using Python **SUBJECT CODE:** C75PC7

COURSE OUTCOMES:

1. Make use of Data sets in implementing the machine learning algorithms.
2. Implement the machine learning concepts and algorithms in any suitable language of choice.

SUBJECT NAME: Natural Language Processing Lab **SUBJECT CODE:** C75PC8

COURSE OUTCOMES:

1. Implementing experimental methodology for training and evaluating empirical NLP systems.
2. Show Sensitivity to linguistic phenomena and an ability to model them with formal grammars.
3. Design, implement, and analyze NLP algorithms.
4. Design different language modeling Techniques.

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SUBJECT NAME: FUNDAMENTALS OF MANAGEMENT **SUBJECT CODE:** CHSM2

COURSE OUTCOMES:

1. To infer the basic knowledge of management functions, levels and evolution of Management.
2. To ensure the students in decision making problem solving for the issues in corporate in the organization.
3. To acquire the knowledge of entire organization design and structure.
4. To perceive the strategically decision in selection, requirement training and development.
5. To enact and impose the qualities of a leader, mentor and coach.

SUBJECT NAME: DATA WAREHOUSING AND DATA MINING

SUBJECT CODE: C76PC1

COURSE OUTCOMES:

1. Gain insights on the necessity of building a data Warehouse, and basic operations that can be performed on it.
2. Understand the importance and process of knowledge discovery from data through its functionalities.
3. Analyse the algorithms developed for understanding Association rule functionality.
4. Learn how to classify the knowledge based on the information, and study different proposed algorithms for classifying the knowledge.
5. Analyse how to group similar knowledge based on the information, and study different approaches proposed for grouping the information.

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SUBJECT NAME: ADVANCED COMPUTER VISION **SUBJECT CODE:** C76PC2

COURSE OUTCOMES:

1. To understand the significance of geometric transformations, coordinate parameters of objects that are viewed using 2D and 3D.
2. To implement feature detection and matching concepts, involving segmentation and feature based alignment.
3. To frame structure while the objects are in motion, estimate how dense is the object from the surface in motion.
4. To understand how, images are joined, and aligned; photographs are captured, using mathematical functions.
5. To construct images of objects in 3D representation.

SUBJECT NAME: CRYPTOGRAPHY **SUBJECT CODE:** C76PE3C

COURSE OUTCOMES:

1. Learn how to encrypt the information using classical techniques like, symmetry, substitution, and steganography.
2. Know how to apply techniques to generate pseudo random sequences, use stream ciphers to for encrypting and decrypting the data.
3. Gain knowledge about Number theory, a mathematical notation of representing information
4. Know the principles of public key crypto systems to encrypt and decrypt the information
5. Understand various algorithms developed for hassing functions; choose one way hashing functions like, Message Authentication codes, Digital Signal Algorithm, Discrete Logarithm Signature.

SUBJECT NAME: NETWORK SECURITY **SUBJECT CODE:** C76PE4C

COURSE OUTCOMES:

1. Learn and understand how to apply security mechanisms across transport layer.
2. Understand and learn the security mechanism involved across a wireless network
3. Understand about types of intruders and respective detection mechanism, malicious software, and viruses.
4. Know the need and significance of firewall and its types.
5. Gain knowledge on basic concepts of Network Management System, legal and ethical aspects of establishing a network.

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SUBJECT NAME: ADVANCED ENGLISH COMMUNICATION SKILLS LAB
SUBJECT CODE: CHSE3

COURSE OUTCOMES:

1. Acquire vocabulary and use it contextually
2. Listen and speak effectively
3. Develop proficiency in academic reading and writing
4. Increase possibilities of job prospects
5. Communicate confidently in formal and informal contexts
6. Develop interpersonal communication skills

SUBJECT NAME: DATA WAREHOUSING AND DATA MINING LAB
SUBJECT CODE: C76PC5

COURSE OUTCOMES:

1. Learn how to build a data warehouse and query it (using open source tools like Pentaho Data Integration and Pentaho Business Analytics),
2. Learn to perform data mining tasks using a data mining toolkit (such as open-source WEKA), 3. Understand the data sets and data preprocessing,
3. Demonstrate the working of algorithms for data mining tasks such association rule mining, classification, clustering, and regression,
4. Exercise the data mining techniques with varied input values for different parameters.

SUBJECT NAME: ADVANCED COMPUTER VISION LAB **SUBJECT CODE:** C76PC6

COURSE OUTCOMES:

1. To develop novel and efficient techniques for the extraction of quantitative descriptions of viewed objects from a variety of images and image sequences.
2. To translate those techniques into high quality software tools that can be used to address real world problems.

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SUBJECT NAME: DEEP LEARNING **SUBJECT CODE:** C77PC1

COURSE OUTCOMES:

1. Understand the concepts of deep feed forward networks, regularization for Deep Learning taxonomy.
2. Know how to apply the knowledge to optimize training deep models, understand the motivation, and mechanism to build convolutional networks.
3. Develop sequence modelling using the knowledge of recurrent and recursive networks.
4. Analyse various auto encoders, gain overview of representation learning
5. Infer how to apply structured probabilistic models for deep learning.

SUBJECT NAME: INFORMATION SECURITY **SUBJECT CODE:** C77PC2

COURSE OUTCOMES:

1. Know the history of information security, by understanding the approaches that are to be implemented in system development life cycle. Along with the needs of security.
2. Plan how to implement security involving legal, ethical and professional issues.
3. Identify and understand risk management issues evolved during planning for securing the information.
4. Implement Encryption mechanisms to develop security for information.
5. Learn about the technologies that are useful for securing the information; understand about the security management models.

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SUBJECT NAME: CYBER SECURITY **SUBJECT CODE:** C77PE3B

COURSE OUTCOMES:

1. Understand the phenomenon of cybercrime based on classification in line to Indian regulations. Learn the essence to eradicate cyber offenses and criminal plans.
2. Know the challenges posed by mobile and wireless devices in terms of attacks and policies framed for handling mobile and wireless devices.
3. Gain the knowledge in implying the legal perspectives with respect to the phenomenon of cyber-crimes and cyber security acts.
4. Learn about the tools and methods used for committing cyber crimes
5. Know the organizational implications caused in view of cybercrimes and understands the causes of cyber terrorism like, psychology, Mind-set and skill of Hackers, role of social political, ethical, and intellectual property in the cyberspace.

SUBJECT NAME: SEMANTIC WEB **SUBJECT CODE:** C77PE4B

COURSE OUTCOMES:

1. Understand the concepts of semantic web, modelling, aggregating and knowledge representation.
2. Know how to describe the web resources, Develop queries using basics of SPARQL.
3. Gain knowledge in web ontology language 2.
4. Learn how to develop and implement logic and inference rules.

SUBJECT NAME: EMBEDDED SYSTEMS DESIGN **SUBJECT CODE:** C46OE2

COURSE OUTCOMES:

1. To provide an overview of Design Principles of Embedded Systems.
2. To provide clear understanding about the role of firmware, operating systems in correlation with hardware systems.

SUBJECT NAME: DEEP LEARNING LAB **SUBJECT CODE:** C77PC6

COURSE OUTCOMES:

1. Expert knowledge in solving real world problems using state of art deep learning techniques

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SUBJECT NAME: CUTTING EDGE TECHNOLOGIES LAB **SUBJECT CODE:** C77PC7

COURSE OUTCOMES:

1. Hierarchical configuration compassable from multiple sources, Configuration can be specified or overridden from the command line and Dynamic command line tab completion
2. Run application locally or launch it to run remotely and Run multiple jobs with different arguments with a single command
3. Metadata Processing Modes such as Metadata Constructing Mode, Metadata Retention Mode, Inter Engine Meta data Transfer Mode and Meta data Scaling

SUBJECT NAME: BLOCKCHAIN TECHNOLOGY **SUBJECT CODE:** C78PE1B

COURSE OUTCOMES:

1. Know the aspects, and learn how to recognize the potential need of block chain by understanding the ownership, by spending money twice.
2. Learn to protect, user accounts created during planning of block chain construction, documenting ownership, authorizing and storing transactions data.
3. Gain knowledge how, to use, store, and protect data among peers; to add transactions using the history of transactions by paying for integrity and bringing pieces together.
4. Know how to overcome the limitations by reinventing block chain and summarizing the events created.
5. Have a brief understanding about, monetary and nonmonetary currencies, demurrage currencies. Technical challenges, business model challenges, scandals and public perception, Government Regulation, Privacy challenges for personal records.

SUBJECT NAME: DISASTER MANAGEMENT **SUBJECT CODE:** C78OE3

COURSE OUTCOMES:

1. 1.Understanding Disasters, man-made Hazards and Vulnerabilities.
2. Understanding disaster management mechanism.
3. Understanding capacity building concepts and planning of disaster managements.
4. To increase the knowledge and understanding of the disaster phenomenon, its different contextual aspects, impacts and public health consequences.
5. To ensure skills and ability to design , implement and evaluate research on disasters.

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SUBJECT NAME: RENEWABLE ENERGY SYSTEMS **SUBJECT CODE:** C38OE1A

COURSE OUTCOMES:

1. Analyze renewable energy sources.
2. Apply solar based technologies in place of non-renewable energy sources.
3. Create a better scope on wind energy utilization and research.
4. Apply the basics of reusing bio degradable waste in relevant industries.
5. Evaluate ocean energy and geo-thermal energy relevant to practical situations.

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