



Koneru Lakshmaiah Education Foundation

(Category -1, Deemed to be University estd. u/s. 3 of the UGC Act, 1956)

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Department of Computer science and Engineering

Program: B. Tech -CSE

Academic Year :2019-2020

Course Code	Course Title	CO NO	Description of the Course Outcome
19UC1101	BASIC ENGLISH	CO1	Understand the concepts of grammar, students will improve their communication, reading, and writing skills
		CO2	Apply the concepts, students will improve their reading, and writing skills
		CO3	Apply the concept of fundamental principles to solve the problems on linear equations, quadratic equations. Apply the concept of progressions while doing problems on progressions & mensuration & also problems on finding volume and surface areas.
		CO4	Analyse the given conditions and finding out the directions, problems related to symbols and notations, numbers or letters. Analyse to find out the hidden analogy and apply that analogy to find solutions. Finding the odd man out by observing the principle which makes the others similar.
19UC1202	ENGLISH PROFICIENCY	CO1	To communicate with others in practical, business-oriented situations.
		CO2	To solve the problems on Alligation
		CO3	Students will apply the concepts Students will improve their reading, and speaking skills.
		CO4	Reasoning concepts: Ranking, Ordering & Sequencing, Data Sufficiency
19UC2103	PROFESSIONAL COMMUNICATION SKILLS	CO1	Understand the importance of Reading techniques, business correspondence using email with proper format, content and tools for improved results.
		CO2	Understand the Listening skills, types of listening skills, Developing speaking skills through mini presentations, Expressing and justifying opinions etc.,
		CO3	Understand the arithmetic concepts Time & Work and Time & Distance
		CO4	Understand the reasoning concepts Deductions, Logical Venn diagrams, Logical connectives
19UC2204	APTITUDE BUILDER-I	CO1	Understand the importance of business correspondence & utilize proper format, content & tools for improved results.
		CO2	Apply the techniques of writing and use standardized

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Course Code	Course Title	CO NO	Description of the Course Outcome
			business vocabulary in formal communication.
		CO3	Understand the properties of numbers, solving the problems on divisibility rules, unit's digit, remainders, averages. Using the concept of Allegations, solving the problems on mixtures, Understanding the concept of surface areas and volumes, solving the 2D & 3D figures.
		CO4	Understand the three dimensions of a cube and answer questions PC)5 2 Based on the concept of 3-D rotation. Understand the concept of Binary Logic and the techniques used in binary logic to solving the problems using method of assumptions. Understand how to organize the data based on a set of constraints.
19UC3105	APTITUDE BUILDER-I I	CO1	Apply the concepts of accurate English for Reading and Writing in order to acquire good vocabulary and language skills
		CO2	Analyse the concept of presentation skills and apply those strategies and techniques in handling real time situations i.e. GDs and Interviews
		CO3	Understand the concepts of ratios, Percentages, Profit and Loss, Simple and Compound interest. Solving the problems related to these areas
		CO4	Understand the various patterns in Number and letter series, Number and letter analogy, Coding and decoding, Odd man and Selections problems
19MT1101	MATHEMATICS FOR COMPUTING	1	set relations, functions, probability, permutations and combinations
		2	matrix algebra, game theory
		3	Mathematical logic ,Applications of Number theory, counting techniques,lattice theory
		4	Graphs & Trees,Statistics
		5	Logic And Reasoning, Foundations in Arithmetic,Geometry
19SC1101	PROBLEM SOLVING AND COMPUTER PROGRAMMING	CO1	Illustrate how problems are solved using computers and programming.
		CO2	Illustrate use of Control Flow Statements in C.
		CO3	Interpret & Illustrate user defined functions and different operations on list of data.
		CO4	Implement Linear Data Structures and compare them.
		CO5	Apply the knowledge obtained by the course to solve real world problems in laboratory
19MT2102	MATHEMATICS FOR ENGINEERS	CO1	Apply differential and integral calculus to find maxima & minima of functions, evaluate the integrals and solve the ordinary differential equations.
		CO2	Demonstrate the Fourier series and Laplace transforms and solve the Partial differential equations.
		CO3	Describe probability, Random Variables & Distributions

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		CO4	Explain complex variables, analytic functions & introduction to stochastic process & Algebraic structures.
19CS2104	MATHEMATICAL PROGRAMMING - 1	CO1	Solve linear programming problems in engineering and business decision making problems
		CO2	Make use of Duality and Sensitivity Analysis in Linear Programming models
		CO3	Solve network models and LINEAR PROGRAMMING PROBLEMS using interior point methods
		CO4	Apply Cutting plane and Branch and Bound methods to solve Discrete optimization problems
19CS2204	MATHEMATICAL PROGRAMMING - 2	CO1	Solve optimization problems for large scale systems, network models, dynamic programming, and robustness
		CO2	Model and solve Non-linear programming problems for decision-making problems
		CO3	Demonstrate the combinatorial optimization problems and their applications
		CO4	Demonstrate stochastic optimization & nature-inspired algorithms
18UC0009	ECOLOGY & ENVIRONMENT	CO1	Understanding the importance of Environmental education and conservation of natural resources
		CO2	Understanding the Ecosystems ,biodiversity and their conservative methods
		CO3	Understand global Environmental issues,pollution
		CO4	Understand the knowledge on solid waste management, disaster management and EIA process
19ME1103	DESIGN TOOLS WORKSHOP - I	CO1	Practice design thinking by developing artistic skills
		CO2	Visualize and complete his innovative design by final drafting using photogrammetric & model his design using prototyping technique
		CO3	Understand & apply the concept of AI , machine learning & Data analytics & finalize the requirements to design his idea
		CO4	Draft a report of his project from the initial stage & make a report which include scope, time and cost management of his project
19SC1106	TECHNICAL SKILLS-1(CODING)	CO1	Develop Solutions to solve real world Problems using Algorithms and flowcharts
		CO2	Develop Solutions to solve real world problems using Control Flow Statements by Sorting algorithms.
		CO3	Develop Solutions and debug to solve real world problems using user defined functions by Searching Algorithms
		CO4	Develop Solutions for real world problems by using stacks, queues and linked Lists and debug.
		CO5	hacker rank problem solving
19SC1202S	DATA STRUCTURES	CO1	Apply measures of efficiency on algorithms and Analyse different Sorting Algorithms.

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Course Code	Course Title	CO NO	Description of the Course Outcome
		CO2	Analyse and compare stack ADT and queue ADT implementations using linked list and applications.
		CO3	Analyse the linked implementation of Binary, Balanced Trees and different Hashing techniques.
		CO4	Analyse different representations, traversals, applications of Graphs and Heap organization.
		CO5	Develop and Evaluate common practical applications for linear and nonlinear data structures.
19SC1209	DESIGN TOOLS WORKSHOP - II	CO1	Describe the concepts of number systems with codes and logic gates usage in digital circuit design and identify the logical expressions in different forms and their minimization techniques for logical circuit optimization. Code conversions and Digital IC's realization with respect to data sheets.
		CO2	Employ Combinational logic circuits with minimization techniques and logical verification through hardware description language
		CO3	Substantiation of Sequential logic circuits and logical verification through hardware description language
		CO4	Implementation of digital circuits using PAL, PLA and FPGA. Discriminate the operations of ALU and execution of microinstructions.
19SC1203	OBJECT ORIENTED PROGRAMMING	CO1	Understand basic Concepts of OOP, fundamentals of Java and apply the concepts of classes and objects through Java language
		CO2	Apply constructors, Overloading, parameter passing in Java Programming
		CO3	Apply access control, Inheritance, Packages
		CO4	Apply Interfaces, Exception Handling
		CO5	Analyse object-oriented programming concepts to write programs
19EC1101	DIGITAL LOGIC & PROCESSORS	CO1	Describe the concepts of number systems with codes and logic gates usage in digital circuit design and identify the logical expressions in different forms & their minimization techniques for logical circuit optimization. Code conversions & Digital IC's realization with respect to data sheets.
		CO2	Employ Combinational logic circuits with minimization techniques and logical verification through hardware description language
		CO3	Substantiation of Sequential logic circuits and logical verification through hardware description language
		CO4	Implementation of digital circuits using PAL, PLA and FPGA. Discriminate the operations of ALU and execution of microinstructions.
		CO5	Analyse the digital IC logic for combinational and sequential circuits implementation

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Course Code	Course Title	CO NO	Description of the Course Outcome
19EC1213	BASIC ELECTRONIC CIRCUITS	CO1	Understand the passive circuit elements and working.
		CO2	Understand the basic circuit analysis techniques
		CO3	Understand the active circuit elements and working.
		CO4	Understand the applications of semiconductor devices
20UC1102	DESIGN THINKING & INNOVATION -I	CO1	Understand the basics of design thinking and its implications in product or service development
		CO2	Understand and Analyse the requirements of a typical problem
		CO3	Plan the necessary activities towards solving the problem through ideation and prototyping
		CO4	evaluate the solution and refine them based on the customer feedback
20UC1203	DESIGN THINKING & INNOVATION -II	CO1	compare and select problems suitable for DT projects and use techniques for empathetic research
		CO2	identify and document insights, user habits and identify user needs
		CO3	Visualise solutions, evaluate solution concepts and able to create rough prototypes, gather feedback
		CO4	Able to create high-fidelity prototypes. Able to test user experience, Able to identify a business model for a solution concept. Able to estimate financial results
19EC1202	COMPUTER ORGANIZATION & ARCHITECTURE	CO1	Understand the functionality of the computer, CPU functional units - control unit, memory unit, arithmetic and logic unit instruction execution unit and the interconnections among these components.
		CO2	Understand the CPU operations, instruction interpretation and execution. Outline the concepts of micro-operations, RTL operations, main memory, cache memory and virtual memory organizations.
		CO3	Understand the different types of I/O subsystems and I/O transfer techniques.
		CO4	Understand the design issues of RISC and CISC CPUs and the design issues of pipeline architectures.
19CS2106	OPERATING SYSTEMS DESIGN	CO1	Understand the internals of UNIX kernel architectures and explore design of File Subsystem, buffer cache, and File System Calls.
		CO2	Understand the internals of system call and explore design of structure of processes, process control, process system calls and scheduling in UNIX systems
		CO3	Understand Traps, interrupts, and drivers. Explore design trade-offs and Implement parts of memory management policies, first address space, page tables and virtual memory in UNIX systems
		CO4	Analyse theory and implementation of inter-process communication, synchronization, concurrency, and Boot loader in UNIX variants.

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Course Code	Course Title	CO NO	Description of the Course Outcome
		CO5	Implement parts of xv6 and develop Programs/commands using UNIX System Programming. Perform system administration.
19CS2211	SOFTWARE ENGINEERING	CO1	Understand the software development life cycle and associated process models and Reverse Engineering.
		CO2	Illustrate Requirement modelling and Agile and Extreme Programming
		CO3	Examine Agile Models such as Scrum, kanban and SAFe Methodology.
		CO4	Categorize various testing strategies, Test Driven Development and CMMI, Six Sigma techniques
19CS2108S	DATABASE MANAGEMENT SYSTEMS	CO1	Illustrate the functional components of DBMS and Design an ER Model for a database.
		CO2	Design a relational model for a database & Implement SQL concepts and relational algebra.
		CO3	Implement PL/SQL programs, normalization techniques, indexing to construct and access database
		CO4	Analyse the importance of transaction Processing, concurrency control and recovery techniques.
		CO5	Design a database and implement SQL queries and PL/SQL programs to do various operations on data.
19CS2212	ARTIFICIAL INTELLIGENCE	CO1	Understand the problems, develop and implement solutions, involving Uninformed and Informed search
		CO2	Understand adversarial search algorithms and develop and implement the same for solving Game playing problems and Constraint satisfaction problems
		CO3	Understand the concepts and algorithms related to Knowledge representation, propositional logic, first order logic, inferencing, forward and backward reasoning, resolution and be able to develop programs to solve different kind of problems that involve reasoning and resolution
		CO4	Understanding uncertainty using Bayes theorem, Hidden Markov model and Kalman filters and be able to implement algorithms for solving problems that involve uncertainty
		CO5	Choose appropriate programming logic techniques that can be used to solve any real world AI problems programming language
19CS2107	ENTERPRISE PROGRAMMING	CO1	Understand the basic concepts of XML. Apply JDBC API & callable statements Learn Maven to build Enterprise Java applications. Implement servlets using Maven
		CO2	Implement enterprise application using JSP and Hibernate
		CO3	Implement enterprise application using Spring Framework

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Course Code	Course Title	CO NO	Description of the Course Outcome
		CO4	Use Spring Boot, Rest APIs and integrating Enterprise Java applications
		CO5	Develop the programs for enterprise application development.
19CS2205	DATA SCIENCE	CO1	Understand Data science, Exploratory Data Analysis, Data Extraction, Wrangling, Examine the inference from Exploratory data analysis (EDA)
		CO2	Demonstrate by organizing, comparing visualization and simple metrics
		CO3	Examine and make inferences by applying acquired knowledge, facts, techniques of Probability and Independence in Data Science
		CO4	Applying Variance, covariance, and correlation on Data Science
		CO5	Implementing Inferential Statistical Analysis
19CS2109	COMPUTER NETWORKS & SECURITY	CO1	Outline OSI and TCP/IP reference models and classify the error control mechanisms like CRC & Hamming code
		CO2	Infer Channel allocation problem and algorithms to avoid it. Classify list of static and dynamic routing algorithms like Dijkstra, Distance vector routing and link state.
		CO3	Identify the importance of IPv4 classful, classless addressing schemes and outline the functionalities of transport layer like TCP Connection management and congestion control.
		CO4	Identify the functionality of DNS, HTTP and SMTP protocols. Apply Encryption algorithms like DES and RSA on the given examples.
19IE2246	INDUSTRIAL TRAINING	CO1	Industrial Training
19IE3247	TERM PAPER	CO5	Analyse research work
19IE4048	PROJECT PART -1	CO1	Exercise to acquire knowledge within the chosen area of technology for project development
		CO2	Identify, discuss and justify the technical aspects of the chosen area for problem analysis
		CO3	Reproduce, improve and refine technical aspects for chosen problem
		CO4	Communicate and report effectively project related activities and findings.
19IE4050	PRACTICE SCHOOL	CO5	Practice School
19IE4051	INTERNSHIP	CO1	Internship
		CO2	Understanding the importance of production training
		CO3	Applying the techniques in the live projects
		CO4	Applying the achieved output, compared to production requirements
		CO5	Internship
19IE4049	PROJECT PART - 2	CO1	Exercise to acquire knowledge within the chosen area of

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Course Code	Course Title	CO NO	Description of the Course Outcome
			technology for project development
		CO2	Identify, discuss and justify the technical aspects Of the chosen area for problem analysis
		CO3	Reproduce, improve and refine technical aspects for chosen problem
		CO4	Communicate and report effectively project related activities and findings
19IE4052	INTERNSHIP	CO5	Internship
19TS2201	TECHNICAL SKILLING (PFSD + COMP.CODING)	CO5	Analyse and apply suitable design technique to solve given real world problems.
19SP2117	SPORTS	CO1	Introduction to Yoga -Yoga and its preparation
		CO2	understand the STANDING ASANAS
		CO3	Understand the SITTING ASANAS
		CO4	Understand the BACKLAYING ASANAS, FRONT LAYING ASANAS and Pranayamas
18UC0007	INDIAN HERITAGE AND CULTURE	CO1	To familiarize with various aspects of the culture and heritage of India through ages.
		CO2	To acquaint with the contributions of Indians in the areas of languages and literature, religion and philosophy.
		CO3	Understand the developments in India during the Medieval Age along with how they contributed to Indian civilization
		CO4	To know and Understand the reasons for colonial rule over India and how independence was achieved from British rule
18UC0008	INDIAN CONSTITUTION	CO1	To acquire knowledge of the historical developments that culminated in the drafting of the Indian Constitution.
		CO2	To understand the basic features of the Indian Constitution.
		CO3	To understand the structure of the government as defined by the Indian Constitution.
		CO4	To understand the Indian Judicial system
18UC0010	UNIVERSAL HUMAN VALUES & PROFESSIONAL ETHICS	CO1	Realize and Understand the basic aspiration, harmony in the human being.
		CO2	Envisage the roadmap to fulfil the basic aspiration of human beings.
		CO3	Analyse the profession and his role in this existence.
		CO4	Understand the profession and his role in this existence.
19CS3113	ANALYSIS & DESIGN OF ALGORITHMS	CO1	Apply concepts of mathematics to find space and time complexities of various algorithms
		CO2	Analyse the problems that can be solved by using Divide and Conquer and Greedy Method
		CO3	Analyse the problems that can be solved by using Dynamic Programming and Backtracking

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Course Code	Course Title	CO NO	Description of the Course Outcome
		CO4	Analyse the problems that can be solved by using Branch and Bound and NP-Hard Graph problems
		CO5	Analyse the various design techniques to solve any real world problems.
19CS3021S	MACHINE LEARNING	CO1	Apply Machine Learning Techniques using Decision Trees to solve Real World Problems
		CO2	Build Bayesian models for solving Classification and Prediction problems
		CO3	Apply Neural Network and Genetic Algorithm techniques to solve Classification, Prediction probe
		CO4	Demonstrates Learning First Order Rules, Analytical Learning ,Explanation-Based Learning and reinforcement learning
		CO5	Implement Machine Learning Techniques using Python Language
19CS3022R	SOFT COMPUTING	CO1	Interpret fuzzy logic system
		CO2	Analyse Artificial Neural Network Models
		CO3	Demonstrate Swarm and Evolutionary Algorithms
		CO4	Illustrate Hybrid Fuzzy-Neural- Evolutionary- Swarm Models
		CO5	Demonstration of neuro, fuzzy, evolutionary, and swarm algorithms using open source tools
19CS3026R	ARTIFICIAL NEURAL NETWORKS	CO1	Understand and build basic network representations, topologies and models
		CO2	Apply various techniques for training and optimizing neural networks
		CO3	Analyse different techniques related to network stochastics
		CO4	Analyse different techniques related to learning algorithms for neural networks and develop knowledge on emerging software, tools and technologies related to these algorithms
		CO5	Evaluate different approaches and techniques for solving problems involving neural networks and their applications using python and develop knowledge on emerging software, tools and technologies related to these approaches
19CS3269S	DEEP LEARNING	CO1	Able to understand and remember the concepts of Perception, Back Propagation, PCA, Singular Value Decomposition
		CO2	Able to understand auto encoders- and apply Regularization, Denoising, Sparse, Contractive, Vectoral Representations of words Convolutional Neural Networks, LeNet, AlexNet

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Course Code	Course Title	CO NO	Description of the Course Outcome
19CS3270R	COGNITIVE COMPUTING	CO1	Understand cognitive computing is, and how it differs from traditional approaches
		CO2	Applying the primary tools associated with cognitive computing
		CO3	Develop a project that leverages cognitive computing
		CO4	Analyse and discuss the business implications of cognitive computing
		CO5	able to implement cognitive computing programs using IBM Watson
19CS3271R	PERCEPTION AND COMPUTER VISION	CO1	Understand image representation and modelling.
		CO2	Understand image transformation methods.
		CO3	Apply and Interpret image processing algorithms.
		CO4	Build and evaluate face detection and recognition algorithms.
		CO5	Evaluate a multitude of image processing techniques and algorithms.
19CS3278R	DIGITAL VIDEO PROCESSING	CO1	Understanding the video signals and its characteristics
		CO2	Understanding the motion analysis, its detection and restoration of video with quality
		CO3	Understanding video segmentation and motion segmentation using different methods
		CO4	Learning to analyse the signals using different algorithms
		CO5	Applying the machine learning algorithms to video signals for the analysis, segmentation and restoration.
19CS3282R	MACHINE LEARNING ON CLOUD	CO1	Understand the concepts of Cloud Environments
		CO2	Demonstrate the working of Sample Pre-processing models
		CO3	Demonstrate the classification and clustering models in the cloud environment
		CO4	Understand Amazon translate, azure Bot service and Google cloud autoML models on real time data
19CS3286R	CLOUD DEVOPS	CO 1	Understanding the basic concepts of Cloud and Devops
		CO 2	Identify the Need of DevOps in SDLC and Cloud Infrastructure in DevOps, Apply Version Control System to track the latest version of Software
		CO 3	Inspect Configuration Management using Infrastructure as Code
		CO 4	Analyse need of Containerization in SDLC and Examine the Kubernetes Pod Configuration.
		CO 5	Build and Inspect the Tools associated to DevOps Life Cycle.
19CS3272R	COMPUTATIONAL EPIDEMIOLOGY	CO1	Understand the models of Epidemiology and applications of computational science in Epidemiology

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Course Code	Course Title	CO NO	Description of the Course Outcome
		CO2	Apply computational model on sparse disease incidence data to infer transmission probability, period of infectivity and reproduction number
		CO3	Design a low cost surveillance and infection control policy using an efficient computational model
		CO4	Design a computational model for epidemic spread using Machine Learning concepts
		CO5	Build and Inspect tools associated Epidemiology using R
19CS3273R	NATURAL LANGUAGE PROCESSING	CO1	Understand approaches to syntax and semantics in NLP
		CO2	Apply the statistical estimation and statistical alignment models
		CO3	Analyse grammar formalism and context free grammars
		CO4	Apply Rule based Techniques, Statistical Machine translation (SMT), word alignment
		CO5	Inspect and evaluate language processing methods using python
19CS3274R	SPEECH PROCESSING	CO1	Understand the speech production and perception mechanism, acoustic phonetics and phonology, speech prosody, speech sound units
		CO2	Understand the speech signal processing in time and frequency domain, discrete Fourier transform, short-time analysis of speech, linear prediction and cepstral analysis of speech.
		CO3	Apply machine learning models such as Dynamic time warping (DTW), Gaussian mixture models (GMM), Hidden Markov models (HMM), Support vector machines (SVM) and state of art Deep Neural Network (DNN) models for speech processing.
		CO4	Apply machine learning approaches for various application of speech processing such as Speech and Speaker recognition, Speech synthesis and Speech enhancement, Language identification etc.
		CO5	Apply above speech processing approaches in laboratory experiments related to feature extraction, and development of machine learning models for speech processing.
19CS3051S	DATA VISUALISATION TECHNIQUES	CO1	Understanding modelling of various types of data
		CO2	Understanding Visualization fundamentals
		CO3	Applying methods and tools for Non-Spatial Data Visualization
		CO4	Applying methods for Scientific / Spatial Data Visualization and Web data visualization
		CO5	Evaluate data visualization through Python and Tableau 2020

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Course Code	Course Title	CO NO	Description of the Course Outcome
19CS3056S	FUNCTIONAL & CONCURRENT PROGRAMMING	CO1	Apply Functions and Lambdas on purely functional programs using generic types, recursion, pattern matching and higher-order functions.
		CO2	Apply Algebraic Data Types to model and use infinite sequences with lazy evaluation , functional programming with objects and classes
		CO3	Apply Functional Data Structures, collections, Parallel Collections, Futures and Promises
		CO4	Apply the functional design of concurrent systems
		CO5	Apply the functional design of concurrent systems
19CS3052R	DATA WAREHOUSING & MINING	CO1	Illustration of Warehouse & Mining, ETL, OLAP & OLTP, Data Cube Operations and Data Warehouse architecture
		CO2	Demonstration of Data Pre-processing through different methods
		CO3	Apply Different Classification Algorithms to Segregate Input data into different class levels and find out Hidden relationship between transactional dataset using Association Rule Mining.
		CO4	Build different Clustering Models using the predefined dataset.
		CO5	Implementation of warehousing and mining algorithms using suitable tools and programming languages
19CS3275S	BIG DATA ANALYTICS	CO1	Illustrate the concepts of big data, Initial exploration of analysis of data and Data visualization
		CO2	Demonstrate Initial exploration of data and advanced data analytics by using R/PYTHON
		CO3	Examine advanced algorithms & Statistical modelling for big data using HDFS, HIVE, and PIG.
		CO4	Apply advanced SQL functions for in-database analytics by MADlib, Greenplum along with common deliverables of analytics life cycle project
		CO5	To implement data analytics concepts.
19CS3276R	BIG DATA OPTIMIZATION	CO1	Understand optimization methods and Apply analytics using R
		CO2	Apply blind search method and Local Search method for real world problems
		CO3	Analyse population based search and develop query processing strategies
		CO4	Apply and Analyse applications like Travelling Salesman Problem.
		CO5	Applying functionalities of R
19CS3277R	BIOINFORMATICS	CO1	Understand Overview of Bioinformatics, biological databases and comparing a data network to a living organism
		CO2	Select online resources in biological database
		CO3	Apply concepts of microarrays and datamining methods

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Course Code	Course Title	CO NO	Description of the Course Outcome
		CO4	Analyse pattern matching techniques of sequence alignment and identification
		CO5	Implement the lab experiments to store and analysis of biological data
19CS3278R	DIGITAL VIDEO PROCESSING	CO1	Understanding the video signals and its characteristics
		CO2	Understanding the motion analysis, its detection and restoration of video with quality
		CO3	Understanding video segmentation and motion segmentation using different methods
		CO4	Learning to analyse the signals using different algorithms
		CO5	Applying the machine learning algorithms to video signals for the analysis, segmentation and restoration.
19CS3272R	COMPUTATIONAL EPIDEMIOLOGY	CO1	Understand the models of Epidemiology and applications of computational science in Epidemiology
		CO2	Apply computational model on sparse disease incidence data to infer transmission probability, period of infectivity and reproduction number
		CO3	Design a low cost surveillance and infection control policy using an efficient computational model
		CO4	Design a computational model for epidemic spread using Machine Learning concepts
		CO5	Build and Inspect tools associated Epidemiology using R
19CS3279R	ADVANCED DATABASES	CO1	Understand the fundamentals of query optimization and database recovery protocols.
		CO2	Apply emerging database technologies and distributed databases.
		CO3	Analyse and Discriminate object oriented and relational database systems.
		CO4	Analyse multimedia databases.
		CO5	Build and Evaluate advanced database applications
19CS3280R	GRAPH & WEB ANALYTICS	CO1	Understand the impact of big data on graphs ,Network Basics and Social Networks
		CO2	Make use of Web Analytics:- Data sources, tools, Web traffic data
		CO3	Analysing Web Analytics Strategy- website traffic analysis, audience identification and segmentation analysis, Emerging Analytics
		CO4	Compare Email Testing Analysis, competitive Intelligence Analysis, and Social, Mobile, Video Analysis.
		CO5	implementing python programming for graph and web analytics
19CS3041S	CRYPT ANALYSIS & CYBER DEFENSE	CO1	Outline the principles of cryptography by various attacks and apply different classic encryption techniques and algorithms like DES.
		CO2	Illustrate the principles of block cipher and apply algorithms like AES.

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Course Code	Course Title	CO NO	Description of the Course Outcome
		CO3	Apply different algorithms of public key cryptosystem for ensuring secured communication.
		CO4	Apply Security engineering principles and respective algorithms to meet authentication and integrity.
		CO5	Analyse various cryptographic algorithms so as to implement the achievability of security goals like Confidentiality, integrity, authentication and also Justify the possibility of cryptanalysis attack with each algorithm.
19CS3042R	NETWORK & INFRASTRUCTURE SECURITY	CO1	Understand security concepts, Infrastructure security techniques and securing enterprise networks. Understand router and switching security mechanism.
		CO2	Understand hardware procedures for digital certificate and techniques of user authentication.
		CO3	Apply the standardization schemes to maintain security in Web application and secured payment system. Identify security vulnerability in the system.
		CO4	Apply security concepts in Email and Internet Protocol. Understand and apply security principles of firewall, gateways and IDS.
		CO5	Analyse various security concepts and their performance using networking tools.
19CS3045R	INTRODUCTION TO BLOCKCHAIN & CRYPTO CURRENCIES	CO1	Understand the basic concepts of cryptography for block chain
		CO2	Understand the basics of block chain and mining process
		CO3	Apply about the different types of block chain and consensus algorithms
		CO4	Apply the different types of crypto currencies & its importance and block chain applications
		CO5	Apply and analyse basic cryptography concepts and smart contracts applications using soft wallet.
19CS3259S	DIGITAL FORENSICS	CO1	Apply Forensic Science and Digital Forensics
		CO2	Apply OS and File System Forensics
		CO3	Analyse Digital Evidence and Network Forensics
		CO4	Analyse Web Forensics and Mobile Device Forensics
		CO5	Implementing the concepts of Digital Forensics
19CS3260R	DATABASE & SYSTEM SECURITY	CO1	Understand Database Users, Roles related to User Administration and Java concepts
		CO2	Apply Data Encryption and Database Vaults
		CO3	Apply secret password Encryption & Decryption.
		CO4	Apply Data Encryption for the Data in Transit.
		CO5	Design Secure Database Schema
19CS3261R	PROGRAMMING FOR SMART CONTRACTS	CO1	Understanding Ethereum block chain and using wallet for interacting with network
		CO2	Learn and use solidity programming language to build smart contracts

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Course Code	Course Title	CO NO	Description of the Course Outcome
		CO3	Building advanced smart contracts with various test setups and try-catch assertions.
		CO4	Build interactive front end for smart contracts and use Contracts design patterns.
		CO5	Implement lab experiments through project-based learning on building smart contracts
19CS3262R	SECURE SOFTWARE ENGINEERING	CO1	Explain about threats and its properties that target software and illustrate the resources that addresses these issues.
		CO2	Illustrate the process of analysing and validating security requirements.
		CO3	Apply software testing methods to analyse the software code to improve the quality and describe the assembly changes for system design.
		CO4	Apply the governance security policy to ensure enterprise security in project management
		CO5	Analyse the security principles and apply the techniques to develop a secure software.
19CS3264R	WEB SECURITY	CO1	Understand and discuss about Web Security Concepts
		CO2	Identify different techniques involved in protecting privacy and principles of Web Security.
		CO3	Deploy SSL server Certificates , client side digital certificates and Microsoft's Authenticode
		CO4	Determine security for content providers through privacy policies and security legislations.
		CO5	Test the software /tools application completely and make it sure that it's performing well and as per the security specifications
19CS3265R	WIRELESS SENSOR NETWORKS	CO1	Understand challenges and technologies for wireless networks
		CO2	Understand architecture and sensors.
		CO3	Apply the communication, energy efficiency, computing, storage, and transmission strategies.
		CO4	Build the infrastructure and simulations.
		CO5	Apply the concept of programming in the WSN environment
19CS3062S	SOFTWARE VERIFICATION & VALIDATION	CO1	To Understand test cases suitable for a software development for different domains.
		CO2	To Identify and apply suitable tests to be carried out. Conduct an inspection or review of software source code for a small or medium sized software project.
		CO3	Prepare and apply test planning based on the document using automatic testing tools.

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Course Code	Course Title	CO NO	Description of the Course Outcome
		CO4	To Document test plans and apply test cases designed
		CO5	To Test the software application completely and make it sure that it's performing well and as per the specifications
19CS3064R	UX DESIGN	CO1	Perceive and discuss about User Experience design process.
		CO2	Recognize User Interface and differentiate from User Experience and principles of User Interface.
		CO3	Focusing and distinguishing about Components of UI design process with Interactive Devices.
		CO4	Determine graphic design techniques and psychology principles of User Experience
		CO5	Designing wire frames using Adobe XD, UXPressia and Whimsical
19CS3256S	CONTINUOUS DELIVERY & DEVOPS	CO1	Identify the Need of DevOps in SDLC and Cloud Infrastructure in DevOps, Apply Version Control System to track the latest version of Software
		CO2	Apply Continuous Integration and Continuous Deployment using Infrastructure as Code, Build in Cloud native Applications using Pipeline and Examine the Software and Automation Testing Frameworks.
		CO3	Analyse need of Containerization in SDLC and Examine the Kubernetes Pod Configuration.
		CO4	Inspect Configuration Management using Infrastructure as Code, Analyse Continuous Monitoring and Container Orchestration process.
		CO5	To Build and Inspect the Tools associated to DevOps Life Cycle.
19CS3257R	SOFTWARE PROJECT MANAGEMENT	CO1	Understanding the concept of software project management process
		CO2	Illustrate the various rules and guidelines that involved to improve the time, Cost, Quality, management aspects in software project management.
		CO3	Identify the guidelines that are involved to improve the Configuration, Human Resource time, Communications management aspects in software project management.
		CO4	Build the techniques that are involved in the Phases of SPM such as Initiating, planning, executing & controlling projects.
		CO5	Apply various estimation levels of cost and effort
19CS3254R	VISUAL PROGRAMING	CO1	Understanding the basic concepts of .Net framework, C#.Net and Build console and desktop applications using C#.net framework

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Course Code	Course Title	CO NO	Description of the Course Outcome
		CO2	Build C#.net desktop applications using ADO.NET
		CO3	Applying the concepts of ASP.NET Standard Server controls for visual programming application development
		CO4	Build the Visual programming applications using MVC, Page and State management and master pages.
		CO5	Develop the programs for desktop, web and enterprise application development using Visual Programming Techniques.
19CS3258R	SOFTWARE RELIABILITY	CO 1	Understand Software Reliability and develop a software project from requirement gathering to implementation.
		CO 2	Analyse software system failures and develop convincing solutions
		CO 3	Estimate Software Reliability parameters using Markovian Modelling, Maximum Likelihood and Least Square Method
		CO 4	Evaluate performance of Binomial-Type, Poison-Type and Markovian Models and Predict Software Reliability using SQA Intelligent Techniques
19CS3255R	CROSS-PLATFORM DEVELOPMENT FRAMEWORKS	CO1	Introduction to Kotlin, Layouts, and Navigations
		CO2	Connect to internet, Database Connectivity and Build APK
		CO3	Development of Flutter Application using DART
		CO4	Build dynamic flutter application with Firebase and REST Operations
		CO5	Lab experiments on android application development
19CS3056S	FUNCTIONAL & CONCURRENT PROGRAMMING	CO1	Apply Functions and Lambdas on purely functional programs using generic types, recursion, pattern matching and higher-order functions.
		CO2	Apply Algebraic Data Types to model and use infinite sequences with lazy evaluation , functional programming with objects and classes
		CO3	Apply Functional Data Structures, collections, Parallel Collections, Futures and Promises
		CO4	Apply the functional design of concurrent systems
		CO5	Apply the functional design of concurrent systems
19CS3037A	CLOUD INFRASTRUCTURE & SERVICES	CO1	Understand IaaS Architectures and Implementation Guidelines. Apply on-demand compute services
		CO2	Analyse applications and frameworks for data analysis and Content delivery in the cloud
		CO3	Understand Cloud Service Availability, Resiliency and dynamic scaling
		CO4	Analyse Networking and security Services for Cloud Deployment and Management
		CO5	Developing Cloud services using Open Cloud Architectures-EUCALYPTUS

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Course Code	Course Title	CO NO	Description of the Course Outcome
		CO6	Implementing public cloud Application on Amazon Web Services
19CS3032R	ADVANCED OPERATING SYSTEMS	CO1	Understand the design of multiprocessor and distributed Operating Systems. Analyse distributed file system.
		CO2	Analyse the scheduling Real time and Parallel Applications on Heterogeneous Distributed Systems. Analyse three basic approaches for implementing distributed mutual exclusion
		CO3	Understand Replication - preventing and accepting divergence. Analyse Deadlock detection in distributed systems.
		CO4	Analyse the algorithms for Check pointing and rollback recovery, Consensus and agreement algorithms, and Failure detectors
		CO5	Implement the Concepts of multiprocessor Threads, distributed mutual exclusion, distributed scheduling, Distributed deadlocks, Distributed consensus and Fault Handling.
19CS3281S	CLOUD & SERVERLESS COMPUTING	CO1	Understand Cloud computing and analyse cloud service scheduling hierarchy.
		CO2	Understand Functions-as-a-service and Event-driven programming. Develop Scalable Models Using Server less Architectures.
		CO3	Manage application functionalities using Server less runtimes and Server less databases.
		CO4	Apply Server less Programming Practices and Patterns. Architect, Build, and Operate server less applications.
		CO5	Build a real world and scalable full stack application using Server less technologies.
		CO6	Skill based -Build a real world and scalable full stack application using Server less technologies.
19CS3251R	ADVANCED COMPUTER ARCHITECTURE	CO1	Understand fundamentals of computer design
		CO2	Understand instruction level parallelism
		CO3	Apply thread level parallelism
		CO4	Analyse memory and I/O
		CO5	Develop programs on computer architectures
19CS3252R	PARALLEL ALGORITHMS	CO1	Understand fundamental principles behind parallel algorithm design and demonstrate the ability to differentiate among interconnection networks models and communication operations.
		CO2	Analyse parallel algorithms for sorting and Computational Geometry
		CO3	Design and Analysis of Parallel Computational algorithms
		CO4	Apply parallel algorithms for Graphs and Search problems and analyse its performance

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Course Code	Course Title	CO NO	Description of the Course Outcome
		CO5	Develop parallel algorithms using OpenMP, MPI and OpenCL
19CS3253R	EDGE COMPUTING	CO1	Describe the Edge/Fog Computing and infer the opportunities and challenges
		CO2	Examine the Architecture of Edge Computing and explore the issues that are being addressed by the industry
		CO3	Interpret the Middleware needed for Edge Computing and its Security Requirements
		CO4	Assess the need for Edge/Fog Computing in various real-time projects
		CO5	computing paradigms using various applications in Edge Computing
19CS3038R	HIGH PERFORMANCE COMPUTING	CO1	Analyse the performance of GPU memory hierarchy and MPI programming
		CO2	Develop parallel programs using OpenCL library and understand FPGA-Based Supercomputer
		CO3	Develop mixed mode programs for Multicore, GPU and cluster optimization systems
		CO4	Generate parallel programs for matrix, graph and sorting problems using CUDA, OpenMP library
		CO5	Implementation and analysis of pre-defined services in the online cloud platform
19CS3071S	PROGRAMMING FOR GAME DEVELOPMENT	CO1	Illustrate the concepts of Game design and development.
		CO2	Understanding the use of mathematical and geometrical concepts in Game Programming.
		CO3	Explain the Core architectures of Game Programming.
		CO4	Relate above advance concepts in game development and explain various platforms and frameworks for Game Programming
		CO5	Implement Games using Course with Code in Unity
19CS3064R	UX DESIGN	CO1	Perceive and discuss about User Experience design process
		CO2	Recognize User Interface and differentiate from User Experience and principles of User Interface.
		CO3	Focusing and distinguishing about Components of UI design process with Interactive Devices.
		CO4	Determine graphic design techniques and psychology principles of User Experience
		CO5	Designing wire frames using Adobe XD, UXPressia and Whimsical

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Course Code	Course Title	CO NO	Description of the Course Outcome
19CS3266S	AR & VR APPLICATION DEVELOPMENT	CO1	To understand Basics of Augmented Reality and Interactions. Fundamentals of Augmented , Mixed Reality and its features P
		CO2	To understand Basics of Virtual Reality and Interactions. Fundamental Concept and Components of Virtual Reality
		CO3	To understand Graphics Pipelines, Creating a sample augmented reality apps in android
		CO4	To apply Unity development Environment, IDE Basics, Sprites, User Interfaces, Simple 3D animation Creation
		CO5	Develop applications through Lab experiments
19CS3267R	BUSINESS OF GAMES & ENTREPRENEURS HIP	CO1	Understanding the flow of money in the game industry & how to protect ideas to make the craft of making games an economically justifiable activity.
		CO2	Explore the mechanism behind gaming production and teamwork with foundation in some of the project management tools and techniques
		CO3	Understand and Work out some of the presentation skills to pitch the gaming ideas in front of investor groups
		CO4	Explore the skills required to be an entrepreneur and know the rules and regulations to start a company
		CO5	Explore and Understand Pitching tools & Business Plan Development tools for Gaming start up
19CS3268R	PRINCIPLES OF GAME DESIGN	CO1	Remembering the definition of Video Games and Design Components
		CO2	Understand the Game Concepts and its world
		CO3	Applying the Story telling Character and user interface Design
		CO4	Analysing the Game Play to its mechanics and balancing
19CS3117S	IOT SENSING AND ACTUATING DEVICES	CO1	Understand the role of sensor and actuators in real time aspects and Analog and Digital Actuators
		CO2	Apply the role of signal conditioning circuits and Impedance Matching circuits
		CO3	Analyse different generation of sensors for the development of IoT based Networks
		CO4	Analyse the role of different Energy sources and power management in IoT
		CO5	Implement and Evaluate the Practical -IoT
		CO6	Creating, Implementation and Evaluating of Practical IoT mini Projects
19CS3250S	CLOUD COMPUTING FOR	CO1	To understand the differences between traditional deployment and cloud computing

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Course Code	Course Title	CO NO	Description of the Course Outcome
	IOT ENGINEERS	CO2	Understand different cloud infrastructures and service models and virtualization
		CO3	Apply the concept of Data Analytics by using AWS cloud
		CO4	Analyse the statistical data analysis and methods for evaluation
		CO5	Able to evaluate the communication between IoT devices and cloud (AWS).by measuring parameters
19CS3278R	DIGITAL VIDEO PROCESSING	CO1	Understanding the video signals and its characteristics
		CO2	Understanding the motion analysis, its detection and restoration of video with quality
		CO3	Understanding video segmentation and motion segmentation using different methods
		CO4	Learning to analyse the signals using different algorithms
		CO5	Applying the machine learning algorithms to video signals for the analysis, segmentation and restoration.
19CS3265R	WIRELESS SENSOR NETWORKS	CO1	Understand challenges and technologies for wireless networks
		CO2	Understand architecture and sensors.
		CO3	Apply the communication, energy efficiency, computing, storage, and transmission strategies.
		CO4	Build the infrastructure and simulations.
		CO5	Apply the concept of programming the in WSN environment
19CS3253R	EDGE COMPUTING	CO1	Describe the Edge/Fog Computing and infer the opportunities and challenges
		CO2	Examine the Architecture of Edge Computing and explore the issues that are being addressed by the industry
		CO3	Interpret the Middleware needed for Edge Computing and its Security Requirements
		CO4	Assess the need for Edge/Fog Computing in various real-time projects
		CO5	computing paradigms using various applications in Edge Computing
19CS3064R	UX DESIGN	CO1	Perceive and discuss about User Experience design process
		CO2	Recognize User Interface and differentiate from User Experience and principles of User Interface.
		CO3	Focusing and distinguishing about Components of UI design process with Interactive Devices.
		CO4	Determine graphic design techniques and psychology principles of User Experience

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Course Code	Course Title	CO NO	Description of the Course Outcome
		CO5	Designing wire frames using Adobe XD, UXPressia and Whimsical
19CS3060R	CONTINUOUS DELIVERY & DEVOPS	CO1	Identify the Need of DevOps in SDLC and Cloud Infrastructure in DevOps, Apply Version Control System to track the latest version of Software
		CO2	Analyse Continuous Integration and Continuous Deployment using Infrastructure as Code, Build in Cloud native Applications using Pipeline and Examine the Software and Automation Testing Frameworks.
		CO3	Analyse need of Containerization in SDLC and Examine the Kubernetes Pod Configuration.
		CO4	Inspect Configuration Management using Infrastructure as Code, Analyse Continuous Monitoring and Container Orchestration process.
		CO5	Build and Inspect the Tools associated to DevOps Life Cycle.
19CS3115R	EMBEDDED SYSTEMS	CO1	Understand C for Embedded Systems. Analyse ARM processor and interrupt architecture
		CO2	Apply Modern Assembly Language Programming with the ARM Processor
		CO3	Apply I/O Synchronization and Interrupt Programming. Program the STM32F4xx chip peripherals: I/O ports, ADCs, UARTs, and Timers
		CO4	Understand Analog Interfacing and Program the STM32F4xx chip peripherals: DACs, SPIs, and I2Cs
		CO5	Apply Embedded Systems Programming on ARM Cortex-M3/M4 Processor
19CS3234R	APPLICATION DEVELOPMENT ON CLOUD	CO1	Analyse, predict and apply the server based computing for hosting the web application with appropriate database and storage.
		CO2	Implement the cloud services to monitor and secure the cloud infrastructure.
		CO3	Analyse, predict and apply the CI/CD services for hosting the web application
		CO4	Analyse, predict and apply appropriate server less, container based, work flow and messaging based services.
		CO5	Apply the knowledge and implement the cloud concepts in real time.
19CS3235R	SOLUTIONS ARCHITECTING ON CLOUD	CO1	Design Resilient Architectures
		CO2	Design High-Performing Architectures
		CO3	Design Secure Applications and Architectures
		CO4	Design Cost-Optimized Architectures

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Course Code	Course Title	CO NO	Description of the Course Outcome
		CO5	Designing solutions to the architecture of Cloud
19CS3232R	MACHINE LEARNING	CO1	Apply Machine Learning Techniques using Decision Trees to solve Real World Problems
		CO2	Build Bayesian models for solving Classification and Prediction problems
		CO3	Apply Neural Network and Genetic Algorithm techniques to solve Classification, Prediction problems
		CO4	Demonstrates Learning First Order Rules, Analytical Learning ,Explanation-Based Learning and reinforcement learning
		CO5	Implement Machine Learning Techniques using Python Language
19CS3233R	DATA VISUALIZATION TECHNIQUES	CO1	Understand the modelling of various types of data
		CO2	Understand the Visualization fundamentals
		CO3	Apply methods and tools for Non-Spatial Data Visualization
		CO4	Apply methods for Scientific / Spatial Data Visualization and Web data visualization
		CO5	Build and Evaluate data visualization through Python & Tableau.
19CS3036R	CLOUD INFRASTRUCTURE & SERVICES	CO1	Apply on-demand compute services. Understand IaaS Architectures and Implementation Guidelines
		CO2	Analyse applications and frameworks for data analysis and Content delivery in the cloud
		CO3	Analyse Cloud Service Availability, Resiliency and dynamic scaling
		CO4	Use Networking and Security Services. Automate cloud Infrastructure, Deployment, and Management
		CO5	Hands-On Cloud Administration. Implement, monitor, and manage important cloud services and components including IaaS and PaaS
19CS2210R	PARALLEL & DISTRIBUTED COMPUTING	CO1	Analyse Distributed Computations, Graph Algorithms, Causality and Time, Message Ordering and group communication
		CO2	Analyse Coordination Algorithms, Consistency and Replication, Global state and snapshot recording algorithms, Self-stabilization, Fault-Tolerant Message-Passing Distributed Systems
		CO3	Understand parallel algorithm design. Demonstrate the ability to differentiate among parallel architectures and interconnection networks models by analysing parallel sorting algorithms
		CO4	Design and analyse Parallel Computational algorithms
		CO5	Develop Parallel and Distributed computing programs using Hadoop Software tool and MapReduce Framework.

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Course Code	Course Title	CO NO	Description of the Course Outcome
19CS3230R	CROSS-PLATFORM DEVELOPMENT FRAMEWORKS	CO1	Introduction to Kotlin, Layouts, and Navigations
		CO2	Connect to internet, Database Connectivity & Build APK
		CO3	Development of Flutter Application using DART
		CO4	Build dynamic flutter application with Firebase and REST Operations
		CO5	Lab experiments on android application development
19CS3231R	VISUAL PROGRAMING	CO1	Understanding the basic concepts of .Net framework, C#.Net and Build console and desktop applications using C#.net framework
		CO2	Build C#.net desktop applications using ADO.NET
		CO3	Applying the concepts of ASP.NET Standard Server controls for visual programming application development
		CO4	Build the Visual programming applications using Web forms, Web Pages and MVC, Page and State management and master pages.
		CO5	Develop the programs for desktop, web and enterprise application development using Visual Programming Techniques.
19CS3214R	AUTOMATA THEORY AND COMPILER DESIGN	CO1	To derive finite automata for various regular expressions
		CO2	To construct context free grammars for various languages and to understand the ole of the Lexical Analyser
		CO3	o construct top-down and bottom-up parsers and to define syntax directed definition and translations for grammars
		CO4	To generate intermediate code, target code and to apply code optimization techniques
19CS3116R	SIGNAL PROCESSING	CO1	Understand the various types of signals, systems and their frequency domain transformation.
		CO2	Understand the design methodology of different filters and their realizations.
		CO3	Apply signal processing approaches for extraction of information present in the natural signals.
		CO4	Apply machine learning approaches for processing of signals.
19CS3040R	CRYPT ANALYSIS & CYBER DEFENSE	CO1	Outline the principles of cryptography by various attacks and apply different classic encryption techniques and algorithms like DES.
		CO2	Illustrate the principles of block cipher and apply algorithms like AES.
		CO3	Apply different algorithms of public key cryptosystem for ensuring secured communication
		CO4	Apply Security engineering principles and respective algorithms to meet authentication and integrity.

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Course Code	Course Title	CO NO	Description of the Course Outcome
		CO5	Analyse various cryptographic algorithms so as to implement the achievability of security goals like Confidentiality, integrity, authentication and also Justify the possibility of cryptanalysis attack with each algorithm
19TS3001	TECHNICAL SKILLS	CO5	Understanding the concepts of MEAN stack, JAVA and RPA and Applying the same in FULL Stack web development, window applications and bot creation.
19TS2201S	TECHNICAL SKILLING (PFSD + COMP.CODING)	CO5	Analyse and apply suitable design technique to solve given real world problems.
19TS3101S	TECHNICAL SKILLING (SDP3)	CO1	Apply JDBC API, JUnit Testing Framework and XML Concepts to build Console and Web Applications
		CO2	Implement Servlets, JSP, Hibernate, Spring and Spring Boot to build web applications and Enterprise Level applications.
		CO3	Analyse the design of linear data structures for real world problems.
		CO4	Analyse alternate algorithm techniques to solve optimization related problems in the real-world scenario.
		CO5	Analyse and apply suitable design technique to solve given real world problems.
19TS3292S	TS SDP4 (CLOUD DEVOPS)	CO5	Analyse and predict the correct cloud services which fit the needs and apply the configurations over the cloud services to host the application.
19TS3291S	TS SDP4 (CLOUD BASED SOLUTIONS ARCHITECT)	CO5	Designing solutions to the architecture of Cloud
19TS3293S	TS-SDP4 (CLOUD BASED SECURITY SPECIALITY)	CO1	to apply generic computational skills like cloud, Full Stack Web Development Skills to specialization based domains
		CO2	to apply the knowledge of secure network infrastructure, Logging and Monitoring for real time problems
		CO3	to apply deeper understanding of system design with security and Access Management for project development.
		CO4	to apply deeper understanding of system design with security and performance optimization for project development
19TS3295S	TS SDP-4 (CLOUD BASED AI/ML SPECIALITY)	CO1	Identify the need of Data Engineering in AWS
		CO2	Visualize and analyse what is involved in learning models from data.
		CO3	Compare and contrast a wide variety of learning algorithms
		CO4	Apply principles and algorithms to evaluate models generated from data.
19TS3296S	TS SDP-4 (CLOUD BASED DATA ANALYTICS SPECIALITY)	CO1	Apply AWS On-Demand Instances, Reserved Instances to process the data analytic operations for better visualization.
		CO2	Implement the structured and unstructured data systems into structures that are suitable for building analytics solutions.
		CO3	Analyse the data analytics operations for real-world problems.

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Course Code	Course Title	CO NO	Description of the Course Outcome
		CO4	Analyse the transforming and preparing data for analysis, Automate and operationalize data processing solutions using AWS and Big data tools.
18PH4101	QUANTUM PHYSICS FOR ENGINEERS	CO1	Able to understand the structure of crystalline solids, semiconductors physics and properties of light in Engineering application of Lasers.
		CO2	Able to understands the behaviour of electrons on the microscopic level by using different quantum models
		CO3	Able to solve the time-independent Schrodinger wave equation as an intermediate step to solve the time-dependent Schrodinger wave equation.
		CO4	Able to explain the meaning and significance of the postulates of the special theory of relativity
18CY1005	CHEMISTRY FOR ENGINEERS	CO1	Predict potential complications from combining various chemicals or metals in an engineering setting
		CO2	Discuss fundamental aspects of electrochemistry and materials science relevant to corrosion phenomena
		CO3	Classify water quality and select appropriate purification technique for intended problem
		CO4	Demonstrate the basic knowledge of instrumental methods and their applications in the structural analysis of materials
18CS40A7	FUNDAMENTALS OF SOFTWARE ENGINEERING	CO1	Comprehend software development life cycle and prepare SRS document
		CO2	implementing software design and development techniques using UML
		CO3	Identify verification and validation methods in a software engineering project
		CO4	Optimize the development process using CMMI Levels
18CS40A6	FUNDAMENTALS OF DBMS	CO1	Understand the fundamentals of Database Management Systems.
		CO2	Construct database tables using SQL
		CO3	Apply various Normalization techniques and develop procedures and functions in PL/SQL
		CO4	Apply the file storage structures in the Database Management and Transaction processing.
18CS40A8	FUNDAMENTALS OF INFORMATION TECHNOLOGY	CO1	Understand the architectural design of a computer and various basic concepts of operating systems
		CO2	Understand programming fundamentals Analyse various software development methodologies
		CO3	Understanding of database design and Apply various SQL commands and Transaction Processing.
		CO4	Apply OOP and model for different case studies using UML

M. Kavitha
Academic Professor I/C

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