



BVRIT HYDERABAD
College of Engineering for Women
Department of Computer Science and Engineering
Course Outcomes
Academic Year 2021-22 Semester-I

IV-I (R18)

Course Code	Course Name	CO No.	Course Outcomes
C411	Cryptogr aphy and Network Security	C411.1	Illustrate the concepts and principles of security Attacks, Services and Mechanisms.
		C411.2	Evaluate applications of Cryptographic algorithms in real time scenarios.
		C411.3	Demonstrate the techniques like Message authentication, Hash function and public key encryption.
		C411.4	Solve the network security issues using available security solutions.
		C411.5	Assess different key management techniques and solutions for web security.
		C411.6	Analyze various case studies to identify the security vulnerabilities and prevention techniques.
C412	Data Mining	C412.1	Examine data mining tasks, KDD process and challenges.
		C412.2	Apply Data Preprocessing techniques to make data sets ready to be mining.
		C412.3	Identify the frequent patterns and association rules from transactional datasets.
		C412.4	Classify the real world data into appropriate classes using various supervised learning techniques and measure its

			performance.
		C412.5	Apply clustering and outlier detection techniques on given data sets and evaluate goodness measures.
		C412.6	Classify web pages and extract knowledge from the web and text data.
C 413	Graph Theory	C413.1	Know some important classes of graph-theoretic problems and the usage of graph theory as a modeling tool.
		C413.2	Formulate the central theorems about trees, matching, connectivity, coloring, and planar graphs.
		C413.3	Describe some basic algorithms for graphs.
		C413.4	The Graph theory as a Modeling tool for presentable in Applications.
		C413.5	Learn the fundamental concepts in graph theory in view of its applications in modern science and create mathematical proofs.
		C413.6	Use the concepts of Graph theory in subsequent courses in the design and analysis of Graph algorithms.
C 414	Introduction to Embedded Systems	C414.1	Distinguish the embedded systems from general purpose processing systems.
		C414.2	Recommend suitable hardware for different applications of embedded systems.
		C414.3	Select different types and amount of memory based on embedded system specifications.
		C414.4	Discuss the Embedded firmware design approaches, development languages and device drivers
		C414.5	Analyze the issues and techniques of Task synchronization and communication in embedded firmware.
		C414.6	Differentiate between general purpose operating systems and RTOS.

C415	Artificial Intelligence	C415.1	To Formulate different search Algorithms and developing problem solving ability
		C415.2	Understand propositional logic and identify constraints satisfaction problems
		C415.3	Improve logic and draw the inferences
		C415.4	Ability to do reasoning and knowledge representation for various categories of information
		C415.5	Define various classical planning approaches applied to real world
		C415.6	Understand probabilistic reasoning and various learning mechanisms
C416	Cloud Computing	C416.1	Understand various types of computing paradigms.
		C416.2	Identify the need for Cloud Computing and its essential characteristics.
		C416.3	Analyze Cloud architecture, network connectivity and its applications.
		C416.4	Analyze management in Cloud infrastructure and approaches of Cloud migration.
		C416.5	Identify Cloud environment using Infrastructure as a Service (IaaS) , PaaS and SaaS.
		C416.6	Analyze Cloud era by different platforms.
C417	Adhoc and Sensor Networks	C417.1	Apply the basic characteristics and routing in Mobile Ad-hoc Networks (MANETS)
		C417.2	Analyze the data transmission in MANETs and the usage of TCP over MANETs and understand MANETs and WSN for Industry and research point
		C417.3	Ability to solve the issues in real time application development based on Geocasting
		C417.4	Demonstrate the ability to solve security related problems using Routing protocols
		C417.5	Understand the basics of WSN and various layers
		C417.6	Choose appropriate tools for WSN simulation
C418	Advanced	C418.1	Analyze complex problems using advanced data structures

	Algorithms	C418.2	Analyze complex problems using advanced data structures (stacks, queues, linked lists, graphs and trees)
		C418.3	Model real life problem using different algorithm design techniques
		C418.4	Apply different design techniques to solve network related problems.
		C418.5	Choose proper pattern matching algorithm for given problem
		C418.6	Analyze NP and NP hard problems
C419	Real - Time Systems	C419.1	Apply the commands for file I/O and process Control
		C419.2	Implement time management & task management in the real time operating systems
		C419.3	Analyze the communication among processes during concurrency
		C419.4	Configure different components of I/O
		C419.5	Handle Exceptions & Interrupts
		C419.6	Distinguish functionalities of various real time operating systems namely RT Linux, Vx Works, MicroC/OS-II, Tiny OS and Embedded Linux
C41A	Soft Computing	C41A.1	Identify the difference between hard and soft computing
		C41A.2	Understand fuzzy logic and reasoning to handle and solve engineering problems
		C41A.3	Identify the difference between problem solving and decision making
		C41A.4	Implement the particle swarm optimizations for various applications
		C41A.5	Perform various operations of genetic algorithms, Rough Sets.
		C41A.6	Create various models to integrate soft computing techniques
C41B	Internet of Things	C41B.1	Inference the impact and challenges posed by IoT networks leading to new architectural models.
		C41B.2	Compare and contrast the deployment of smart objects and the technologies to connect them to network.
		C41B.3	Appraise the role of IoT protocols for efficient network communication.
		C41B.4	Elaborate python programming with various interfacing devices using with Raspberry PI.
		C41B.5	Illustrate different sensor technologies for sensing real world entities and identify the applications of IoT in

			Industry.
		C41B.6	Construct a restful web API.
C41C	Software Process and Project Management	C41C.1	Analyze the Software process maturity levels for Process Improvement and Process Assessment.
		C41C.2	Explore the Software Management Renaissance in Economics.
		C41C.3	Evaluate Life cycle phases and Artifacts in Project Management.
		C41C.4	Examine the role of workflows and checkpoints in process planning.
		C41C.5	Illustrate the importance of Project Organization, Project control and process instrumentation in Project Management.
		C41C.6	Evaluate the Project management practices with Case Studies.
C41D	Electronic sensors	C41D.1	Illustrate the characteristics and operating principles of Sensors
		C41D.2	Summarize the construction and operation of various Electro Mechanical Sensors.
		C41D.3	Analyze the working principles and applications of different Thermal Sensors
		C41D.4	Explore the working principles of different Magnetic Sensors
		C41D.5	Utilize Radiation and Electro Analytical Sensors to compute radiation and various electrical parameters.
		C41D.6	Make use of smart sensors to measure different physical parameters and apply them in various Fields
C41E	Cryptography and Network Security Lab	C41E.1	Compare various cryptographic techniques to encode and decode the given text.
		C41E.2	Develop solutions using symmetric key algorithms.
		C41E.3	Build solutions using public key cryptographic algorithms.
		C41E.4	Analyze various secure hash algorithms to generate hash key.
C41F	Seminar	C41F.1	Identify emerging topic specific to the programme.
		C41F.2	Extract the information relevant to the chosen topic.
		C41F.3	Deliver the knowledge using multimedia.
		C41F.4	Answer the queries with appropriate explanation and elaboration.
		C41F.5	Compile an effective technical report, providing conclusions and proposing an appropriate future scope.

C41G	Project Stage-I	C41G.1	Identify problem, conduct literature survey and formalize it.
		C41G.2	Analyze and propose an efficient, cost-effective and eco-friendly solution using relevant tools and technologies.
		C41G.3	Finalize the design plan and implement at least one module of the project.
		C41G.4	Demonstrate effective communication and report writing skills.
		C41G.5	Recognize the need for team work and exhibit professional ethics.

III-I (R18)

Course Code	Course Name	CO No.	Course Outcomes
C311	Formal Languages and Automata Theory	C311.1	Design FA machines, minimize, and achieve conversions among them.
		C311.2	Make use of Regular expressions and Test for regular languages
		C311.3	Derive sentential forms from CFG and remove ambiguity
		C311.4	Minimize and design recognizers for CFG.
		C311.5	Design appropriate Turing Machine for a given problem
		C311.6	Identify undecidability in NREL, REL and RL
C312	Software Engineering	C312.1	Illustrate process framework and models for the development based on nature of the software.
		C312.2	Analyze the requirements to select a model and for preparation of SRS document.
		C312.3	Choose appropriate model to create architecture by using design principles.

		C312.4	Apply various testing strategies to validate the software quality.
		C312.5	Illustrate the importance of product metrics in software development.
		C312.6	Develop reliable software by managing risk and following Quality Standards.
C313	Computer Networks	C313.1	Examine various reference models in terms of protocols, layer interfaces, connecting and grouping of users.
		C313.2	Analyze counter measures like error detection, correction, flow control and medium access protocols in data link layer.
		C313.3	Identify the suitable routing algorithm in Network layer.
		C313.4	Identifying suitable hardware components for connecting hosts based on location.
		C313.5	Assess the connection management and congestion control of TCP protocols and services of various protocols in Application layer.
		C313.6	Analyze the security threats and counter mechanism to handle.
C314	Web Technologies	C314.1	Design dynamic web based applications using PHP
		C314.2	Design static web applications using HTML
		C314.3	Analyze XML tags and parsing of XML data in Java
		C314.4	Develop server side programming using servlet and connect to the database using JDBC
C315	Information Theory & coding	C315.1	Calculate information, entropy, mutual information and channel capacity for various channels
		C315.2	Compare various source coding techniques in terms of their efficiency

		C315.3	Inspect error detection and correction in linear block codes
		C315.4	Design encoder and decoder for various codes
		C315.5	Analyze the applicability of source and channel codes
		C315.6	Devise Minimum distance and BCH bounds and procedure of decoding BCH codes
C316	Advanced Computer Architecture	C316.1	Identify different computational models and Computer Architectures.
		C316.2	Analyze operation of parallel processing and memory hierarchy and the range of performance issues influencing its design.
		C316.3	Classify the performance of different pipelined & non-pipelined processors.
		C316.4	Analyze architectural features of advanced processors like Superscalar processors, multiprocessors.
		C316.5	Choose multiprocessors & thread level parallelism using shared, distributed memory models.
		C316.6	Develop the design techniques of Scalable and multithreaded Architecture.
C317	Data Analytics	C317.1	Fetch data from various sources and make it ready for analysis
		C317.2	Make use of various tools and technologies for data analysis
		C317.3	Apply regression techniques to data and evaluate performance
		C317.4	build supervised and unsupervised learning models for object segmentation
		C317.5	Build models for time series and evaluate performance
		C317.6	Visualize the data and interpret the insights exist in data
C318	Image Processin	C318.1	Demonstrate the knowledge of the basic concepts of the two-dimensional signal acquisition, sampling and

	g		quantization and its applications of Image Processing
		C318.2	Model of spatial and frequency filtering technique for image enhancement.
		C318.3	Demonstration of the knowledge of 2Dimensional transformation techniques.
		C318.4	Implement the image enhancement, segmentation, restoration, and compression techniques and problems.
		C318.5	Implement image processing algorithms using Open Source / Image Processing Tools / Matlab Software
		C318.6	Professional Contribution in the field of Digital Image Processing
C319	PRINCIPLES OF PROGRAMMING LANGUAGES	C319.1	Identify the building blocks of various Programming languages
		C319.2	Implement various methods to describe syntax and semantics of programming languages
		C319.3	Examine fundamentals like Data types, Control Structures etc. of various programming languages
		C319.4	Make use of Subprograms and ADT in implementing business logic
		C319.5	Apply the techniques to handle Concurrency, Exceptions and Events in programming
		C319.6	Outline Functional, Logic and Scripting Programming Language Concept
C31A	Computer Graphics	C31A.1	Analyze the functionality of various Input , output devices
		C31A.2	Design algorithms for primitive components and to fill 2-D shapes
		C31A.3	Perform transformations and create views for 2-D co-ordinates
		C31A.4	Perform transformations and create views for 3-D co-ordinates
		C31A.5	Apply surface detection methods
		C31A.6	Design and Create a Graphics Visualization and its

			applications using OpenGL or Opensource software
C31B	Advanced Operating Systems	C31B.1	Draw inference on the various design approaches of advanced operating systems
		C31B.2	Analyze the design issues of distributed operating systems.
		C31B.3	Inspect and Identify the advantages and challenges in designing distributed algorithms for different primitives like mutual exclusion, deadlock detection, agreement, etc.
		C31B.4	Examine design issues and computational performance of multi-processor operating systems.
		C31B.5	Identify the requirements of Distributed File System and Distributed Shared Memory.
		C31B.6	Analyze how computing power is created and synchronized in Distributed systems
C31C	Information Retrieval Systems	C31C.1	Implementing Information Retrieval system capabilities and Digital Libraries
		C31C.2	Implement the Indexing and the Data Structures
		C31C.3	Compute the Automatic indexing, Document and term clustering.
		C31C.4	Apply user search techniques to improve the information visualization.
		C31C.5	Implementation of Text Search Algorithms.
		C31C.6	Build the working model for multimedia information retrieval system.
C31D	Distributed Systems	C31D.1	Analyze the architecture and design of distributed database systems.
		C31D.2	Explore the objectives and algorithms for distributed query processing.
		C31D.3	Examine the mechanisms of concurrency control and deadlock management.
		C31D.4	Evaluate the measures of distributed systems reliability and fault tolerance.
		C31D.5	Illustrate the importance of parallel database systems.
		C31D.6	Examine the concepts of object oriented database management systems.
C31E	Natural Language Processin	C31E.1	Outline the sensitivity to linguistic phenomena and ability to model using syntax, semantics and pragmatics with formal grammars.
		C31E.2	Students will able to understand and carry out proper

	g		experimental methodology for training and evaluating empirical NLP systems
		C31E.3	Manipulate probabilities, construct statistical models over strings and trees, and estimate parameters using supervised and unsupervised training methods with ambiguity resolution.
		C31E.4	Design, implement, and analyze NLP algorithms for a given Natural Language tasks.
		C31E.5	Design different language Modeling Techniques using AI and ML algorithms.
		C31E.6	Design Applications of Natural Language Processing using open source / Python / NLTK and Natural Language Tools.
C31F	Software Engineering Lab	C31F.1	Analyze the problem and identify project scope and objectives and analyze the software requirements and prepare SRS document.
		C31F.2	Develop risk strategy and QA techniques for developing quality software
		C31F.3	Design the software using UML diagrams
		C31F.4	Design the test case document
C31G	Computer Networks and Web Technologies Lab	C31G.1	Implement various algorithms of data link, network, transport and presentation layer.
		C31G.2	Evaluate data transmission techniques and monitor the network traffic using appropriate simulation tools.
		C31G.3	Develop web applications using Client Side Technologies HTML, CSS, Javascript and XML
		C31G.4	Develop web applications using Server Side Technologies PHP, Servlet and JSP
C31H	Advanced Communication Skills Lab	C31H.1	Build sound vocabulary and use functional English effectively
		C31H.2	Analyze the given text and respond appropriately and develop efficacious writing skills
		C31H.3	Develop effective speaking skills and maximize job prospects

		C31H.4	Plan and make different forms of presentation using various techniques
C31I	Intellectual Property Rights	C31I.1	Discuss the fundamental aspects of Intellectual property Rights which play a major role in development and management of innovative projects in industries.
		C31I.2	Examine Trademarks, Acquisition of Trade Mark Rights and its registration processes.
		C31I.3	Evaluate various aspects relating to copyrights and its procedure for registration processes.
		C31I.4	Evaluate with the Trade Secret Law, protection for submission, Unfair Competition
		C31I.5	Evaluate on the International Developments in Intellectual Property Rights
		C31I.6	Interpret about current trends in IPR and the steps taken by the Government of India in fostering IPR
C31J	Artificial Intelligence	C31J.1	Possess the ability to formulate an efficient problem space for a problem expressed in English
		C31J.2	Possess the ability to select a search algorithm for a problem and characterize its time and space complexities
		C31J.3	Possess the skill for representing knowledge using the appropriate technique for a given problem
		C31J.4	Apply and evaluate AI techniques to solve problems of Machine learning and Natural Language Processing
		C31J.5	Choose and implement appropriate learning algorithms for a given problem.
		C31J.6	Create an expert system to simulate behaviour of a person

II-I (R18)

Course Code	Course Name	CO No.	Course Outcomes
C211	Analog and Digital Electronics	C211.1	Analyze the construction, principle of operation and characteristics of PN junction diode.
		C211.2	Differentiate various types of diodes and their applications.
		C211.3	Analyze the construction, principle of operation, characteristics and applications of BJT and FET.
		C211.4	Design biasing circuits to maintain stable operating point based on given specifications.
		C211.5	Realize logic circuits using diodes and transistors.
		C211.6	Design and analyze simple combinational and sequential circuits.
C212	Data Structures	C212.1	Experiment with various operations on Stacks and queues.
		C212.2	Implement various operations on linear data structures and its applications.
		C212.3	Design programs using a variety of data structures like Hash Table Representation.
		C212.4	Experiment with various operations on non linear data structures.
		C212.5	Choose appropriate sorting technique for a given problem.
		C212.6	Exploring Pattern matching algorithms and suffix Tries.
C213	Computer Oriented Statistical Methods	C213.1	Distinguish between discrete and continuous probability. Distributions.
		C213.2	Analyze and interpret statistical data using appropriate probability distributions.
		C213.3	Apply sampling distributions in real world problems.

		C213.4	Estimate the value for a given parameter by choosing appropriate method.
		C213.5	Apply suitable test to accept or reject a given hypothesis.
		C213.6	Apply Stochastic process and Markov process to solve various problems.
		C214.6	Apply Stochastic process and Markov process to solve various problems.
C214	Computer Organization and Architecture	C214.1	Implement Micro-operations in Design, Organization and Architecture of a basic computer.
		C214.2	Design a suitable Control unit for a decided set of Instructions.
		C214.3	Design Hardware and Algorithms for manipulation of data, represented in different formats.
		C214.4	Implement data transfer with appropriate IO Interface and Interrupt mechanism.
		C214.5	Choose suitable type of Memory for given purpose
		C214.6	Perform Parallel Processing using suitable mechanism
C215	Object Oriented Programming using C++	C215.1	Make use of object oriented paradigm with concepts of classes and objects.
		C215.2	Design and Implement programs using C++
		C215.3	Apply concepts of Inheritance in real time problems.
		C215.4	Design solutions for real time problems using Polymorphism and Abstract classes.
		C215.5	Apply features of stream I/O, various file handling techniques in C++
		C215.6	Analyze the concept Exception handling using C++
C216	ADE Lab	C216.1	Analyze the characteristics of Full wave rectifier.
		C216.2	Analyze the characteristics of different Transistor amplifier configurations.
		C216.3	Implement Boolean expressions using universal logic gates.

		C216.4	Design and verify simple combinational and sequential circuits using IC s of different logic families.
C217	Data Structure s Lab	C217.1	Implement various linear data structures.
		C217.2	Implement various non linear data structures.
		C217.3	Compare various searching and sorting algorithms.
		C217.4	Ability to implement trees and graphs traversals.
C218	IT Worksho p Lab	C218.1	Construct a Personal Computer and prepare the computer ready to use.
		C218.2	Prepare the Documents & slide presentations using Word processors and presentation tools.
		C218.3	Apply internet concepts to connect two or more computers for information sharing.
		C218.4	Build a dual mode operating system PC by installing OS Software.
C219	C++ Program ming Lab	C219.1	Apply Object oriented features and C++ concepts.
		C219.2	Apply the concept of polymorphism and inheritance.
		C219.3	Implement exception handling and templates.
		C219.4	Develop applications using Console I/O and File I/O.
C21A	GS Lab	C21A.1	Develop a better understanding of important issues related to gender in contemporary India
		C21A.2	Analyze basic dimensions of the biological, sociological, psychological and legal aspects of gender
		C21A.3	Develop a sense of appreciation of women in all walks of life and will be equipped to work and live together as equals.
		C21A.4	Examine the new laws for women protection & relief, and empower students to understand and respond to gender violence

Academic Year 2021-22 Semester-II

IV-II (R18)

Course Code	Course Name	CO No.	Course Outcomes
C421	Organizational Behavior	C421.1	Analyze the behavior of individuals and groups in Organizations
		C421.2	Analyze the factors that influence Organizational behavior
		C421.3	Examine the potential effects of organizational level factors on organizational behavior.
		C421.4	Analyze potential effects of important developments in the external environment on Organizational behavior.
		C421.5	Examine the role of globalization and advances in technology on Organizational behavior.
		C421.6	Analyze organizational behavior theories, models and concepts.
C422	Computational Complexity	C422.1	Analyze the computational complexity and classify algorithms into appropriate complexity classes.
		C422.2	Construct reduction of problem.
		C422.3	Analyze algorithmic paradigms and choose appropriate paradigm for a given problem.
		C422.4	Choose appropriate randomized algorithms for pattern recognition.
		C422.5	Compare various graph based algorithms for approximation and randomization problems.
		C422.6	Apply suitable data structure for complex applications.
C423	Distributed Systems	C423.1	Classify the various distributed systems, challenges and models.
		C423.2	Evaluate the importance of clock, process synchronization and debugging of distributed systems.
		C423.3	Examine the protocol for inter process communication and distributed objects.
		C423.4	Explore distributed file system, naming services and shared memory for distributed systems.
		C423.5	Categorize the distinct transactions mechanism and locks.
		C423.6	Inspect concurrency control and recovery mechanisms for distributed systems.

C424	Neural Networks and Deep Learning	C424.1	Ability to understand the concepts of Neural Networks
		C424.2	Ability to select the Learning Networks in modeling real world systems
		C424.3	Ability to understand deep learning architectures
		C424.4	Ability to use an efficient algorithm for Deep Models
		C424.5	Ability to use Regularizations for deep learning
		C424.6	Ability to apply optimization strategies for large scale applications
C425	Human Computer Interaction	C425.1	Elaborate the design of good Interface and features of GUI
		C425.2	Compare the Human interaction speed with computers
		C425.3	Apply visually pleasing composition of elements on screen design
		C425.4	Identify Various Navigation Schemes, Screen based controls in user interface design
		C425.5	Design effective HCI for individuals
		C425.6	Ability to design certain tools for blind or PH people.
C426	Cyber Forensics	C426.1	Understand the fundamentals of Cyber Crime
		C426.2	Analyze the nature and effect of cybercrime in society.
		C426.3	Demonstrate Accounting Forensics.
		C426.4	Analyze Computer Crime and Criminals and Liturgical Procedures.
		C426.5	Apply the laws and regulations to the applications
		C426.6	Analyze the email tracking cyber applications.
C427	Basics of Power Plant Engineering	C427.1	Understand the components and layouts of various power plants.
		C427.2	Analyze Rankine Cycle in coal-based power plants and Brayton Cycle in Gas turbine power plants
		C427.3	Elucidate various nuclear reactors
		C427.4	Discuss the principles of various non-conventional energy power plants
		C427.5	Examine the economic aspects for electrical power generation
		C427.6	Apply various pollution control techniques in power plants.
C428	Project Stage-II	C428.1	Implement the remaining modules or features of the project complying with timelines.
		C428.2	Demonstrate the functionality of the project and evaluate the results.
		C428.3	Derive the conclusion to provide scope for future enhancement.
		C428.4	Integrate the findings of Stage-I & Stage-II and prepare a comprehensive report.
		C428.5	Exhibit technical, interpersonal and leadership skills with individual contribution.

III-II (R18)

Course Code	Course Name	CO No.	Course Outcomes
C321	Machine Learning	C321.1	Formulate the problems of searching that converge to correct hypothesis using concept and decision tree learning.
		C321.2	Interpret face recognition, learning robot control with ANN
		C321.3	Apply Bayesian classification, Naïve Bayes theorem to analyze several learning algorithms.
		C321.4	Evaluate the accuracy of learned hypothesis with statistical methods and analyze the operations of algorithm
		C321.5	Apply genetic, sequential algorithms to perform simulated evaluation of learning and optimization problems
		C321.6	Formulate the general hypothesis with inductive and analytical learning.
C322	Compiler Design	C322.1	Illustrate the functionality of compiler phases.
		C322.2	Apply practical aspects of automata theory.
		C322.3	Design parsers for a given CFG.
		C322.4	Construct SDT for various aspects including Intermediate Code.
		C322.5	Make use of relevant data structures.
		C322.6	Apply various code generation and optimization techniques.
C323	Design and Analysis of Algorithms	C323.1	Analyze the performance of algorithms and represent using relevant notations.
		C323.2	Model real world applications using sets graphs and trees.
		C323.3	Explore basic techniques for designing algorithm using divide – conquer & Greedy approach to various problems.
		C323.4	Identify suitable design paradigms to improve the solution space using Dynamic Programming & Backtracking method.
		C323.5	Reduce the search space of a problem using bounding functions.
		C323.6	Categorize problems into NP hard & NP Complete.
C324	Concurrent	C324.1	Understand the use of shared objects for communication and co-ordination among concurrent processes.

	t Programm ing	C324.2	Apply mutual exclusion and condition synchronization in multithreaded processes.
		C324.3	Design concurrent programs using blocking and non-blocking concurrent objects
		C324.4	Solve synchronization problems by identifying a set of primitive synchronization operations.
		C324.5	Implement multithreading using various synchronization mechanisms.
		C324.6	Implement concurrent queues and stacks to achieve high degree of parallelism.
C325	Network Programm ing	C325.1	Examine major protocols used for inter process communication
		C325.2	Analyzing Client server communication, elementary UDP Sockets programming, I/o multiplexing
		C325.3	Apply the concepts related to Inter process communication using sockets.
		C325.4	Explain network services that communicate through Internet
		C325.5	Access various kinds of Broadcasting and Multicasting mechanisms.
		C325.6	Design robust socket-based applications
C326	Scripting Languages	C326.1	Make use of resources to gain some fluency programming in Ruby, Perl, TCL and TK
		C326.2	Analyze the features of Ruby by embedding in different ways
		C326.3	Understanding the Perl by utilizing the advanced features
		C326.4	Explain syntax, variables and various features of TCL
		C326.5	Elaborate strengths and weakness TCL and select an appropriate language for solving a given problem
		C326.6	Examine the TK by embedding in different ways
C327	Mobile Applicatio n Developm ent	C327.1	Analyze the features, components and life cycle of Android Operating system
		C327.2	Design Android application with UI components, Fragments and event handling
		C327.3	Identify the importance of intents in Android applications development
		C327.4	Develop Android applications using broadcasts and notifications
		C327.5	Examine the data persistence mechanism using Files and Shared Preferences
		C327.6	Develop Android application to perform operations with SQLite database

C328	Software Testing Methodologies	C328.1	Identify the need of testing and understand the use of path testing
		C328.2	Compare and contrast transaction flow testing, dataflow testing and domain testing strategies
		C328.3	Examine path products, expressions, regular expression and flow anomaly detection in testing process.
		C328.4	Choose appropriate path expression, KV charts, specifications in logic based testing.
		C328.5	Analyze state graphs, graph matrix and their applications in transition testing.
		C328.6	Analyze graph matrices, matrix properties and their applications in building tools like JMeter, Win-runner etc.
C329	Machine Learning Lab	C329.1	Compare Machine Learning algorithms based on their advantages and limitations and use the best one according to situation
		C329.2	Interpret and understand modern notions in data analysis-oriented computing
		C329.3	Apply common Machine Learning algorithms in practice and implement.
		C329.4	Experiment with real-world data using Machine Learning algorithms.
C32A	Compiler Design Lab	C32A.1	Identify the practical approach of how a compiler works
		C32A.2	Construct top down and bottom up parse tools
		C32A.3	Construct LEX and YACC programs
		C32A.4	Develop new computer languages
C32B	Concurrent Programming Lab	C32B.1	Implement mutual exclusion, dead lock free and starvation free multi thread programming.
		C32B.2	Create concurrent FIFO queue data structure using multi thread programming
		C32B.3	Design a consensus object by implementing mutual exclusion lock using CompareAndSet() Primitive
		C32B.4	Apply multithread programming to implement List, stack and queue using atomic primitives
C32C	Network Programming Lab	C32C.1	Develop inter process communication using pipes, message queue & shared memory
		C32C.2	Design and implement client-server applications using TCP and UDP sockets
		C32C.3	Implement peer to peer communication
		C32C.4	Analyze Network programs
C32D	Scripting Languages Lab	C32D.1	Design and test programs to solve mathematical problems
		C32D.2	Develop programs Using Ruby Script
		C32D.3	Develop Programs Using TCL Script

		C32D.4	Develop Programs Using Perl Script
C32E	Mobile Application Development Lab	C32E.1	Design Android User Interface using Layouts and components
		C32E.2	Design android applications using menus, notifications and files
		C32E.3	Develop Android application to persist data in Files, Shared Preferences and SQLite databases
		C32E.4	Develop Android application based on Alarm and URL
C32F	Software Testing Methodologies Lab	C32F.1	Examine selenium tool to perform functional testing
		C32F.2	Develop test scripts using selenium tool
		C32F.3	Apply advanced features of Selenium to automate the use cases
		C32F.4	Build test scripts on automation of web based and windows-based applications
C32G	Environmental Sciences	C32G.1	Discover knowledge regarding environment and its components.
		C32G.2	Understand the classification, importance and conservation of natural resources.
		C32G.3	Perceive the knowledge regarding different Bio -Geo classification of India.
		C32G.4	Examine impacts of pollution on the environment and their control measures.
		C32G.5	Analyze Environmental laws and Environmental Impact Assessments.
		C32G.6	Determine sustainable development that aims to meet raising human needs.
C32H	Cyber Security	C32H.1	Analyze and evaluate the cyber security needs of an organization
		C32H.2	Determine and analyze software vulnerabilities and security solutions to reduce the risk of exploitation
		C32H.3	Implement cyber security solutions and use of cyber security, information assurance, and cyber/computer forensics software/tools.
		C32H.4	Comprehend and execute risk management processes, risk treatment methods, and key risk and performance indicators
		C32H.5	Design and develop a security architecture for an organization.
		C32H.6	Design operational and strategic cyber security strategies and policies.

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Course Code	Course Name	CO No.	Course Outcomes
C221	Discrete mathematics	C221.1	Apply mathematical logic to prove reason and infer various compound statements.
		C221.2	Model the mathematical problems using sets, functions and relations.
		C221.3	Prove mathematical results using various forms of Induction techniques.
		C221.4	Solve the counting problems on finite and discrete structures.
		C221.5	Solve the recursive functions by converting into recurrence relations.
		C221.6	Construct graphs to solve appropriate real-world problems.
C222	Business Economics and Financial Analysis	C222.1	Understand the Economic Concepts in business decision making process.
		C222.2	Familiarize with the cost concepts, market structures.
		C222.3	Make use of breakeven analysis, CVP Analysis, pricing strategies.
		C222.4	Examine financial accounting and analyze various financial statements.
		C222.5	Interpret various financial statements by applying different types of ratios.
		C222.6	Examine the usefulness of funds flow statement and cash flow statement for better managerial decisions.
C223	Operating	C223.1	Analyze the functionalities and structure of a generic Operating System.

	Systems	C223.2	Evaluate various CPU scheduling algorithms.
		C223.3	Analyze process synchronization and IPC mechanisms.
		C223.4	Assess the techniques of deadlock avoidance and prevention.
		C223.5	Examine different Memory management techniques.
		C223.6	Explore file system interface and its operations.
C224	Database Management Systems	C224.1	Identify and classify the components of Database system.
		C224.2	Model the data using ER model and convert into Relational Model.
		C224.3	Access and manipulate the data in the databases.
		C224.4	Refine the database schema to improve data consistency.
		C224.5	Ensure the properties of transactions on databases.
		C224.6	Examine different file organizations and indexing methods.
C225	Java Programming	C225.1	Illustrate Object Oriented concepts and basics of java programming.
		C225.2	Make use of the concepts of packages and Interfaces.
		C225.3	Implement the concepts of multithreading and /or handle run time errors for Java applications.
		C225.4	Utilize collection framework and /or file management in Java applications.
		C225.5	Design real time applications using event handling concepts.
		C225.6	Develop real time GUI applications using applet, AWT, JDBC and swings.

C226	Operating Systems Lab	C226.1	Evaluate CPU Scheduling Algorithms and Memory management techniques.
		C226.2	Construct deadlock detection and avoidance algorithms.
		C226.3	Solve classical problems of synchronization using semaphores.
		C226.4	Evaluate inter process communication mechanisms using system calls and pipes.
C227	Database Management Systems Lab	C227.1	Design conceptual model (E-R model) for the given database.
		C227.2	Formulate the queries using DML, DDL, DCL commands.
		C227.3	Enforce integrity constraints on databases.
		C227.4	Implement triggers, stored procedures and cursors.
C228	Java Programming Lab	C228.1	Make use of JDK, Eclipse platform for developing java programs.
		C228.2	Build programs using abstract classes and multithreading concepts.
		C228.3	Develop programs using GUI components.
		C228.4	Develop Programs using Quick Sort and Bubble Sort.
C229	Constitution of India	C229.1	Understand the historical perspective of Constitution of India.
		C229.2	Analyze the features and Characteristics of Constitution of India.
		C229.3	Understand the concepts of Fundamental Rights and Duties of Indian Citizens.
		C229.4	Examine The Directive Principles of State Policy.
		C229.5	Understand the Parliamentary form of Government in India.

		C229.6	Examine the emergency provisions: National Emergency, President Rule and Financial Emergency.
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