MARRI LAXMAN REDDY
Institute of Technology & Management
(Autonomous)

Department of Computer Science and Engineering

Course Outcomes

Regulation :(MLRS-R22)

At the end of the course, **the students will be able to**:

S. No	Course Name& Code	Year/ Sem	COURSE OUTCOMES
1	**Matrix Algebra and Calculus 2210001**	**C111.1**	Recall the concepts of rank, Echelon form, Normal form, and the properties of non-singular matrices.
		C111.2	Explain the process of finding eigenvalues and eigenvectors of a matrix and their role in diagonalization.
		C111.3	Relate Beta and Gamma functions to standard integrals and solve related problems.
		C111.4	Apply Euler's theorem and compute total derivatives for multivariable functions.
		C111.5	Understand the methods for changing variables in double and triple integrals, including transformations to polar, spherical, and cylindrical coordinates.
2	**Engineering Chemistry 2210009**	**C112.1**	Understand the basics on softness of water by ion exchange process.
		C112.2	Remember the types of Factors affecting the corrosion.
		C112.3	Knowledge of polymer usage in day-to-day life.
		C112.4	Compare the various types of solid, liquid, and Gaseous Fuels.
		C112.5	Recall upon smart materials and their Applications.
3	**Programming for Problem Solving 2210501**	**C113.1**	Define the algorithms and draw flowcharts for solving Mathematical and Engineering problems.
		C113.2	Construct programs for decision structures and loops.
		C113.3	Interpret various types of functions, arrays and strings for complex problem solving.

		C113.4	Illustrate the dynamic memory allocation, structures, unions and enumerations to solve problems.
		C113.5	Interpret file input and output functions to do integrated programming.
4	**Basic Electrical Engineering 2210201**	**C114.1**	Understand the utilization of various semiconductor components
		C114.2	Acquire the knowledge of various electronic devices and their use on real life.
		C114.3	Assess the performance of BJT in different configurations.
		C114.4	Explain how the Field effect transistors are used in to design of electronic circuits
		C114.5	Acquire the knowledge about the role of special purpose devices in day to day life.
5	**Engineering Drawing Practice 2210371**	**C115.1**	Illustrate bureau of Indian standards conventions of engineering drawing with basic concepts, ideas and methodology for different geometries and their execution
		C115.2	Apply for development of multi-aspect sketches, additional and sectional view
		C115.3	Construct parabolic, Hyperbolic and elliptical curves for profiles likes buildings and bridges Build Cycloidal and involutes profiles fordevelopingnewproductslikegearsandotherengineeringapplications
		C115.4	Explain the concept of projection of solids inclined to both the planes for interpretation of different views and orthographic projectionconceptsinsolidmodeling.
		C115.5	Recall the orthographic projection concepts in solid modeling for use in conversation to isometric and Vice-versa.
6	**Elements of Computer Science and Engineering 2210518**	**C116.1**	Know the working principles of functional units of a basic Computer
		C116.2	Understand program development, the use of data structures and algorithms in problem solving.
		C116.3	Know the need and types of operating system, database systems.
		C116.4	Understand the significance of networks, internet, WWW and cyber security.
		C116.5	Understand Autonomous systems, the application of artificial intelligence.
7	**Engineering Chemistry**	**C117.1**	Determination of parameters like hardness of water by complexometric method and determine the given Fe amount by volumetric analysis.

		C117.2	Able to perform methods such as conductometry, potentiometry in order to find out the concentrations or equivalence points of acids and bases .
		C117.3	Able to prepare polymers like Bakelite and Thiokol rubber from different monomers.
		C117.4	Estimation the viscosity of lubricant oils. To know its properties for the proper lubrication of machinery in industries and determine the acid value of lubricating oils.
		C117.5	Learn about construct, functioning and applications of virtual lab experiments.
8	**Programming for Problem Solving Lab** 2210571	**C118.1**	Develop the algorithms and draw flowcharts for solving Mathematical and Engineering problems.
		C118.2	Identify, compile and debug programs in C-language to analyze the result experiments.
		C118.3	Constructprogramsinvolving)decisionstructuresandloopsforspecifying iteration,understand which allows code to be executed repeatedly.
		C118.4	Compare the difference between call by value and call by reference to provide appropriate communication between functions.
		C118.5	Apply the working of arrays to implement mathematical vectors and matrices, as well as other kinds of rectangular tables.
9	**Basic Electrical Engineering Laboratory 2210271**	**C119.1**	**Identify** various passive (resistors, capacitors, inductors) and active components (diodes, transistors, ICs) and understand their applications
		C119.2	**Use** measuring instruments such as voltmeters, ammeters, and multimeters to accurately measure voltage, current, and other electrical parameters
		C119.3	**Analyze** the truth tables of basic logic gates, identify digital and analog ICs, and explore available software tools for electronics and communication applications
		C119.4	**Utilize** function generators to generate various signals and study their characteristics using CRO & spectrum analyzer.
		C119.5	**Understand** the significance of electronics and communication engineering and its applications in modern technology.
	1-2		
10	**DIFFERENTIAL EQUATIONS AND VECTO**	**C121.1**	Utilize the methods of differential equations for solving Newton's law of cooling and Law of Natural growth and decay
		C121.2	Understand the solutions of linear differential equations with constant coefficients

		C121.3	Explain the concept of the Laplace transform and its significance in solving differential equations and evaluating integrals
		C121.4	Interpret the vector differential operators and their relationships for solving engineering problems
		C121.5	Apply the integral transformations to surface, volume and line of different geometrical models.
11	**Applied Physics 2220008**	**C122.1**	Illustrate the concepts of the dual nature of matter and the Schrödinger wave equation of a particle confined in a basic system
		C122.2	Classification of semiconductors and their roles in different types of optoelectronic devices utilized in a range of engineering applications
		C122.3	Gain knowledge on properties of dielectric and magnetic materials, suitable for engineering applications
		C122.4	Explain the key factors, fabrication methods, characterization techniques, and applications of nanomaterials
		C122.5	Relate the concepts of lasers and optical fibers, when used with normal light, in terms of their mechanisms and applications across various fields and scientific practices.
12	**ENGINEERING WORK SHOP 2220372**	**C123.1**	Identifytheabilitytoworkfromdrawingsanddemonstrateproficiencywithhandtools common to carpentry.
		C123.2	DeterminetheabilitytoProduceFittingjobsasperspecifieddimensionsinadditiontodemonstratingproficiencywithhandtoolscommontofitting
		C123.3	Createworksofmetalartusingfireandfurnacetoconvertgivenshapeintouseableelementsusingbasicblacksmithtechniques.
		C123.4	Develop various engineering and house hold articles such as tin boxes,cans, funnels, ducts etc. ,from a flat sheet of metal.
		C123.5	Compare various wiring diagrams using conduit system of wiring and prepare different types of wiring joints on the given circuit boards using appropriate electrical tools.
13	**English for Skill Enhancement 2220010**	**C124.1**	Explain the importance of vocabulary and sentence structures.
		C124.2	Apply appropriate vocabulary and sentence structures in both oral and written communication.

		C124.3	Demonstrate their understanding of functional grammar rules.
		C124.4	Develop comprehension skills from the known and unknown passages.
		C124.5	Draft and organize paragraphs, letters, essays, abstracts, précis, and reports for various contexts.
14	**BASICS OF ELECTRONIC DEVICES AND CIRCUITS 2220401**	**C125.1**	Analyze the characteristics and applications of semiconductor devices, including PN junction diodes, Zener diodes, and SCRs
		C125.2	Design and test rectifiers (half-wave and full-wave) with and without filters, and evaluate clippers and clampers for voltage shaping.
		C125.3	Examine the input and output characteristics of BJTs and FETs in different configurations and Analyze their applications.
		C125.4	Employ transistors as switches for on-off control of devices and design circuits like voltage level indicators using BJTs.
		C125.5	Implement and evaluate Zener diodes as voltage regulators and test diode-powered backup systems
15	**DATA STRUCTURES LABORATORY 2220572**	**C126.1**	Identify appropriate searching technique for efficient retrieval of data stored location
		C126.2	choose sorting technique to represent data in specified format to optimize data searching
		C126.3	Make use of stacks and queues representation, operations and their applications to organize specified data
		C126.4	Construct tree to perform different traversal techniques
		C126.5	Select Appropriate graph traversal techniques to visit the vertices of a graph
16	**APPLIED PHYSICS LABORATORY 22200071**	**C127.1**	Know the determination of the Planck's constant using Photo electric effect and identify the material whether it is n-type or p-type by Hall experiment.
		C127.2	Appreciate quantum physics in semiconductor devices and optoelectronics.
		C127.3	Gain the knowledge of applications of dielectric constant.
		C127.4	Understand the variation of magnetic field and behaviour of hysteresis curve.
		C127.5	Carried out data analysis.
17	**English Language &Communication**	**C128.1**	Enhance fluency in English by expanding vocabulary through multimedia exercises.
		C128.2	Interpret spoken English at normal conversational speed, demonstrating active listening skills.

		C128.3	Adapt responses to various socio-cultural and professional contexts, showcasing situational awareness
		C128.4	Compose clear and coherent written communication that effectively conveys ideas.
		C128.5	Prepare for placement opportunities by practicing interview techniques and professional interactions.
18	**IT WORKSHOP Laboratory 2220575**	**C129.1**	Disaasemble and assemble a personal computer and prepare the computer to use.
		C129.2	Access the internet and browse it to obtain the required information.
		C129.3	Prepare the documents using word processor.
		C129.4	Prepare slides using the presentation tool.
		C129.5	Perform calculations using spreadsheets.
19	**ENVIRONMENTAL SCIENCE 2220021**	**C1210.1**	Illustrate the role of ecosystems in sustaining life on Earth, their contribution to environmental stability.
		C1210.2	Summarize the role of environmental regulations in achieving sustainable development goals (SDGs)**.**
		C1210.3	Organize the key characteristics of renewable and non-renewable resources and their contribution in functioning of ecosystems.
		C1210.4	Interpret how environmental regulations help decision-makers consider environmental factors in developing activities.
		C1210.5	Illustrate the role of ecosystems in sustaining life on Earth, their contribution to environmental stability.
	2-1		
16	**Database Management Systems 2230504**	**C211.1**	Outline the importance of database system, RDBMS and its functionalities for voluminous data storage and management
		C211.2	Model the real world database systems using Entity Relationship Diagrams from the requirement specification
		C211.3	Construct queries in Relational Algebra, Relational Calculus and SQL to retrieve desired information
		C211.4	Identify appropriate normalization technique using dependencies for controlling the redundancy of database
		C211.5	Demonstrate ACID properties of Transaction processing, concurrency control protocols and recovery to preserve the database in a consistent state.
17	**Business Economics and financial Analysis 2230016**	**C212.1**	Understand the basic concepts of economics and business economic inter-relationship
		C212.2	Apply the measurement techniques of Demand and Supply, their forecasting methods and concepts of elasticity

		C212.3	Analyze and demonstrate on production functions, production and cost analysis, market structure (like perfect competition, monopoly, monopolistic competition, oligopoly, etc.), know the price and quantity and their determination in each model
		C212.4	Understand concepts and conventions of accounting, analyze and demonstrate preparation of accounting statements, interpret the solutions for real time problems in business and projects
		C212.5	Develop the ability to use a basic accounting system along with the application of ratios to create (record, classify, and summarize) the data needed to know the financial position of the organization.
18	**SOFTWARE ENGINEERING 2230506**	**C213.1**	Illustrate process models, approaches and techniques for managing a software development process.
		C213.2	Summarize the importance of Project planning activites that accurately help in selection and initiation of individual projects and portfolios of Projects in the Enterprise.
		C213.3	Develop the approaches for implementation, verification and validation including static analysis and reviews.
		C213.4	Demonstrate the concept of risk management through risk identification, risk measurement and mitigation.
		C213.5	Make use of earned value analysis and project metric for scheduling and improving the quality of software.
19	**Digital Logic Design 2230505**	**C214.1**	Understand the different forms of number representations and binary codes in digital logic circuits.
		C214.2	Make use of Boolean postulates, theorems and k-map for obtaining minimized Boolean expressions.
		C214.3	Implement the combinational logic circuits using the logic gates.
		C214.4	Utilize the functionality and characteristics of flip-flops and latches for designing sequential circuits.
		C214.5	Extend the knowledge of memories and programmable logic devices for understanding the architectural blocks of FPGA.
20	**OOPS Through JAVA 2230510**	**C215.1**	Demonstrate object oriented programming concepts that helps to organize complex problems solving
		C215.2	Utilize the abstraction, encapsulation and polymorphism Techniques to solve different complex problems
		C215.3	Experiment with all threading and thread synchronization problems in soft real time systems.
		C215.4	Make use of inheritance, interfaces, packages and files to implement reusability in real time environment
		C215.5	Construct GUI based applications along with Exception handling using AWT, Swing and Applets with JDBC connectivity
21	**Database Management Systems Lab 2230574**	**C216.1**	Demonstrate database creation and manipulation concepts with the help of SQL queries.
		C216.2	Make use of inbuilt functions of SQL queries to perform data aggregations, subqueries, embedded queries and views

		C216.3	Apply key constraints on database for maintaining integrity and quality of data.
		C216.4	Demonstrate normalization by using referential key constraint.
		C216.5	Implement PL/SQL programs on procedures, cursors and triggers for enhancing the features of database system to handle exceptions.
22	**SKILL DEVELOPMENT COURSE (DATA VISUALIZATION - R PROGRAMMING/ POWER BI) 2230583**	**C217.1**	Understand How to import data into Power BI
		C217.2	Understand Power BI concepts of Dimensions and Measures.
		C217.3	Develop Programs and understand how to map Visual Layouts and Graphical Properties.
		C217.4	Create a Dashboard that links multiple visualizations.
		C217.5	Use graphical user interfaces to create Frames for providing solutions to real world problems.
23	**JAVA Through OOPS LAB 2230576**	**C218.1**	Make use of operators, precedence of operators, associativity while evaluating expressions in program statements
		C218.2	Make use of the concept of class and objects with access control and polymorphism techniques to represent real world entities.
		C218.3	Utilize Greedy Technique or principle of Optimality for finding solutions to optimization problems.
		C218.4	Compare the efficiencies of traversal problems using different Tree and Graph traversal algorithms.
		C218.5	Utilize Backtracking method for solving Puzzles involving building solutions incrementally
24	**Gender Sensitization 2230022**	**C219.1**	Gain insights into the history and evolution of gender studies and its impact on society.
		C219.2	Identify forms of gender inequality and discrimination in various societal structures, including workplace, education, media, and law.
		C219.3	Analyze the intersectionality of gender with other factors such as race, class, caste, sexual orientation, and disability
		C219.4	Apply gender-sensitive approaches to real-world scenarios, including group discussions, workshops, and projects.
		C219.5	Discuss the role of legal frameworks in combating gender-based violence and discrimination.
	2-2		
25	**Discrete Mathematics 2240507**	**C221.1**	Demonstrate operations on discrete mathematical structures like sets, functions, lattices for representing the relations among them.
		C221.2	Illustrate rings, integral domains, and field structures with binary operations defined on them.
		C221.3	Apply addition rule and substitution rule for solving the problems of combinatorics.

		C221.4	Develop solutions for recurrence relations and generating functions to obtain terms of equation.
		C221.5	Identify appropriate algorithms of graphs and trees for finding shortest path
26	**COMPUTER ORIENTED STATISTICAL METHODS 2240004**	**C222.1**	Write programs in C to solve problems using DS and choose appropriate DS to specific application.
		C222.2	Apply the concepts of probability and distributions to some case studies
		C222.3	Analyze sampling theory and testing of hypothesis and making inferences and implement and correlate the material of one unit to the material in other units.
		C222.4	Understand probability distributions of single and multiple random variables.
		C222.5	Understand Stochastic process and Markov chains.
27	**COMPUTER ORGANIZATION AND ARCHITECTURE 22X0508**	**C223.1**	Understand the basics of instructions sets and their impact on processor design.
		C223.2	Demonstrate an understanding of the design of the functional units of a digital computer system.
		C223.3	Evaluate cost performance and design trade-offs in designing and construct a computer processor including memory.
		C223.4	Design a pipeline for consistent execution of instructions with minimum hazards.
		C223.5	Recognize and manipulate representations of numbers stored in digital computers.
28	**OPERATING SYSTEMS 2240509**	**C224.1**	Explain different architectures used in design of modern operating systems.
		C224.2	Solve problems related to process scheduling, synchronization and deadlock handling in uni and multi-processing systems.
		C224.3	Choose memory allocation algorithms and page replacement algorithms for effective utilization of resources.
		C224.4	Make use of different file allocation and disk scheduling algorithms applied for efficient utilization of storage.
		C224.5	Outline mechanisms used in protection of resources in real time environment.
29	**PYTHON PROGRAMMING 2240503**	**C225.1**	Demonstrate the basic concepts of python programming with the help of data types, operators and expressions, console input/output
		C225.2	Make use of control statements for altering the sequential execution of programs in solving problems.

		C225.3	Demonstrate operations on built-in container data types (list, tuple, set, dictionary) and strings
		C225.4	Illustrate operations and applications on strings with the help of built in functions.
		C225.5	Identify object-oriented programming constructs for developing large, modular and reusable real-time programs.
30	**PYTHON PROGRAMMING LAB 2240573**	**C226.1**	Make use of control statements for altering the sequential execution of programs in solving problems.
		C226.2	Demonstrate operations on built-in container data types (list, tuple, set, dictionary) and strings.
		C226.3	Make use of operations and applications on strings with the help of built in functions.
		C226.4	Solve the problems by using modular programming concepts through functions.
		C226.5	Identify object-oriented programming constructs for developing large, modular and reusable real-time programs.
31	**OPERATING SYSTEMS LAB 2240577**	**C227.1**	Make use of pre-emptive and non-pre-emptive scheduling strategies for calculating system performance.
		C227.2	Choose page replacement algorithm for effective utilization of main memory.
		C227.3	Utilize file allocation strategy for efficient mass storage devices management
		C227.4	Develop deadlock handling procedures for improving process management
		C227.5	Make use of various file organization techniques for proper organization of directory structures.
32	**SKILL DEVELOPMENT COURSE (NODE JS/ REACT JS/ DJANGO) 224584**	**C228.1**	Build a custom website with HTML, CSS, and Bootstrap and little JavaScript.
		C228.2	Demonstrate Advanced features of JavaScript and learn about JDBC
		C228.3	Develop Server – side implementation using Java technologies like
		C228.4	Develop the server – side implementation using Node JS.
		C228.5	Design a Single Page Application using React.
33	**Field Based Project 2240591**	**C229.1**	Identify the requirements of the project.
		C229.2	Plan the schedule and budget required for project development
		C229.3	Utilize the application tool with the learned technologies.
		C229.4	Develop the real-time applications and analysis the performance of the application

		C229.5	Prepare the document for the project developed.
	Constitution of India 2240023	**C2210.1**	Understand the Meaning and Importance of Constitution, Fundamental rights and Duties, Union Government, State and Local Governments, other Statutory Bodies
		C2210.2	Create Awareness about social Responsibilities
		C2210.3	Apply the Functioning of Union, State and Local Governments in Indian Federal System
		C2210.4	Analyze Election commission and Amendment Procedure for various statuary bodies
		C2210.5	Comprehend the Judiciary's role in Interpreting the constitution and Ensuring Fundamental Rights Through Judicial Review
	3-1		
34	**Design and Analysis of Algorithms 2250511**	**C311.1**	Find the (worst case, randomized, amortized) running time and space complexity of given algorithms using techniques such as recurrences and properties of probability.
		C311.2	Apply divide and conquer algorithms for solving sorting, searching and matrix multiplication.
		C311.3	Make Use of appropriate tree traversal techniques for finding shortest path.
		C311.4	Identify suitable problem solving techniques for a given problem and finding optimized solutions using Greedy and Dynamic Programming techniques
		C311.5	Utilize backtracking and branch and bound techniques to deal with traceable and in-traceable problems.
34	**Computer Networks 2250512**	**C312.1**	Understanding of the basic concepts of data communications including the key aspects of networking and their interrelationship, packet switching, circuit switching and cell switching as internal and external operations, physical structures, types, models, and internetworking.
		C312.2	Illustratively explain the concept of Hamming distance, and the significance of the minimum Hamming distance and its relationship to errors as well as detection and correction of errors in block codes.
		C312.3	Evaluate the performance of a single link, logical process-to-process (end-to-end) channel, and a network as a whole (latency, bandwidth, and throughput).
		C312.4	Distinguish between the different types of bit errors and can explain the concept of bit redundancy and how it is generally achieved in the facilitation of error detection and the main methods of error correction.

		C312.5	Explain and demonstrate the mechanics associated with IP addressing, device interface, association between physical and logical addressing, subnetting and super netting.
34	**Artificial Intelligence 2250516**	**C313.1**	Frame an efficient problem space for a problem expressed in natural language.
		C313.2	Finalize a search algorithm for a problem and estimate its time and space complexities.
		C313.3	Possess the skill for representing knowledge using the appropriate technique for a given problem.
		C313.4	Develop Logical Reasoning Systems
		C313.5	Apply AI techniques to solve problems of game playing, and machine learning.
34	**Air and Noise pollution Control**	**C314.1**	have a firm foundation and knowledge of mathematics, science and engineering principles.
		C314.2	define fundamental concepts of Air Pollution
		C314.3	design and conduct experiments
		C314.4	Design a component system
		C314.5	think logically, critically and creatively
35	**INTERNET OF THINGS 22X0544**	**C315.1**	Understand the characteristics, protocols and communication models required for logical design of IoT.
		C315.2	Realize the hardware platforms for implementing and interfacing the IoT based board with different peripheral devices and serial communication devices.
		C315.3	Develop stacks for IoT and M2M networks and configurations.
		C315.4	Integrate devices and develop an application that can communicate through IoT Cloud.
		C315.5	Understand the characteristics, protocols and communication models required for logical design of IoT.
34	**COMPUTER NETWORK LAB 250578**	**C316.1**	Demonstrate the ability to set up and configure basic network topologies using computers, media, and devices.
		C316.2	Experiment key aspects of data communication, such as packet switching, circuit switching, and cell switching.
		C316.3	Implement Hamming distance by constructing and verifying error detection and correction methods in block codes.

		C316.4	Evaluate network performance parameters such as latency, bandwidth, and throughput for single links and end-to-end channels using simulation tools.
		C316.5	Utilize bit errors, error detection and correction methods, and analyze their performance in terms of redundancy and efficiency.
34	**Design and Analysis of Algorithms Lab 2250579**	**C317.1**	Make use of operators, precedence of operators, associativity while evaluating expressions in program statements
		C317.2	Make use of the concept of class and objects with access control and polymorphism techniques to represent real world entities.
		C317.3	Utilize Greedy Technique or principle of Optimality for finding solutions to optimization problems.
		C317.4	Compare the efficiencies of traversal problems using different Tree and Graph traversal algorithms.
		C317.5	Utilize Backtracking method for solving Puzzles involving building solutions incrementally
34	**SKILL DEVELOPMENT COURSE(UI-FLUTTER) 2250585**	**C318.1**	Implements Flutter Widgets and Layouts.
		C318.2	Create Responsive UI Design and with Navigation in Flutter.
		C318.3	Create custom widgets for specific UI elements and also Apply styling using themes and custom styles.
		C318.4	Design a form with various input fields, along with validation and error handling.
		C318.5	Fetch data and write code for unit Test for UI components and also animation.
34	**INTERNSHIP 2250592**	**C319.1**	
		C319.2	
		C319.3	
		C319.4	
		C319.5	
34	**INTELLECTUAL PROPERTY RIGHTS 2250024**	**C3110.1**	Understands the fundamentals of Intellectual Property
		C3110.2	Understands the ethical implication of IP

		C3110.3	Apply Intellectual Property Laws in National and International Contexts
		C3110.4	Understands IP' impact on Global Trade and Economic Development
		C3110.5	Understand the role of IP in creative Industries
	3-2		
34	**MACHINE LEARNING 2260514**	**C321.1**	Understand supervised and unsupervised learning, concept learning, inductive bias, and decision tree learning.
		C321.2	Apply artificial neural networks and the backpropagation algorithm to solve error comparison methods.
		C321.3	Make Use Bayes theorem, Naïve Bayes Classifier, and Bayesian Belief Networks, to compute learning theory such as PAC learning and the KNN algorithm.
		C321.4	Explore Genetic Algorithms, Sequential Covering Algorithms, and Reinforcement Learning, Q-learning and rule-based learning.
		C321.5	Apply analytical learning to augment the hypothesis and search operators.
34	**FORMAL LANGUAGE OF AUTOMATA THEORY 2260515**	**C322.1**	Make use of deterministic finite automata and non-deterministic finite automata for modeling lexical analysis and text editors.
		C322.2	Extend regular expressions and regular grammars for parsing and designing programming languages.
		C322.3	Illustrate the pumping lemma on regular and context free languages for perform negative test.
		C322.4	Demonstrate context free grammars, normal forms for generating patterns of strings and minimize the ambiguity in parsing the given strings.
		C322.5	Apply Turing machines and Linear bounded automata for recognizing the languages, complex problems.
34	**WEB TECHNOLOGIES 2260524**	**C323.1**	Develop effective and interactive web pages using elements and selectors in style sheets and dynamic HTML.
		C323.2	Make use of functions in JavaScript and PHP for implementing data validations in web applications
		C323.3	Construct the XML document for storing and transporting the web page information in a structured form through web.
		C323.4	Demonstrate a server-side web application using servlets and Java Server Pages (JSP) for request-response programming paradigm.
		C323.5	Develop dynamic web site using server side and PHP programming and database connectivity.

	DATA SCIENCE 22X0546	**C324.1**	Understand basic terms what Statistical Inference means.
		C324.2	Identify probability distributions commonly used as foundations for statistical modelling. Fit a model to data
		C324.3	Describe the data using various statistical measures.
		C324.4	Utilize R elements for data handling.
		C324.5	Perform data reduction and apply visualization techniques.
34	**FUNDAMENTALS OF EMBEDDED SYSTEMS**	**C325.1**	
		C325.2	
		C325.3	
		C325.4	
		C325.5	
34	**ADVANCED COMMUNICATION SKILLS LAB 2260074**	**C326.1**	Enhance fluence in English by expanding vocabulary through multimedia exercises.
		C326.2	Interpret spoken English at normal conversational speed, demonstrating active listening skills.
		C326.3	Adapt responses to various socio -cultural and professional contexts, showcasing situational awareness.
		C326.4	Compose. Clear and coherent written communication that effectively conveys ideas.
		C326.5	Prepare for placement opportunities by practicing interview techniques and professional interactions.
34	**MACHINE LEARNING LAB 2260580**	**C327.1**	Extract and preprocess data from databases for machine learning applications using Python.
		C327.2	Design and apply k-nearest neighbors (KNN) and k-means clustering algorithms for classification and clustering tasks.
		C327.3	Analyze real-world datasets to compute probabilities and evaluate relationships between variables for conditional and unconditional probabilities.
		C327.4	Apply machine learning techniques like linear regression, Naïve Bayes classifier, and genetic algorithms for prediction, classification, and optimization tasks.

		C327.5	Build and evaluate a finite-word classification system using neural networks with the backpropagation algorithm.
34	**WEB TECHNOLOGIES LAB 2260587**	**C328.1**	Design static web pages using HTML and CSS. .
		C328.2	Develop effective and interactive web pages using elements and selectors in style sheets and dynamic HTML.
		C328.3	Make use of functions in JavaScript and JavaScript Control statements for implementing data validations in web applications.
		C328.4	Develop dynamic web site using server-side PHP programming
		C328.5	Construct website by using front end and back end end programming.
34	**INDUSTRY ORIENTED MINI PROJECT 2260593**	**C329.1**	Identify and implement an investigation or developmental project with given general objectives and guidelines
		C329.2	Develop an in-depth skill to use some laboratory modern tools and techniques
		C329.3	Analyze data produce useful information and draw conclusions
		C321.4	Communicate results concepts, analyses and ideas.
		C321.5	Conduct an extended independent investigation that results in the production of a research thesis
	ENVIRONMENTAL SCIENCE 2260025	**C3210.1**	Illustrate the role of ecosystems in sustaining life on Earth, their contribution to environmental stability.
		C3210.2	Summarize the role of environmental regulations in achieving sustainable development goals (SDGs).
		C3210.3	Organize the key characteristics of renewable and non-renewable resources and their contribution in functioning of ecosystems
		C3210.4	Interpret how environmental regulations help decision-makers consider environmental factors in developing activities.
		C3210.5	Identify the role of aesthetic, social and ethical values in environmental design.
	FUNDAMENTALS OF MANAGEMENT 2270017	**C411.1**	Understand Management Principles ArticulateKey management Concepts and their historical development
		C411.2	Apply planning Techniques Develop strategic, tactical and operational plans to achieve organizational goals
		C411.3	Analyze Organizational Structures Evaluate different organizational designs and their effectiveness in various contents
		C411.4	Implement Control Mechanisms Utilize performance measurement tools to assess and improve organizational effectiveness, leadership skills

		C411.5	Enhance Decision-Making Abilities Employ analytical and creative problem-solving techniques in decision -making scenarios and controlling Budgetary and non-Budgetary
	CRYPTOGRAPHY AND NETWORK SECURITY 2270519	**C412.1**	Outline model for network security and cryptographic algorithms to prevent attacks on computer and computer security.
		C412.2	Demonstrate symmetric and asymmetric key ciphers for messaging end to end encryption used in different types of cryptographic algorithms
		C412.3	Choose appropriate architecture and protocols used in email and IP security to protect against attackers and intruders
		C412.4	Select firewalls to provide web security as case study in cryptography and network security
		C412.5	Utilize cryptographic and security algorithms to enhance defense against cyber-attacks and to improve organization working culture.
	COMPILER DESIGN 2270517	**C413.1**	Summarize phases of a compiler in the construction of language processors.
		C413.2	Make use of finite automata for designing a lexical analyzer for a specific programming language constructs.
		C413.3	Choose top down, bottom up parsing methods for developing a parser with representation of a parse table or tree.
		C413.4	Relate symbol table, type checking and storage allocation strategies used in run-time environment.
		C413.5	Select code optimization techniques on intermediate code form for generating target code.
	FULL STACK DEVELOPMENT 22X0549	**CS414.1**	Develop responsive and interactive web pages using HTML, CSS, and JavaScript to implement user-friendly interfaces.
		CS414.2	Design dynamic web applications using frontend frameworks like React, Angular, or Vue.js, incorporating modern design patterns and best practices.
		CS414.3	Design and implement RESTful APIs using backend technologies such as Node.js, Express, Django, or Flask to handle requests and responses efficiently.
		CS414.4	Combine databases (SQL and NoSQL) with web applications to store, retrieve, and manipulate data effectively.
		CS414.5	Test for correctness of web services and client-side interactions using relevant tools, ensuring reliability, performance.
	DEEP LEARNING 22X0551	**CS414.1**	Differentiate between shallow and deep learning paradigms.
		CS414.2	Compare different deep network architectures, including their strengths, weaknesses, and suitable application areas.

		CS414.3	Identify optimization methods such as gradient descent, momentum, and adaptive learning rates.
		CS414.4	Experiment tools TensorFlow, PyTorch or Keras for implementing deep learning models.
		CS414.5	Assess the limitations and future trends of deep learning technologies.
	OE-VI	**CS415.1**	
		CS415.2	
		CS415.3	
		CS415.4	
		CS415.5	
	CRYPTOGRAPHY AND NETWORK SECURITY LAB 2270581	**CS416.1**	
		CS416.2	
		CS416.3	
		CS416.4	
		CS416.5	
	COMPILER DESIGN LAB 2270582	**CS417.1**	
		CS417.2	
		CS417.3	
		CS417.4	
		CS417.5	

	PROJECT STAGE-1 2270594	**CS418 .1**	Identify and formulate a problem for developing a project with given general objectives and guidelines
		CS418 .2	Use research-based knowledge and methods including design of experiments analysis and interpretation of data and synthesis of information
		CS418 .3	Design solution for problems and system components or processes that meet the specified needs
		CS418 .4	Apply appropriate techniques resources and tools for various activities of solution
		CS418 .5	Communicate results, concepts, analyses and ideas in written and oral form
	CLOUD COMPUTING	**CS421 .1**	Discuss the various paradigm of cloud computing and articulate the main concepts, key technologies, strengths, and limitations of cloud computing
		CS421 .2	Identify the architecture and infrastructure of cloud computing suitable for the specified environment
		CS421 .3	Interpret various data, scalability and cloud services to acquire efficient database for cloud storage.
		CS421 .4	Explain the security, privacy, and interoperability of cloud computing with its controlling mechanism
		CS421 .5	Construct the cloud to utilize for the real-world applications.
	DATA ANALYTICS	**CS421 .1**	
		CS421 .2	
		CS421 .3	
		CS421 .4	
		CS421 .5	
	MOBILE APPLICATION DEVELOPMENT	**CS421 .1**	Understand the fundamentals of Android operating systems
		CS421 .2	Demonstrate their ability to develop software with reasonable complexity on mobile platform
		CS421 .3	Develop Android user interfaces.
		CS421 .4	Deploy the Android Applications.

		CS421.5	Examines the Android Applications.
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	TECHNICAL SEMINAR 2280595	**CS424.1**	Demonstrate the ability to research, analyze, and summarize recent advancements in engineering or technology.
		CS424.2	Develop and deliver effective technical presentations using clear communication, structured content, and appropriate visual aids.
		CS424.3	Exhibit confidence and professionalism in presenting technical ideas and answering audience questions.
		CS424.4	Enhance collaboration and teamwork by engaging in peer discussions and providing constructive feedback during technical seminars.
		CS424.5	Improve lifelong learning skills by exploring and adapting to emerging technologies and innovative practices in the chosen domain.
	PROJECT STAGE-2 2280596	**CS425.1**	Apply appropriate techniques, resource, and tools for various activities of solution
		CS425.2	Develop an in-depth skill to use modern tools and techniques
		CS425.3	Analyze data to produce useful information and draw conclusions
		CS425.4	Communicate results, concepts, analyses and ideas in written and oral form oral
		CS425.5	Conduct an extended independent investigation that results in the production of a research thesis