



Nimra College of Engineering & Technology

Estd. By Nimra Educational Society (A Muslim Minority Society)
 Affiliated to JNTUK, Approved by AICTE, New Delhi, Permitted by Govt. of A.P.
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UG(B.TECH)- (COMPUTER SCIENCE AND ENGINEERING-AI&ML)

COURSE OUTCOMES FOR FIRST YEAR FIRST SEMESTER

COURSE TITLE WITH CODE	CO	STATEMENT
COMMUNICATIVE ENGLISH(R201102)	CO-1	To Facilitate effective listening skills for better comprehension of academic lectures and English spoken by native speakers
	CO-2	To Focus on appropriate reading strategies for comprehension of various academic texts and authentic materials
	CO-3	To Help improve speaking skills through participation in activities such as role plays, discussions and structured talks/oral presentations
	CO-4	To Impart effective strategies for good writing and demonstrate the same in summarizing, writing well organized essays, record and report useful information
	CO-5	To Provide knowledge of grammatical structures and vocabulary and encourage their appropriate use in speech and writing
MATHEMATICS-I(R201101)	CO-1	To utilize mean problems value theorems to real life
	CO-2	To solve the differential equations related to various engineering fields
	CO-3	To familiarize with functions of several variables which is useful in optimization
	CO-4	To apply double integration techniques in evaluating areas bounded by region
	CO-5	To will also learn important tools of calculus in higher dimensions. Students will become familiar with 2- dimensional and 3-dimensional coordinate systems.
APPLIED CHEMISTRY (R201215)	CO-1	To Importance of usage of plastics in household appliances and composites (FRP) in aerospace and automotive industries.
	CO-2	To Outline the basics for the construction of electrochemical cells, batteries and fuel cells. Understand the mechanism of corrosion and how it can be prevented.
	CO-3	To Explain the preparation of semiconductors and nanomaterials, engineering applications of nanomaterials, superconductors and liquid crystals.
	CO-4	To Recall the increase in demand for power and hence alternative sources of power are studied due to depleting sources of fossil fuels. Advanced instrumental techniques are introduced.
	CO-5	To Outline the basics of computational chemistry and molecular switches.
PROGRAMMING FOR PROBLEM SOLVING USING C(R201110)	CO-1	To write algorithms and to draw flowcharts for solving problems, converting flowcharts/algorithms to C Programs, compile and debug program using two-way/ multi-way selection
	CO-2	To select the best loop construct for a given problem
	CO-3	To design and implement programs to analyze the different pointer applications
	CO-4	To decompose a problem into functions and to develop modular reusable code
	CO-5	To apply File I/O operations .
COMPUTER ENGINEERING WORKSHOP (R201118)	CO-1	To Assemble and disassemble components of a PC .
	CO-2	To Construct a fully functional virtual machine, Summarize various Linux operating system commands
	CO-3	To Recognize characters & extract text from scanned images, Create audio files and podcasts.
	CO-4	To have knowledge on Networking commands, Productivity tools like developing Web pages by using HTML tags to develop own home page. Etc
	CO-5	To have knowledge on Office Tools such as Microsoft Word, Power Point, Excel. Demonstration and practice on LaTeX and produce professional pdf documents

ENGLISH COMMUNICATION SKILLS LABORATORY(R201106)	CO-1	To understand the syntactical and grammatical intricacy
	CO-2	To use right structure for right context and meaning
	CO-3	To read and comprehend the content in English well
	CO-4	To write well for his/her professional requirement
	CO-5	To short audio texts and identifying the context and specific pieces of information to answer a series of questions in speaking.1
APPLIED CHEMISTRYLAB(R201239)	CO-1	To demonstrate the volumetric analysis experiments introduce.
	CO-2	To understand the EDTA titrations, redox titrations with different indicators.
	CO-3	To expose a few instrumental methods of chemical analysis
	CO-4	To understand the different methods of chemical analysis and use of some commonly employed instruments. They thus acquire some experimental skills
	CO-5	To Understand the application of fundamental principles of chemistry to real-world problems, including stoichiometry, chemical kinetics, thermodynamics, and equilibrium.
PROGRAMMING FOR PROBLEM SOLVING USING 'C' LAB(R201113)	CO-1	To gain Knowledge on various concepts of a C language
	CO-2	To draw flowcharts and write algorithms.
	CO-3	To design and development of C problem solving skills.
	CO-4	To design and develop modular programming skills.
	CO-5	To trace and debug a program.
ENVIRONMENTAL SCIENCE(R201228)	CO-1	To gain knowledge on Overall understanding of the natural resources.
	CO-2	To understand the basics of the ecosystem and its diversity.
	CO-3	To acquaintance on various environmental challenges induced due to unplanned anthropogenic activities
	CO-4	To understand the environmental impact of developmental activities
	CO-5	To be awareness on the social issues, environmental legislation and global treaties.
MATHEMATICS-II (Linear Algebra And Numerical Methods)(R201201)	CO-1	To develop the use of matrix algebra techniques that is needed by engineers for practical applications
	CO-2	To solve system of linear algebraic equations using Gauss elimination, Gauss Jordan, Gauss Seidel
	CO-3	To evaluate the approximate roots of polynomial and transcendental equations by different algorithms
	CO-4	To apply Newton's forward & backward interpolation and Lagrange's formulae for equal and unequal intervals.
	CO-5	To apply numerical integral techniques to different Engineering problems.
COURSE OUTCOMES FOR FIRST YEAR SECOND SEMESTER		
COURSE TITLE WITH CODE	CO	STATEMENT
MATHEMATICS-III (R2012011)	CO-1	To Understand the fundamental concepts and principles of propositional calculus, including statements, connectives, truth tables, and tautologies.
	CO-2	To Develop a deep understanding of set theory, including operations, relations, functions, and algebraic structures such as groups and lattices.
	CO-3	To Gain a solid foundation in combinatorics, including counting principles, permutations, combinations, and binomial coefficients, for problem-solving in various contexts.
	CO-4	To Develop proficiency in working with generating functions and understanding their role in solving recurrence relations.
	CO-5	To Develop a comprehensive understanding of graph theory concepts, including graph representations, paths, circuits, and graph algorithms like Prim's and Kruskal's.
APPLIED PHYSICS (R20117)	CO-1	To Explain the need of coherent sources and the conditions for sustained interference Analyze the differences between interference and diffraction with applications.
	CO-2	To Explain various types of emission of radiation, role of laser in engineering applications Apply the fiber optic concepts in various fields.
	CO-3	To Describe the dual nature of matter, wave functions. Identifying the role of classical and quantum free electron theory in the study of electrical conductivity
	CO-4	To Explain the concept of dielectric constant and polarization in dielectric materials. Interpret Lorentz field and Claussius-Mosotti relation in dielectrics.
	CO-5	To Outline the properties of charge carriers in semiconductors conductors, super conductors, Meissner's effect, BCS theory & Josephson effect in superconductors

DIGITAL LOGIC DESIGN (R201221)	CO-1	To An ability to define different number systems, binary addition and subtraction, 2's complement representation and operations with this representation.
	CO-2	To An ability to understand the different switching algebra theorems and apply them for logic functions.
	CO-3	To An ability to define the Karnaugh map for a few variables and perform an algorithmic reduction of logic functions.
	CO-4	To design various logic gates starting from simple ordinary gates to complex programmable logic devices & arrays.
	CO-5	To design various sequential circuits starting from flip-flop to registers and counters
PYTHON PROGRAMMING (R201225)	CO-1	To develop essential programming skills in computer programming concepts like data types, containers
	CO-2	To apply the basics of programming in the Python language
	CO-3	To apply the basics of programming in the Python language
	CO-4	To solve coding tasks related conditional execution, loops
	CO-5	To solve coding tasks related to the fundamental notions and techniques used in object -oriented programming
DATA STRUCTURES (R201218)	CO-1	To summarize the properties, interfaces, and behaviors of basic abstract data types
	CO-2	To discuss the computational efficiency of the principal algorithms for sorting & searching
	CO-3	To use arrays, records, linked structures, stacks, queues, trees, and Graphs in writing programs
	CO-4	To demonstrate different methods for traversing trees
	CO-5	To analyze problems and write program solutions using data structures like linked lists and binary tree
APPLIED PHYSICS LAB (R201119)	CO-1	To gain practical experience in conducting experiments
	CO-2	To development in skills in analyzing experiments
	CO-3	To enhance their problem solving skills
	CO-4	To utilize various components and equipment in physics practicals.
	CO-5	To impart knowledge on a wide range of electric and magnetic phenomena and their scientific applications.
PYTHON PROGRAMMING LAB (R201250)	CO-1	To write, Test and Debug Python Programs
	CO-2	To use Conditionals and Loops for Python Programs
	CO-3	To use functions and represent Compound data using Lists, Tuples and Dictionaries
	CO-4	To use the applications of the listed programs
	CO-5	To use various applications using python
COURSE OUTCOMES FOR SECOND YEAR FIRST SEMESTER		
COURSE TITLE WITH CODE	CO	STATEMENT
Mathematical Foundations of Computer Science R2021054	CO-1	To Develop a deep understanding of propositional calculus, including statement notations, connectives, truth tables, tautologies, equivalence, normal forms, and the theory of inference for statement calculus.
	CO-2	To Develop a comprehensive understanding of set theory, including operations on sets, principles like inclusion-exclusion, properties and operations of relations, transitive closure, equivalence relations, and partial ordering.
	CO-3	To Develop a strong foundation in combinatorics, including counting principles, permutations, combinations, and binomial/multinomial coefficients, and their applications in solving combinatorial problems.
	CO-4	To Manipulate and analyze data numerically and/or graphically using appropriate Software
	CO-5	To Communicate effectively mathematical ideas/results verbally or in writing
Introduction to Artificial Intelligence and Machine Learning	CO-1	To Understand the fundamentals of Artificial Intelligence (AI), including its history, current state, and key concepts like rationality, agents, and environments.
	CO-2	To Gain expertise in problem-solving techniques, including uninformed and informed search strategies, local search algorithms, and handling nondeterministic actions.
	CO-3	To Develop proficiency in knowledge representation techniques, including propositional logic, ontological engineering, and reasoning systems for categories and objects.

Machine Learning R2021421	CO-4	To Gain a comprehensive understanding of machine learning fundamentals, including well-posed learning problems, designing learning systems, and addressing perspectives and issues in machine learning.
	CO-5	To Develop the ability to apply decision tree learning techniques effectively to solve classification and regression problems, analyze decision trees, and address challenges in decision tree-based machine learning models.
Object Oriented Programming with Java R2021422	CO-1	To Able to realize the concept of Object Oriented Programming & Java Programming Constructs.
	CO-2	To Able to describe the basic concepts of Java such as operators, classes, objects, inheritance, packages, Enumeration and various keywords.
	CO-3	To Apply the concept of exception handling and Input/ Output operations
	CO-4	To Able to design the applications of Java & Java applet
	CO-5	To Able to Analyze & Design the concept of Event Handling and Abstract Window Toolkit
Database Management Systems R2021121	CO-1	To Describe a relational database and object-oriented database
	CO-2	To Create, maintain and manipulate a relational database using SQL
	CO-3	To Describe ER model and normalization for database design
	CO-4	To Examine issues in data storage and query processing and can formulate appropriate solutions
	CO-5	To Outline the role and issues in management of data such as efficiency, privacy, security, ethical, responsibility, and strategic advantage
Introduction to Artificial Intelligence and Machine Learning Lab R2021423	CO-1	To Apply the basic principles of AI in problem solving using LISP/PROLOG
	CO-2	To Implement different algorithms using LISP/PROLOG
	CO-3	To Develop an Expert System using JESS/PROLOG
	CO-4	To Gain hands-on experience in implementing and applying artificial intelligence and machine learning algorithms in real-world scenarios.
	CO-5	To Develop practical skills in data preprocessing, model training, evaluation, and deployment of AI and ML solutions, enhancing problem-solving abilities and technical proficiency.
Object Oriented Programming with Java Lab R2021424	CO-1	To Evaluate default value of all primitive data type, Operations, Expressions, Control-flow, Strings.
	CO-2	To Determine Class, Objects, Methods, Inheritance, Exception, Runtime Polymorphism, User defined Exception handling mechanism..
	CO-3	To Illustrating simple inheritance, multi-level inheritance, Exception handling mechanism .
	CO-4	To Construct Threads, Event Handling, implement packages, developing applets.
	CO-5	To Develop proficiency in object-oriented programming concepts using Java, including classes, objects, inheritance, polymorphism, encapsulation, and abstraction.
Database Management Systems Lab R2021123	CO-1	To Utilize SQL to execute queries for creating database and performing data manipulation operations
	CO-2	To Examine integrity constraints to build efficient databases
	CO-3	To Apply Queries using Advanced Concepts of SQL
	CO-4	To Build PL/SQL programs including stored procedures, functions, cursors and triggers
	CO-5	To Gain hands-on experience in designing and implementing relational database systems using SQL, including database creation, manipulation, querying, and optimization.
Mobile App Development R2021425	CO-1	To Identify various concepts of mobile programming that make it unique from programming for other platforms
	CO-2	To Critique mobile applications on their design pros and cons.
	CO-3	To Utilize rapid prototyping techniques to design and develop sophisticated mobile interface.
	CO-4	To Program mobile applications for the Android operating system that use basic and advanced phone features
	CO-5	To Deploy applications to the Android marketplace for distribution
Essence of Indian Traditional Knowledge R2021426	CO-1	To Understand the significance of Indian Traditional Knowledge
	CO-2	To Classify the Indian Traditional Knowledge
	CO-3	To Compare Modern Science with Indian Traditional Knowledge system.
	CO-4	To Analyze the role of Government in protecting the Traditional Knowledge
	CO-5	To Understand the impact of Philosophical tradition on Indian Knowledge System.

COURSE OUTCOMES FOR SECOND YEAR SECOND SEMESTER

COURSE TITLE WITH CODE	CO	STATEMENT
Probability and Statistics R2022051	CO-1	To Classify the concepts of data science and its importance.
	CO-2	To Interpret the association of characteristics and through correlation and regression tools
	CO-3	To Make use of the concepts of probability and their applications
	CO-4	To Apply discrete and continuous probability distributions
	CO-5	To Design the components of a classical hypothesis test. To Infer the statistical inferential methods based on small and large sampling tests
Computer Organization R2022421	CO-1	To Develop a detailed understanding of computer systems
	CO-2	To Cite different number systems, binary addition and subtraction, standard, floating-point, and micro operations
	CO-3	To Develop a detailed understanding of architecture and functionality of central processing unit
	CO-4	To Exemplify in a better way the I/O and memory organization
	CO-5	To Illustrate concepts of parallel processing, pipelining and inter processor communication
Data warehousing and Mining R2022422	CO-1	To Summarize the architecture of data warehouse
	CO-2	To Apply different preprocessing methods, Similarity, Dissimilarity measures for any given raw data.
	CO-3	To Construct a decision tree and resolve the problem of model overfitting.
	CO-4	To Compare Apriori and FP-growth association rule mining algorithms for frequent itemset generation
	CO-5	To Apply suitable clustering algorithm for the given data set
Formal Languages and Automata Theory R2022053	CO-1	To Classify machines by their power to recognize languages
	CO-2	To Summarize language classes & grammars relationship among them with the help of Chomsky hierarchy
	CO-3	To Employ finite state machines to solve problems in computing
	CO-4	To Illustrate deterministic and non-deterministic machines
	CO-5	To Quote the hierarchy of problems arising in the computer science
Managerial Economics and Financial Accountancy R2022055	CO-1	To The Learner is equipped with the knowledge of estimating the Demand and demand elasticities for a product
	CO-2	To The knowledge of understanding of the Input-Output-Cost relationships and estimation of the least cost combination of inputs
	CO-3	To The pupil is also ready to understand the nature of different markets and Price Output determination under various market conditions and also to have the knowledge of different
	CO-4	To The Learner is able to prepare Financial Statements and the usage of various Accounting tools for Analysis
	CO-5	To The Learner can able to evaluate various investment project proposals with the help of capital budgeting techniques for decision making
R Programming Lab R2022423	CO-1	To Implement basic concepts of R programming, and its different module that includes conditional, looping, lists, Strings, Functions, Frames, Arrays, and File programming.
	CO-2	To Implement the concepts of R Script to extract the data from data frames and file operations.
	CO-3	To Implement the various statistical techniques using R
	CO-4	To Extend the functionality of R by using add-on packages
	CO-5	To Use R Graphics and Tables to visualize results of various statistical operations on data
Data Mining using Python Lab R2022424	CO-1	To Apply preprocessing techniques on real world datasets
	CO-2	To Apply apriori algorithm to generate frequent itemsets.
	CO-3	To Apply Classification and clustering algorithms on different datasets.
	CO-4	To effectively communicate their findings.
	CO-5	To perform exploratory data analysis using various statistical and visualization techniques.
Web Application Development Lab R2022425	CO-1	To Develop Single Page Applications
	CO-2	To Develop NodeJS & ReactJS Reusable Service
	CO-3	To Store the data in MySQL
	CO-4	To Get acquainted with the latest web application development trends in the IT industry
	CO-5	To Understand how to integrate databases into web applications using technologies like MYSQL, MONGO, DB or FIRE BASE.
Natural Language Processing with	CO-1	To Explore natural language processing (NLP) libraries in Python
	CO-2	To Learn various techniques for implementing NLP including parsing & text processing
	CO-3	To Understand how to use NLP for text feature engineering

Python R2022426	CO-4	To learn how to build text generation models such as markov chains transformer models.
	CO-5	To Understand the ethical and societal implications of NPL technologies including issues related to bias, fairness, privacy and responsible use of language models.
COURSE OUTCOMES FOR THIRD YEAR FIRST SEMESTER		
COURSE TITLE WITH CODE	CO	STATEMENT
COMPILER DESIGN R2031421	CO-1	To Demonstrate phases in the design of compiler
	CO-2	To Organize Syntax Analysis, Top Down and LL(1) grammars
	CO-3	To Design Bottom Up Parsing and Construction of LR parsers
	CO-4	To Analyze synthesized, inherited attributes and syntax directed translation schemes
	CO-5	To Determine algorithms to generate code for a target machine
OPERATING SYSTEMS R2031422	CO-1	To Describe various generations of Operating System and functions of Operating System
	CO-2	To Describe the concept of program, process and thread and analyze various CPU Scheduling Algorithms and compare their performance
	CO-3	To Solve Inter Process Communication problems using Mathematical Equations by various methods
	CO-4	To Compare various Memory Management Schemes especially paging and Segmentation in Operating System and apply various Page Replacement Techniques
	CO-5	To Outline File Systems in Operating System like UNIX/Linux and Windows
MACHINE LEARNING R2031423	CO-1	To Explain the fundamental usage of the concept Machine Learning system
	CO-2	To Demonstrate on various regression Technique
	CO-3	To Analyze the Ensemble Learning Methods
	CO-4	To Illustrate the Clustering Techniques and Dimensionality Reduction Models in Machine Learning.
	CO-5	To Discuss the Neural Network Models and Fundamentals concepts of Deep Learning
OPEN ELECTIVE- I R203102F	CO-1	The course outcome of Open Elective-I includes enhancing creative knowledge regarding business selection
	CO-2	Students are expected to define, describe, and apply basic concepts related to modeling and simulation
	CO-3	To the objective is to introduce students to the integration of people involved in the software process with development
	CO-4	It involves understanding the basics of communication systems, both analog and digital
	CO-5	Students are expected to gain a deeper understanding of business selection, basic concepts related to modeling and simulation, integration of people in the software process, and
SOFTWARE ENGINEERING R203142A	CO-1	To Ability to transform an Object-Oriented Design into high quality, executable code
	CO-2	To Skills to design, implement, and execute test cases at the Unit and Integration level
	CO-3	To Compare conventional and agile software methods
	CO-4	To Design within the Context of Software Engineering, The Design Process, Design Concepts, The Design Model, Software Architecture, Architectural Genres, Architectural Styles
	CO-5	To The Golden Rules, User Interface Analysis and Design, Interface Analysis, Interface Design Steps
OPERATING SYSTEMS & COMPILER DESIGN LAB R2031424	CO-1	To Implement various scheduling, page replacement algorithms and algorithms related to deadlocks
	CO-2	To Design programs for shared memory management and semaphores
	CO-3	To Determine predictive parsing table for a CFG
	CO-4	To Apply Lex and Yacc tools
	CO-5	To Examine LR parser and generating SLR Parsing table
MACHINE LEARNING LAB R2031425	CO-1	To Implement procedures for the machine learning algorithms
	CO-2	To Design and Develop Python programs for various Learning algorithms
	CO-3	To Apply appropriate data sets to the Machine Learning algorithms
	CO-4	To Develop Machine Learning algorithms to solve real world problems
	CO-5	To Understanding the mathematical and statistical perspectives of machine learning algorithms through Python programming.
CONTINUOUS INTEGRATION AND CONTINUOUS DELIVERY USING DevOps	CO-1	To Understand the why, what and how of DevOps adoption
	CO-2	To Attain literacy on Devops
	CO-3	To Align capabilities required in the team
	CO-4	To Create an automated CICD pipeline using a stack of tools
	CO-5	To Continuous Integration (CI): Learners will understand how to merge code changes efficiently,

EMPLOYABILITY SKILLS-I R2031058	CO-1	To Understand the corporate etiquette
	CO-2	To Make presentations effectively with appropriate body language
	CO-3	To Be composed with positive attitude
	CO-4	To Understand the core competencies to succeed in professional and personal life
	CO-5	Essential Employability Skills (EES) are emphasized throughout the program, with opportunities for students to practice these skills in real-world scenarios
Summer Internship 2 Months (Mandatory) after second year (to be evaluated during V semester) R2031426	CO-1	Internship learning outcomes are crucial for students participating in internships. These outcomes serve as learning targets, providing interns with a clear understanding of what they should learn or achieve by the end of the internship
	CO-2	Student learning outcomes for internships include exploring career alternatives, integrating theory and practice, developing work habits and attitudes necessary for job success, building a record of work experience, and acquiring employment contacts leading to full-time job
	CO-3	The internship program aims to provide students with an introduction to the organization's professional culture, develop critical skills like communication and interpersonal skills, and promote academic, career, and personal development
	CO-4	Setting successful internship goals is essential for both interns and employers. Internship goals are measurable expectations that interns set for themselves and share with their employers and advisors
COURSE OUTCOMES FOR THIRD YEAR SECOND SEMESTER		
COURSE TITLE WITH CODE	CO	STATEMENT
Computer Networks R203242	CO-1	To Demonstrate different network models for networking links OSI, TCP/IP, B-ISDN, N-BISDN and get knowledge about various communication techniques, methods and protocol standards.
	CO-2	To Discuss different transmission media and different switching networks.
	CO-3	To Analyze data link layer services, functions and protocols like HDLC and PPP
	CO-4	To Compare and Classify medium access control protocols like ALOHA, CSMA, CSMA/CD, CSMA/CA
	CO-5	To Determine application layer services and client server protocols working with the client server.
Deep Learning R2032422	CO-1	To Demonstrate the fundamental concepts learning techniques of Artificial Intelligence, Machine Learning and Deep Learning.
	CO-2	To Discuss the Neural Network training, various random models.
	CO-3	To Explain the Techniques of Keras, TensorFlow, Theano and CNTK
	CO-4	To Classify the Concepts of CNN and RNN
	CO-5	To Implement Interactive Applications of Deep Learning.
Design and Analysis of Algorithms R2032423	CO-1	To Analyze the performance of a given algorithm, denote its time complexity using the asymptotic notation for recursive and non-recursive algorithms
	CO-2	To List and describe various algorithmic approaches and Solve problems using divide and conquer & greedy Method
	CO-3	To Synthesize efficient algorithms dynamic programming approaches to solve in common engineering design situations.
	CO-4	To Organize important algorithmic design paradigms and methods of analysis: backtracking, branch and bound algorithmic approaches
	CO-5	To Demonstrate NP- Completeness theory, lower bound theory and String Matching
Professional Elective-II 1. Software Project Management 2. Distributed Systems	CO-1	To Apply the process to be followed in the software development life-cycle models
	CO-2	To Apply the concepts of project management & planning
	CO-3	To Implement the project plans through managing people, communications and change
	CO-4	To Conduct activities necessary to successfully complete and close the Software projects
	CO-5	To Implement communication, modeling, and construction & deployment practices in software development
Open Elective-II Open Electives offered by other departments/ MEAN Stack Development (Job Oriented Course) R203205E	CO-1	To Build static web pages using HTML 5 elements.
	CO-2	To Apply JavaScript to embed programming interface for web pages and also to perform Client side validations.
	CO-3	To Build a basic web server using Node.js, work with Node Package Manager (NPM) and recognize the need for Express.js.
	CO-4	To Develop JavaScript applications using typescript and work with document database using Mongo DB.
	CO-5	To Utilize Angular JS to design dynamic and responsive web pages.
Computer Networks Lab R2032424	CO-1	To Know how reliable data communication is achieved through data link layer.
	CO-2	To Suggest appropriate routing algorithm for the network.
	CO-3	To Provide internet connection to the system and its installation
	CO-4	To Provide internet connection to the system and its installation.

	CO-5	To Work on various network management tools
Algorithms for Efficient Coding Lab R2032425	CO-1	To Analyze and calculate time complexity and space complexity of various algorithms or written code using mathematical methods
	CO-2	To analyze the asymptotic performance of algorithm and write correctness proofs for them
	CO-3	To design and apply appropriate algorithms to solve real-life problems
	CO-4	To break down and describe the simulation of various algorithms for different input values
	CO-5	To Identify which algorithm falls under specific algorithmic paradigms, compare different algorithms, and choose the most efficient one
Deep Learning with Tensor flow R2032426	CO-1	To Implement deep neural networks to solve real world problems.
	CO-2	To Choose appropriate pre-trained model to solve real time problem
	CO-3	To Interpret the results of two different deep learning models
	CO-4	To Cover the concepts of Neural Networks and Deep Learning
	CO-5	To Provide a basic understanding of the Python language and TensorFlow.
Skill Oriented Course - IV 1. MEAN Stack Technologies- Module I HTML 5, JavaScript, Node.js, Express.js and TypeScript OR 2. Big Data : Apache	CO-1	To Develop professional web pages of an application using HTML elements like lists, navigations, tables, various form elements, embedded media which includes images, audio, video and CSS Styles.
	CO-2	To Utilize JavaScript for developing interactive HTML web pages and validate form data.
	CO-3	To Build a basic web server using Node.js and also working with Node Package Manager (NPM).
	CO-4	To Build a web server using Express.js
	CO-5	To Make use of Typescript to optimize JavaScript code by using the concept of strict type checking.
Employability skills-II R2032059	CO-1	To Solve various Basic Mathematics problems by following different methods
	CO-2	To Follow strategies in minimizing time consumption in problem solving Apply shortcut methods to solve problems
	CO-3	To Solve confidently any mathematical problems and utilize these mathematical skills both in their professional as well as personal life.
	CO-4	To Develop a set of own responsibilities and objectives, such as creative planning, financial analysis, business proposals, training provision, and balancing staffing lists to achieve efficiency, productivity, and cost reduction
	CO-5	Demonstrating initiative and self-direction through high achievement and lifelong learning, managing workload efficiently, setting and achieving high standards and goals, engaging in effective problem-solving processes, delivering quality job performance on time, communicating and working productively with others to increase innovation and quality of work.
COURSE OUTCOMES FOR FOURTH YEAR FIRST SEMESTER		
COURSE TITLE WITH CODE	CO	STATEMENT
Cryptography and Network Security Professional Elective-III R204105B	CO-1	To Understand basic concepts of Reinforcement learning
	CO-2	To able to apply fuzzy logic and reasoning to handle uncertainty in engineering problems Make use of genetic algorithms to combinatorial optimization problems.
	CO-3	To determine the knowledge of Application layer, Transport layer and Network layer security Protocols such as PGP, S/MIME, SSL, TSL, and IPsec .
	CO-4	To make Use of Block-chain in E-Governance, Land Registration, Medical Information Systems and others
	CO-5	To understand the speech production and perception process. To analyze speech signals in time and frequency domain.
Professional Elective-IV 2. Cloud Computing 3. Big Data Analytics R2041052	CO-1	To describe the different types of variables, Control Flow and data manipulation techniques. To Identify and understand Image, Text and Data Tables Automation.
	CO-2	To analyze Cloud infrastructure including Google Cloud and Amazon Cloud. To Create Combinatorial Auctions for cloud resource and design scheduling algorithms for computing
	CO-3	To use various techniques for mining data stream. To design and develop Hadoop
	CO-4	To discuss about Aggregate Data Models. To explain about Master-Slave Replication, Peer-to-Peer Replication
	CO-5	To design video analytic algorithms for security applications. To design video analytic algorithms for business intelligence
Professional Elective-V	CO-1	To Demonstrate social network analysis and measures. To Analyze random graph models and navigate social networks data
	CO-2	To Analyze the nature of complex system and its solutions. To Illustrate & relate the conceptual model of the UML, identify & design the classes and relationships

Object Oriented Analysis and Design R2041054	CO-3	To design, build, test, and iterate a fully-functional, interactive chatbot using a commercial platform. To Deploy the finished chatbot for public use and interaction
	CO-4	To Implement machine-learning and data-mining algorithms in recommender systems data sets. To design and implement a simple recommender system.
	CO-5	To be able to visualize, summarize and compare networks. Illustrate basic principles behind network analysis algorithms
Open Elective-III Open Electives offered by other departments/API and Microservices (Job Oriented Course) R2041055	CO-1	To develop a Spring Data JPA application with Spring Boot
	CO-2	To Implement CRUD operations using Spring Data JPA
	CO-3	To develop RESTful endpoints using Spring REST Processing URI parameters
	CO-4	To handle exceptions and errors in Spring REST endpoints
	CO-5	To create secure RESTful endpoints using Spring Security Document and version the Spring REST endpoints Implement CORS in a Spring REST application
Open Elective-IV Open Electives offered by other departments/Secure Coding Techniques (Job Oriented Course) R2041058	CO-1	To differentiate the objectives of information security
	CO-2	To understand the trend, reasons and impact of the recent Cyber attacks
	CO-3	To understand OWASP design principles while designing a web application
	CO-4	To understand Threat modelling
	CO-5	To Write secure coding using some of the practices in C/C++/Java and Python programming languages
Universal Human Values OR Understanding Harmony R2041011	CO-1	To become more aware of themselves
	CO-2	To handling problems with sustainable solutions
	CO-3	To apply what they have learnt to their own self in different day-to-day settings in real life
	CO-4	To keeping human relationships and human nature in mind
	CO-5	To would have better critical ability
1.Machine Learning with Go (Infosys Spring Board) OR 2.MEAN Stack Technologies- Module II Angular JS and MongoDB R2041562	CO-1	To build a component-based application using Angular components and enhance their functionality using directives.
	CO-2	To utilize data binding for developing Angular forms and bind them with model data.
	CO-3	To apply Angular built-in or custom pipes to format the rendered data.
	CO-4	To develop a single page application by using synchronous or asynchronous Angular routing.
	CO-5	To make use of MongoDB queries to perform CRUD operations on document database.
Industrial/Research Internship 2 months (Mandatory) after third year (to be evaluated during VII semester R2041563	CO-1	To practical skills, industry knowledge, and professional contacts that enhance their employability
	CO-2	To help interns collaborate with multidisciplinary teams, fostering teamwork, cooperation
	CO-3	To help interns improve their communication skills by interacting with supervisors, colleagues, and clients
	CO-4	To learn research methodologies, experimental design, data collection, analysis
	CO-5	To acquire and enhance technical skills specific to their discipline, such as laboratory techniques, data analysis
COURSE OUTCOMES FOR FOURTH YEAR SECOND SEMESTER		
COURSE TITLE WITH CODE	CO	STATEMENT
Major projectwork, seminar,intership R204156P	CO-1	To understanding of theoretical concepts and practical applications relevant to their field of study
	CO-2	To help in Presenting seminar topics, collaborating with team members on projects, and communicating findings
	CO-3	To learn how to conduct comprehensive literature reviews, gather and analyze data, and draw meaningful conclusions
	CO-4	To help in engaging in research and project work encourages students to think critically
	CO-5	To encourage on their learning process, identify strengths and areas for improvement