CSE(AI&ML) R22 Courses

I YEAR I SEMESTER

(MA101BS) MATRICES AND CALCULUS

CO1: Write the matrix representation of a set of linear equations and to analyze the solution of the system of equations

CO2: Find the Eigen values and Eigen vectors of the matrix and discuss the nature of the quadratic form.

CO3: Discuss the applications of mean value theorems to the mathematical problems, Evaluation of improper integrals using Beta and Gamma functions.

CO4: Examine the extreme of functions of two variables with/ without constraints.

CO5: Analyze the convergence of sequence and series.

(CH102BS) ENGINEERING CHEMISTRY

CO1: Understand the basic properties of water and its usage in domestic and industrial purposes.

CO2: Acquire the basic knowledge of electrochemical procedures related to corrosion and its control.

CO3: Learn the fundamentals and general properties of polymers and other engineering materials.

CO4: Apply the knowledge of atomic, molecular and electronic changes related to conductivity

CO5: Apply the knowledge of engineering materials in daily life.

(CS103ES) PROGRAMMING FOR PROBLEM SOLVING

CO1: Design algorithms, flowcharts and programs involving decision and iteration structures.

CO2: Analyze the concepts of arrays, strings and structures for real world problems.

CO3: Apply various file handling techniques for better data management.

CO4: Apply the concept code reusability using Functions.

CO5: Implement various searching and sorting Techniques.

(EE104ES) BASIC ELECTRICAL ENGINEERING

CO1: Understand the importance of DC circuits and analyze theorems.

CO2: Understand the concept of AC circuits and resonance.

CO3: Concept of principle of operation of transformer and efficiency of single phase transformer.

CO4: Analyze the performance of DC machines and Induction motors.

CO5: Demonstrate the importance of electrical installation and the concept of power, power factor and its improvement.

(EG105ES) COMPUTER AIDED ENGINEERING GRAPHICS

CO1: Apply computer aided drafting tools to create 2D and 3D objects

CO2: Sketch conics and different types of solids

CO3: Appreciate the need of Sectional views of solids and Development of surfaces of solids

CO4: Read and interpret engineering drawings

CO5: Conversion of orthographic projection into isometric view and vice versa manually and by using computer aided drafting

(CS106ES) ELEMENTS OF COMPUTER SCIENCE & ENGINEERING

CO1: Know the working principles of functional units of a basic Computer

CO2: Understand program development, the use of data structures and algorithms in problem solving.

CO3: Know the need and types of operating system, database systems.

CO4: Understand the significance of networks, internet, WWW and cyber security.

CO5: Understand Autonomous systems, the application of artificial intelligence.

(CH107BS) ENGINEERING CHEMISTRY LABORATORY

CO1: Determination of rate of corrosion of mild steel in various conditions.

CO2: To perform methods such as conductometry, potentiometry and pH metry in order to find out the concentrations or equivalence points of acids and bases.

CO3: To prepare polymers like Thiokol rubber and Bakelite.

CO4: Estimation of Saponification value, Viscosity and surface tension of lubricant oils.

CO5: Estimation of hardness of water, Chloride content of water sample.

(CS109ES) PROGRAMMING FOR PROBLEM SOLVING LABORATORY

CO1: Apply fundamental programming concepts and Exercise control statements to solve simple problems.

CO2: Represent and manipulate data with arrays and strings

CO3: Modularize the code with functions so that they can be reused.

CO4: Develop applications using user defined data types

CO5: Implement various searching and sorting techniques

(EE108ES) BASIC ELECTRICAL ENGINEERING LABORATORY

CO1: Apply the various procedures and techniques for the experiments.

CO2: Verify the various electrical laws and theorems with DC Excitation.

CO3: Determine the losses, efficiency and regulation of single phase transformer.

CO4: Obtain the performance of induction motors.

CO5: Evaluate the speed of DC shunt motor.

(HS110MC) CONSTITUTION OF INDIA

CO1: Knowledge of historical perspective and salient features of Indian constitution

CO2: Aware of the fundamental rights of Indian citizens.

CO3: Know the directive principles and fundamental duties of government and citizens

CO4: Knowledge of the Quasi-federal and parliamentary structure of Indian constitution

CO5: Knowledge of the constitution amendment powers and Emergency Provisions of Indian constitution

I YEAR II SEMESTER

(MA201BS) ORDINARY DIFFERENTIAL EQUATIONS AND VECTOR CALCULUS

CO1: Methods of solving the differential equations of first order

CO2: Methods of solving the second and higher order differential equations.

CO3: Evaluation of multiple integrals

CO4: The basic properties of vector valued functions and derivatives

CO5: Line, surface and volume integrals and vector integral theorems.

(AP202BS) APPLIED PHYSICS

CO1: Understand various optical phenomena of light

CO2: Apply basic the principles of quantum mechanics to classify solids based on band theory.

CO3: Identify the role of semiconductor devices in science and engineering Applications.

CO4: Understand the features and applications of Nanomaterial's in various fields.

CO5: Understand various aspects of Lasers and Optical fiber and their applications in diverse fields.

(ME203ES) ENGINEERING WORKSHOP

CO1: Study and practice on machine tools and their operations

CO2: Practice on manufacturing of components using workshop trades including pluming, fitting, carpentry, and foundry, house wiring and welding.

CO3: Identify and apply suitable tools for different trades of engineering processes including drilling, material removing, measuring, and chiseling.

CO4: Build right attitude, team working, precision and safety at work place.

CO5: Apply basic electrical engineering knowledge and various manufacturing processes.

(EN204HS) ENGLISH FOR SKILL ENHANCEMENT

CO1: Understand the importance of vocabulary and sentence structures.

CO2: Choose appropriate vocabulary and sentence structures for oral and written communication.

CO3: Demonstrate understanding of the rules of functional grammar.

CO4: Develop comprehension skills from known and unknown passages through effective reading strategies.

CO5: Construct paragraphs, letters, essays, abstracts, précis and reports in various contexts thereby improving proficiency in writing modules of English.

(EC205ES) ELECTRONIC DEVICES AND CIRCUITS

CO1: Analyze the PN Junction diode operation and its characteristics

CO2: Know the applications of Diode such as clippers and clampers.

CO3: Analyze the characteristics of BJT.

CO4: Analyze the characteristics of FET.

CO5: Understand the concept of special purpose devices

(AP206BS) APPLIED PHYSICS LABORATORY

CO1: KnowthedeterminationofthePlanck'sconstantusingPhotoelectriceffect

CO2: Appreciate quantum physics in semiconductor devices and opto electronics.

CO3: Gain the knowledge of various semiconductor devices like .PN junction diode, Zener diode, BJT, LED, solar Cell

CO4: Understand the properties and principles of laser and optical fiber.

CO5: Carried out data analysis

(CS207ES) PYTHON PROGRAMMING LABORATORY

CO1: Able to develop programs using control statements.

CO2: Able to code programs using modular approach.

CO3: Read and write data from/to files in Python Programs

CO4: To write GUI program to create window wizard using various buttons.

CO5: Implement digital systems using python and to install and use various libraries.

(EN208HS) ENGLISH LANGUAGE AND COMMUNICATION SKILLS LABORATORY

CO1: Reproduce speech sounds and improve language

CO2: Develop accent and pronunciation in various situations

CO3: Understand variants in pronunciation by differentiating between British and American accents

CO4: Identify the diverse purposes of listening and speaking

CO5: Exhibit critical thinking, problem-solving and decision-making skills through Group Discussions and Interviews.

(CS209ES) IT WORKSHOP

CO1: Perform Hardware troubleshooting

CO2: Understand Hardware components and inter dependencies

CO3: Safeguard computer systems from viruses/worms

CO4: Document/ Presentation preparation

CO5: Perform calculations using spreadsheets

(ES210MC) ENVIRONMENTAL SCIENCE

CO1: The multidisciplinary nature of environment, essence of environment,

CO2: About the natural resources utilization and their conservation

CO3: The importance of Biodiversity and its Conservation

CO4: About the causes and effects of environmental pollution and its management as well as environmental issues

CO5: About the environmental wastes management rules, regulations and EIA for the protection of environment and to achieve sustainable development.

II YEAR I SEMESTER

(PS301BS) PROBABILITY AND STATISTICS

CO1: Basic concepts of probability and Understand Chance causes and random variable that describes randomness or an uncertainty in certain realistic situation. It can be of either discrete or continuous type.

CO2: Concepts like mean variance, co-variance of random variables expectation, discrete distributions.

CO3: The Normal random variable for the continuous case predominantly describes important probability distributions, the types of sampling and Sampling distribution.

CO4: Estimations of statistical parameters and Testing of hypothesis of few unknown statistical parameters.

CO5: Understand the stochastic process and Markov chains.

(CS303PC) DATA STRUCTURES

CO1: Analyze the representation of various static, dynamic and, hierarchical datastructures and Design and implement the mechanism of linear data structures.

CO2: Outline the concepts of hashing, collision and its resolution methods using hash function.

CO3: Design and Implementation of various advanced concepts of binary trees.

CO4: Implement various algorithms on graph data structures and implementation of various sorting techniques.

CO5: Design and implementation of Pattern Matching algorithms to find patterns within a bigger set of data or text.

(CS304PC) COMPUTER ORGANIZATION AND ARCHITECTURE

CO1: Understand the basics of instruction sets and their impact on processor design.

CO2: Demonstrate an understanding of the design of the functional units of a digital computer system.

CO3: Evaluate cost performance and design trade-offs in designing and constructing a computer processor including memory.

CO4: Design a pipeline for consistent execution of instructions with minimum hazards.

CO5: Recognize and manipulate representations of numbers stored in digital computers

(AM305PC) SOFTWARE ENGINEERING

CO1: Understand the software engineering principles, practices and process models.

CO2: Elicit, analyse and specify software requirements from the project stakeholders.

CO3: Analyse and translate the specifications into software designs and model the designs.

CO4: Apply different test strategies to perform testing and metrics to assess the software.

CO5: Identify and manage software risks and maintain the quality of the software.

(AM306PC) OPERATING SYSTEMS

CO1: Will be able to control access to a computer and the files that may be shared

CO2: Demonstrate the knowledge of the components of computers and their respective roles in computing.

CO3: Ability to recognize and resolve user problems with standard operating environments.

CO4: Gain practical knowledge of how programming languages, operating systems, and architectures interact and how to use each effectively.

CO5: Identify storage management and protection

(CS306PC) DATA STRUCTURES LABORATORY

CO1: Ability to develop C programs for computing and real-life applications using basic elements like control statements, functions, pointers and structures and various linked lists.

CO2: Ability to develop data structures like stacks and queues using arrays and pointers.

CO3: Ability to implements the sorting methods like Quick sort, Heap sort and Merge sort.

CO4: Ability to implement various trees and tree traversal techniques in recursive and non-recursive manner.

CO5: Gain knowledge on implementing the graph traversal techniques and Pattern matching algorithms like Boyer- Moore, Knuth-Morris-Pratt

(AM307PC) OPERATING SYSTEMS LABORATORY

CO1: Simulate and implement operating system concepts such as scheduling,

CO2: Able to implement C programs using Unix system calls

CO3: Implement the dead lock avoidance using banker's algorithm

CO4: Implement the producer and consumer problem and Page Replacement algorithms

CO5: Exercise inter-process communication.

(AM308PC) SOFTWARE ENGINEERING LABORATORY

CO1: Understand and analyse problem domain of the applications

CO2: Create software requirements documents for the applications to be developed

CO3: Define software design documents for applications to be developed

CO4: Build various models to represent software design using modeling tools

CO5: Design different types of test cases to test the applications

(HS309MC) GENDER SENSITIZATION

CO1: Students will have developed a better understanding of important issues related to gender in contemporary India.

CO2: Students will be sensitized to basic dimensions of the biological, sociological, psychological and legal aspects of gender. This will be achieved through discussion of materials derived from research, facts, everyday life, literature and film.

CO3: Students will attain a finer grasp of how gender discrimination works in our society and how to counter it.

CO4: Students will acquire insight into the gendered division of labor and its relation to politics and economy.

CO5: Men and women students and professionals will be better equipped to work and live together as equals

(AM310PC) SKILL DEVELOPMENT COURSE (NODE JS/ REACT JS/ DJANGO)

CO1: Build a custom website with HTML, CSS, and Bootstrap and little JavaScript.

CO2: Demonstrate Advanced features of JavaScript and learn about JDBC

CO3: Develop Server – side implementation using Java technologies.

CO4: Develop the server – side implementation using Node JS.

CO5: Design a Single Page Application using React.

II YEAR II SEMESTER

(CS402PC) DISCRETE MATHEMATICS

CO1: Understand and construct Inference Theory and Normal Forms

CO2: Apply set theory and Relations to formulate Discrete Structures

CO3: Analyze and solve Posets and Algebraic Problems using Groups

CO4: Apply Permutations and Combinations to Solve the Discrete Problems

CO5: Apply graph theory in solving computing problems

(AM403PC)AUTOMETA THEORY AND COMPILER DESIGN

CO1: Able to employ finite state machines for modeling and solving computing problems.

CO2: Able to design context free grammars for formal languages.

CO3: Able to distinguish between decidability and undecidability.

CO4: Demonstrate the knowledge of patterns, tokens & regular expressions for lexical analysis.

CO5: Acquire skills in using lex tool and design LR parsers.

(CS404PC) DATABASE MANAGEMENT SYSTEMS

CO1: Gain knowledge of fundamentals of DBMS and ER Model.

CO2: Able to apply the knowledge of relational model and normalization.

CO3: Apply the basics of SQL for retrieval and management of data.

CO4: Be acquainted with the basics of transaction processing and concurrency control.

CO5: Gain knowledge on database storage structures and access techniques.

(AM405PC) INTRODUCTION TO ARTIFICIAL INTELLIGENCE

CO1: Able to select a search algorithm for a problem and estimate its time and space complexities.

CO2: Apply AI techniques to solve problems of game playing, theorem proving, and machine learning.

CO3: Understand different knowledge representation techniques.

CO4: Analyse classical planning and Hierarchical planning.

CO5: Comprehend the applications of Probabilistic Reasoning and Bayesian Networks.

(AM406PC) OBJECT ORIENTED PROGRAMMING THROUGH JAVA

CO1: Understand the basic object-oriented programming concepts and apply them in problem solving.

CO2: Illustrate inheritance and package concepts for reusing the program.

CO3: Demonstrate developing of exception handling and multitasking programs using multiple threading concept.

CO4: Able to write programs of graphical user interface using AWT.

CO5: Able to write Applet based programs and swing applications

(CS407PC) DATABASE MANAGEMENT SYSTEMS LABORATORY

CO1: Develop ER data model and Relational data model for a database.

CO2: Design database schema for a given application and apply normalization.

CO3: Apply SQL commands for data definition and data manipulation.

CO4: Apply the basics of SQL for retrieval and management of data.

CO5: Develop solutions for database applications using procedures, cursors and triggers.

(AM408PC) JAVA PROGRAMMING LABORATORY

CO1: Able to write programs using OOP principles.

CO2: Able to write programs using abstract classes.

CO3: Able to write multithreaded programs.

CO4: Able to write programs for solving real world problems using the java collection framework.

CO5: Able to write GUI programs using swing controls in Java.

(HS411MC) INTELLECTUAL PROPERTY RIGHTS

CO1: Understand the fundamentals of intellectual properties and its agencies.

CO2: Know the trade mark registration process and its rights.

CO3: Understand the fundamentals of copy rights and patent law.

CO4: Know the trade secret determination and protection.

CO5: Know the recent developments in protection of intellectual property rights

(AM412PC) SKILL DEVELOPMENT COURSE (PROLOG/ LISP/ PYSWIP)

CO1: Explore the features of PROLOG programming language, including basic syntax, selection and search strategies of PROLOG.

CO2: Develop structured prolog programs for various tasks of moderate complexity and requirements

CO3: Understand syntax, semantics and natural deduction of predicate logic.

CO4: Describe the basic predicates to manipulate list data structure and sorting algorithms using PROLOG programming

CO5: Demonstrate the PROLOG programming language skills by solving real life problems through AI prospect.

III YEAR I SEMESTER

(CS501PC) DESIGN AND ANALYSIS OF ALGORITHMS

CO1: Acquire the knowledge of algorithm analysis and its notations that are applied on the problems solved by divide and conquer paradigm

CO2: Apply the major graph algorithms for model engineering problems and knowledge of the greedy paradigm

CO3: Apply the dynamic programming paradigm and recite algorithms that employ dynamic programming paradigm

CO4: Apply the concept of back tracking, branch and bound paradigm for real time problems

CO5: Analyse the complexity of problems and differentiate that in term of P and NP Problems.

(CS502PC) COMPUTER NETWORKS

CO1: Analyze TCP/IP and OSI models and various protocols and various error handling mechanisms.

CO2: Use of various devices in connecting different types of LANs.

CO3: Analyze different routing protocols and IP Addresses.

CO4: Discuss the various services offered by transport layer.

CO5: Describes the working of various networked applications such as DNS, Mail, WWW and HTTP.

(AM503PC) MACHINE LEARNING

CO1: Demonstrate the foundational Machine Learning concepts.

CO2: Generate models using Perceptron in real world scenarios.

CO3: Build appropriate models for real world problem solving using Supervised Learning.

CO4: Interpret algorithm results and transform them into actionable information suitable for real-time applications in Unsupervised Learning.

CO5: Device Reinforcement Learning models.

(BF504HS)BUSINESS ECONOMICS AND FINANCIAL ANALYSIS

CO1: The students will understand the various Forms of Business and the impact of economic variables on the Business.

CO2: The students will understand the concept in Demand and supply.

CO3: The student will learn the various concepts in Production, Cost and Pricing strategies.

CO4: The student will gain the knowledge on financial position by analyzing the financial statements of a company.

CO5: The students can able to understand financial position by analyzing the financial rations of the company.

(AM511PE) GRAPH THEORY

CO1: Know some important classes of graph theoretic problems.

CO2: Apply cut-sets, cut-vertices, Dijkstra"s shortest path algorithm

CO3: Prove central theorems about trees, matching ,connectivity, coloring and planar graphs;

CO4: Describe and apply some basic algorithms for graphs;

CO5: Use graphs & coloring as a modeling tool.

(AM512PE) INTRODUCTION TO DATA SCIENCE

CO1: Understand basic terms of statistical modeling and data science

CO2: Analyze data measuring the Central Tendency and measuring the Dispersion of Data.

CO3: Understand arrays, matrices, data frames and Lists

CO4: Implement R programming concepts

CO5: Utilize R elements for data visualization and prediction

(AM513PE) WEB PROGRAMMING

CO1: Understand the User Interface for web applications using HTML, CSS and Java Script.

CO2: Understand the object oriented programming concepts using Java.

CO3: Describe the usage of JDBC API and Network API in Java.

CO4: Understand the importance of Applets, Event driven programming in Java and the usage of Servlet API.

CO5: Identify XML tags with their purpose.

(EC514PE) IMAGE PROCESSING

CO1: Demonstrate the knowledge of the basic concepts of two-dimensional signal acquisition, sampling, and quantization.

CO2: Demonstrate the knowledge of filtering techniques.

CO3: Demonstrate the knowledge of 2D transformation techniques.

CO4: Demonstrate the knowledge of image enhancement, segmentation, restoration .

CO5: Demonstrate the compression techniques.

(AM515PE) COMPUTER GRAPHICS

CO1: Understand the applications and primitives of Computer Graphics system.

CO2: Perform 2D transformations on graphical objects.

CO3: Understand 3D object representations.

CO4: Perform 3D transformations on graphical objects.

CO5: Design computer based animation systems.

(AM505PC) MACHINE LEARNING LAB

CO1: Understand modern notions in predictive data analysis.

CO2: Select data, model selection, model complexity and identify the trends.

CO3: Understand a range of machine learning algorithms along with their strengths and weaknesses.

CO4: Build predictive models from data and analyse their performance.

CO5: Understand the Performance Analysis of Classification Algorithms.

(CS504PC) COMPUTER NETWORKS LAB

CO1: Implement data link layer farming methods

CO2: Analyze error detection and error correction codes.

CO3: Implement and analyze routing and congestion issues in network design.

CO4: Implement Encoding and Decoding techniques used in presentation layer

CO5: To be able to work with different network tools

(CS507PC)SKILL DEVELOPMENT COURSE(UI DESIGN-FLUTTER)

CO1: Knowledge on installation of various softwares.

CO2: Understanding of various Widgets

CO3: Application of Animation to Apps

CO4: Implements Flutter Widgets and Layouts

CO5: Responsive UI Design and with Navigation in Flutter

III YEAR II SEMESTER

(AM601PC) KNOWLEDGE REPRESENTATION AND REASONING

CO1: Ability to understand Representing knowledge in logic

CO2: Acquire theoretical knowledge on Ontological categories.

CO3: Ability to understand knowledge-engineering process and frames.

CO4: Percept Classification of processes and Syntax and Semantics of Contexts.

CO5: Ability to understand Conceptual schema and tools for knowledge acquisition

(AM602PC) DATA ANALYTICS

CO1: Understand the impact of data analytics for business decisions and strategy

CO2: Carry out data analysis/statistical analysis

CO3: To carry out standard data visualization and formal inference procedures

CO4: Design Data Architecture

CO5: Understand various Data Sources

(AM603PC) NATURAL LANGUAGE PROCESSING

CO1: Understand the natural language word and document structures.

CO2: Analyse syntax processing and parsing algorithms.

CO3: Comprehend sematic parsing techniques.

CO4: Understand structure of representation systems.

CO5: Analyse multilingual cross lingual models.

(AM621PE) SOFTWARE TESTING METHODOLOGIES

CO1: Understand purpose of testing and path testing

CO2: Understand strategies in data flow testing and domain testing

CO3: Develop logic-based test strategies

CO4: Understand graph matrices and its applications

CO5: Implement test cases using any testing automation tool

(AM622PE) INFORMATION RETRIEVAL SYSTEMS

CO1: Know the basics of information retrieval & database systems and their capabilities.

CO2: Understand different data structures and indexing algorithms.

CO3: Understand automatic indexing and clustering techniques.

CO4: Analyse search procedures and visualization technologies.

CO5: Comprehend text and multimedia retrieval systems

(AM623PE) PATTERN RECOGNITION

CO1: Understand the importance of pattern recognition and its representation

CO2: Analyze the variants of NN algorithm

CO3: Understand the necessity of Hidden 21arkov models, decision tree and SVM for classification

CO4: Ability to apply Neural Networks, SVM for Classification

CO5: Apply different types of clustering algorithms.

(AM624PE) DISTRIBUTED COMPUTING

CO1: Compare and differentiate between different forms of computing techniques.

CO2: Demonstrate Distributed computing Paradigms and Distributed Objects Paradigms.

CO3: Demonstrate the remote method invocation and its comparison with CORBA

CO4: Define and study the Distributed Document Based systems and distributed multimedia systems.

CO5: Express the outline of Grid computing concept and cluster computing concept.

(AM625PE) DATA WAREHOUSING AND BUSINESS INTELLIGENCE

CO1: Understand architecture of data warehouse and OLAP operations.

CO2: Understand Fundamental concepts of BI

CO3: Application of BI Key Performance indicators

CO4: Understand Utilization of Advanced BI Tools and their Implementation.

CO5: Implementation of BI Techniques and BI Ethics.

(CE611OE) DISASTER PREPAREDNESS & PLANNING MANAGEMENT

CO1: Understand the need of disaster management system in India.

CO2: Have the thorough knowledge of environmental hazards and disasters.

CO3: Get the complete concept of endogenous hazards and their mitigation measures.

CO4: Know the principles and measures to control exogenous hazards.

CO5: Have the in-depth knowledge of emerging approaches in disaster management.

(CE612OE) BUILDING MANAGEMENT SYSTEMS

CO1: Understand the need of building management systems.

CO2: Have the thorough knowledge of Fire Alarm Systems.

CO3: Get the complete concept of Access Control Systems.

CO4: Know the principles of Security Systems Fundamentals.

CO5: Have the in-depth knowledge of Energy Management Building Management Systems.

(CE613OE) ENVIRONMENTAL IMPACT ASSESSMENT

CO1: Develop students regarding environmental impact assessment.

CO2: Gain knowledge on EIA methodologies.

CO3: Get information about Environmental Management Plan.

CO4: Expose the students on Environmental Legislation and Life cycle assessment.

CO5: Help students reflects new Preparation of EIA.

(CE614OE) HYDROGEOLOGY

CO1: Students will demonstrate a comprehensive understanding of fundamental hydrogeological principles, including groundwater flow, aquifer properties, and contamination processes.

CO2: Students will exhibit proficiency in interpreting hydrogeological data, including groundwater level measurements, pumpig test results, and contaminant concentrations, to draw meaningful conclusions.

CO3: Students will effectively communicate hydrogeological concepts, findings, and recommendations through written reports, oral presentations, and discussions, demonstrating clarity, coherence, and professionalism.

CO4: Students will develop the ability to identify, analyze, and solve hydrogeological problems using quantitative and qualitative approaches, considering technical, environmental, and socio- economic factors.

CO5: students will be able to analyze the principles of groundwater management and evaluate sustainable development practices, including legal and regulatory aspects, to address groundwater depletion and its environmental consequences.

(EE611OE) RENEWABLE ENERGY SOURCES

CO1: Understand the principles of wind power plants.

CO2: Understand the principles of solar photovoltaic power generation and fuel cells.

CO3: Assess the cost of generation for conventional and renewable energy plants

CO4: Understand the different energy storage methods and detect about environmental effects of energy conversion.

CO5: Design suitable power controller for wind and solar applications and analyze the issues involved in the integration of renewable energy sources to the grid

(EE612OE) FUNDAMENTAL OF ELECTRIC VEHICLES

CO1: Understand the fundamentals of Electric Vehicles.

CO2: Understand the Electrical Vehicle Dynamics

CO3: Understand the technology associated with each element of EV drive-train

CO4: Design the batteries, EV motors and Power electronic controllers for EV systems.

CO5: Analyze the economics of EV market and EV data using Analytical tools.

(ME611OE) BASIC MECHANICAL ENGINEERING

CO1: Understand different types of power generation, working of refrigerator.

CO2: SummarizedifferenttypesofmanufacturingprocessesandPowertransmission systems.

CO3: Discuss about conventional and non-conventional sources of energy.

CO4: Identifyautomationofvariousmanufacturingprocessesinengineeringpractice. robotics.

CO5: Describe the basic concepts and applications of industrial

(ME612OE) POWER PLANT ENGINEERING

CO1: Understand the principle of various sources of energy, resources and development of Power.

CO2: To know the concept of internal combustion engine and gas turbine power plant.

CO3: To know the concept of hydroelectric power plant.

CO4: To know the concept of nuclear power stations and non-conventional power sources.

CO5: Understand the power plant economics and environmental considerations.

(EC611OE) FUNDAMENTALS OF INTERNET OF THINGS

CO1: Know basic protocols in sensor networks.

CO2: Program and configure Arduino boards for various designs.

CO3: Python programming and interfacing for Raspberry Pi.

CO4: Understand the Software defined Network and Data Handling.

CO5: Design IoT applications in different domains.

(EC612OE) PRINCIPLES OF SIGNAL PROCESSING

CO1: Understand the concepts of continuous time and discrete time systems.

CO2: Understand the characteristics of linear time invariant systems.

CO3: Understand the concepts of sampling theorem.

CO4: Apply the correlation and PSD functions for various applications.

CO5: Determine the noise sources and signal to noise ratios.

(EC613OE) DIGITAL ELECTRONICS FOR ENGINEERING

CO1: Get basic knowledge on logic gates, Universal gates and their switching logics.

CO2: Realize Boolean expressions using NAND/NOR gates and reduce them using K map.

CO3: Know all types of combinational and sequential circuits.

CO4: Acquire knowledge on realization of logic families using diodes and

transistor, and also on different types of integrated circuits.

CO5: Acquire knowledge on different types of integrated circuits.

(CS611OE) DATA STRUCTURES

CO1: Analyze the representation of various static, dynamic and, hierarchical data structures.

CO2: Design and implement the mechanism of stacks, general tree data structures with their applications.

CO3: Implement various algorithms on graph data structures, including finding the minimum spanning tree , shortest path with real time applications, etc.,

CO4: Implementation of various advance concepts of binary trees and graphs with real time applications.

CO5: Outline the concepts of hashing, collision and its resolution methods using hash function

(CS612OE) DATABASE MANAGEMENT SYSTEMS

CO1: Gain knowledge of fundamentals of DBMS and ER Model.

CO2: Able to apply the knowledge of relational model and normalization.

CO3: Apply the basics of SQL for retrieval and management of data.

CO4: Be acquainted with the basics of transaction processing and concurrency control.

CO5: Gain knowledge on database storage structures and access techniques.

(IT611OE) JAVA PROGRAMMING

CO1: Solve real world problems using OOP techniques.

CO2: Develop programs using the concepts of exception handling.

CO3: Solve problems using packages and java collection framework.

CO4: Develop multithreaded applications with synchronization and applications using JDBC.

CO5: Design GUI based applications

(IT612OE) SOFTWARE ENGINEERING

CO1: Understand the software engineering principles, practices and process models.

CO2: Identify, analyse and specify software requirements from the project stakeholders.

CO3: Analyse and translate the specifications into software designs and model the designs.

CO4: Apply different test strategies to perform testing and metrics to assess the software.

CO5: Identify and manage software risks and maintain the quality of the software.

(AM611OE) FUNDAMENTALS OF AI

CO1: Visualize what Artificial Intelligence is and the role of Intelligent Agents.

CO2: Investigate the uniformed and informed search techniques and tracing the execution various search algorithm.

CO3: Differentiate Propositional and First-order logic knowledge representation techniques and draw inferences using them.

CO4: State what Uncertainty knowledge is and inference mechanisms therein.

CO5: Ability to apply supervised learning algorithms to real-world datasets.

(AM612OE) MACHINE LEARNING BASICS

CO1: Distinguish between, supervised, unsupervised and semi-supervised learning

CO2: Understand algorithms for building classifiers applied on datasets of non-linearly separable classes

CO3: Understand the principles of evolutionary computing algorithms

CO4: Analyze Support Vector Machine and Genetic algorithms

CO5: Understand the Reinforcement Learning methods.

(AM604PC) NATURAL LANGUAGE PROCESSING LAB

CO1: Apply Knowledge of Word Analysis & Word Generation.

CO2: Implement Ambiguous sense & WSD.

CO3: Knowledge on Morphological Analysis NLTK tool Kit

CO4: Understand the Morphological Analysis using NLTK library

CO5: Explore N- Grams Smoothing &NLTK Package.

(AM605PC) DATA ANALYTICS LAB

CO1: Understand linear regression and logistic regression

CO2: Understand the functionality of different classifiers

CO3: Implement visualization techniques using different graphs

CO4: Apply descriptive and predictive analytics for different types of data

CO5: Design various classification techniques.

(AE606HS) ADVANCED ENGLISH COMMUNICATION SKILLS LAB

CO1: Apply reading and listening strategies to enhance comprehension skills

CO2: Develop different kinds of Writing: Formal Letters, Précis Writing, Essay Writing and Technical Report Writing

CO3: Enhance presentation skills to apply in professional life

CO4: Use strategies and techniques to clear group discussions

CO5: Practice mock interviews to improve employability skills