

## Koneru Lakshmaiah Education Foundation

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

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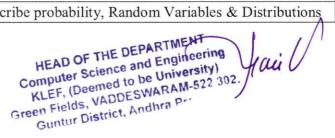
## Department of Computer science and Engineering

Program: B. Tech -CSE Academic Year :2019-2020

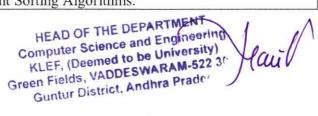
Course Code	Course Title	CO NO	Description of the Course Outcome
		CO1	Understand the concepts of grammar, students will improve their communication, reading, and writing skills
		CO2	Apply the concepts, students will improve their reading, and writing skills
19UC1101	BASIC ENGLISH	CO3	Apply the concept 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.
1		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.
	ENGLISH PROFICIENCY	CO1	To communicate with others in practical, business- oriented situations.
		CO2	To solve the problems on Alligation
19UC1202		CO3	Students will apply the concepts Students will improve their reading, and speaking skills.
		CO4	Reasoning concepts: Ranking, Ordering & Sequencing, Data Sufficiency
		CO1	Understand the importance of Reading techniques, business correspondence using email with proper format, content and tools for improved results.
19UC2103	PROFESSIONAL COMMUNICATION SKILLS	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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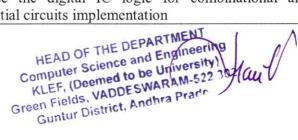
Course Code	Course Title	CO NO	Description of the Course Outcome
			business vocabulary in formal communication.
		CO3	Understand the properties of numbers, solving the problems on divisibility rules, unit's digit, remainders, averages. Using the concept of Allegations, solving the problems on mixtures, 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.
		CO1	Apply the concepts of accurate English for Reading and Writing in order to acquire good vocabulary and language skills
19UC3105	APTITUDE	CO2	Analyse the concept of presentation skills and apply those strategies and techniques in handling real time situations i.e. GDs and Interviews
19003103	BUILDER-I I	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
		1	set relations, functions, probability, permutations and combinations
		2	matrix algebra, game theory
19MT1101	MATHEMATICS FOR COMPUTING	3	Mathematical logic ,Applications of Number theory, counting techniques, lattice theory
	*	4	Graphs & Trees, Statistics
		5	Logic And Reasoning, Foundations in Arithmetic, Geometry
		CO1	Illustrate how problems are solved using computers and programming.
	PROBLEM	CO2	Illustrate use of Control Flow Statements in C.
19SC1101	SOLVING AND COMPUTER	CO3	Interpret & Illustrate user defined functions and different operations on list of data.
	PROGRAMMING	CO4	Implement Linear Data Structures and compare them.
		CO5	Apply the knowledge obtained by the course to solve real world problems in laboratory
101/472102	MATHEMATICS	CO1	Apply differential and integral calculus to find maxima & minima of functions, evaluate the integrals and solve the ordinary differential equations.
19MT2102	FOR ENGINEERS	CO2	Demonstrate the Fourier series and Laplace transforms and solve the Partial differential equations.
		CO3	Describe probability, Random Variables & Distributions



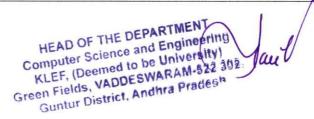
Course Code	Course Title	CO NO	Description of the Course Outcome
		CO4	Explain complex variables, analytic functions & introduction to stochastic process & Algebraic structures.
		CO1	Solve linear programming problems in engineering and business decision making problems
19CS2104	MATHEMATICAL PROGRAMMING -	CO2	Make use of Duality and Sensitivity Analysis in Linear Programming models
	1	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
		CO1	Solve optimization problems for large scale systems, network models, dynamic programming, and robustness
19CS2204	MATHEMATICAL PROGRAMMING -	CO2	Model and solve Non-linear programming problems for decision-making problems
	2	CO3	Demonstrate the combinatorial optimization problems and their applications
		CO4	Demonstrate stochastic optimization & nature-inspired algorithms
	ECOLOGY & ENVIRONMENT	CO1	Understanding the importance of Environmental education and conservation of natural resources
18UC0009		CO2	Understanding the Ecosystems ,biodiversity and their conservative methods  Understand global Environmental issues,pollution
		CO4	Understand the knowledge on solid waste management, disaster management and EIA process
		CO1	Practice design thinking by developing artistic skills
	DESIGN TOOLS WORKSHOP - I	CO2	Visualize and complete his innovative design by final drafting using photogrammetric & model his design using prototyping technique
19ME1103		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
		CO1	Develop Solutions to solve real world Problems using Algorithms and flowcharts
19SC1106		CO2	Develop Solutions to solve real world problems using Control Flow Statements by Sorting algorithms.
	TECHNICAL SKILLS-1(CODING)	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.



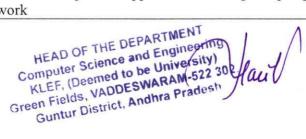
Course Code	Course Title	CO NO	Description of the Course Outcome
		CO2	Analyse and compare stack ADT and queue ADT implementations using linked list and applications.
		CO3	Analyse the linked implementation of Binary, Balanced Trees and different Hashing techniques.
		CO4	Analyse different representations, traversals, applications of Graphs and Heap organization.
		CO5	Develop and Evaluate common practical applications for linear and nonlinear data structures.
		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.
19SC1209	DESIGN TOOLS WORKSHOP - II	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.
		CO1	Understand basic Concepts of OOP, fundamentals of Java and apply the concepts of classes and objects through Java language
19SC1203	OBJECT ORIENTED	CO2	Apply constructors, Overloading, parameter passing in Java Programming
	PROGRAMMING	CO3	Apply access control, Inheritance, Packages
1981	J*	CO4	Apply Interfaces, Exception Handling
		CO5	Analyse object-oriented programming concepts to write programs
TORCITOL		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.
	19EC1101 DIGITAL LOGIC & PROCESSORS	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



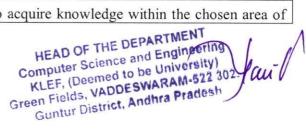
Course Code	Course Title	CO NO	Description of the Course Outcome
		CO1	Understand the passive circuit elements and working.
19EC1213	BASIC ELECTONIC	CO2	Understand the basic circuit analysis techniques
17201213	CIRCUITS	CO3	Understand the active circuit elements and working.
		CO4	Understand the applications of semiconductor devices
		CO1	Understand the basics of design thinking and its implications in product or service development
20UC1102	DESIGN THINKING	CO2	Understand and Analyse the requirements of a typical problem
20001102	& INNOVATION -1	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
		CO1	compare and select problems suitable for DT projects and use techniques for empathetic research
	DESIGN THINKING	CO2	identify and document insights, user habits and identify user needs
20UC1203	& INNOVATION -II	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
	COMPUTER ORGANIZATION & ARCHITECTURE	C01	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.
19EC1202		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.
		C03	Understand the different types of I/O subsystems and I/O transfer techniques.
		C04	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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		CO5	Implement parts of xv6 and develop Programs/commands using UNIX System Programming. Perform system administration.
		CO1	Understand the software development life cycle and associated process models and Reverse Engineering.
19CS2211	SOFTWARE	CO2	Illustrate Requirement modelling and Agile and Extreme Programming
19002211	ENGINEERING	CO3	Examine Agile Models such as Scrum, kanban and SAFe Methodology.
		CO4	Categorize various testing strategies, Test Driven Development and CMMI, Six Sigma techniques
		CO1	Illustrate the functional components of DBMS and Design an ER Model for a database.
	DATABASE	CO2	Design a relational model for a database & Implement SQL concepts and relational algebra.
19CS2108S	MANAGEMENT SYSTEMS	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.
ŧ		CO1	Understand the problems, develop and implement solutions, involving Uninformed and Informed search Understand adversarial search algorithms and develop
		CO2	and implement the same for solving Game playing problems and Constraint satisfaction problems
19CS2212	ARTIFICIAL INTELLIGENCE	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
1005211	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
19CS2107		CO2	Implement enterprise application using JSP and Hibernate
		CO3	Implement enterprise application using Spring Framework



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		CO4	Use Spring Boot, Rest APIs and integrating Enterprise Java applications
		CO5	Develop the programs for enterprise application development.
		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
19CS2205	DATA SCIENCE	СОЗ	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
		CO1	Outline OSI and TCP/IP reference models and classify the error control mechanisms like CRC & Hamming code
	COMPUTER NETWORKS & SECURITY	CO2	Infer Channel allocation problem and algorithms to avoid it. Classify list of static and dynamic routing algorithms like Dijikstra, Distance vector routing and link state.
19CS2109		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
		CO1	Exercise to acquire knowledge within the chosen area of technology for project development
19IE4048	PROJECT PART -1	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
		CO1	Internship
		CO2	Understanding the importance of production training
19IE4051	INTERNSHIP	CO3	Applying the techniques in the live projects
		CO4	Applying the achieved output, compared to production requirements
15		CO5	Internship
19IE4049	PROJECT PART - 2	CO1	Exercise to acquire knowledge within the chosen area of



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			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.
		CO1	Introduction to Yoga -Yoga and its preparation
		CO2	understand the STANDING ASANAS
19SP2117	SPORTS	CO3	Understand the SITTING ASANAS
		CO4	Understand the BACKLAYING ASANAS, FRONT LAYING ASANAS and Pranayamas
		CO1	To familiarize with various aspects of the culture and heritage of India through ages.
	18UC0007 INDIAN HERITAGE AND CULTURE	CO2	To acquaint with the contributions of Indians in the areas of languages and literature, religion and philosophy.
18UC0007		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
		CO1	To acquire knowledge of the historical developments that culminated in the drafting of the Indian Constitution.
18UC0008	INDIAN CONSTITUTION	CO2	To understand the basic features of the Indian Constitution.
	CONSTITUTION	CO3	To understand the structure of the government as defined by the Indian Constitution.
		CO4	To understand the Indian Judicial system
	UNIVERSAL	CO1	Realize and Understand the basic aspiration, harmony in the human being.
18UC0010	HUMAN VALUES & PROFESSIONAL ETHICS	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.
19CS31·13		CO1	Apply concepts of mathematics to find space and time complexities of various algorithms
	ANALYSIS & DESIGN OF 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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Computer Science and Engineering

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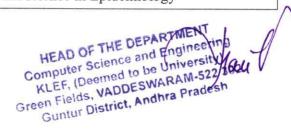
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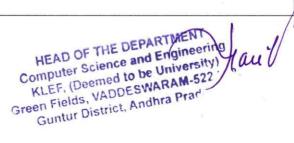
Computer Science

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		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.
		CO1	Apply Machine Learning Techniques using Decision Trees to solve Real World Problems
		CO2	Build Bayesian models for solving Classification and Prediction problems
19CS3021S	MACHINE	CO3	Apply Neural Network and Genetic Algorithm techniques to solve Classification, Prediction probe
	LEARNING	CO4	Demonstrates Learning First Order Rules, Analytical Learning ,Explanation-Based Learning and reinforcement learning
		CO5	Implement Machine Learning Techniques using Python Language
		CO1	Interpret fuzzy logic system
		CO2	Analyse Artificial Neural Network Models
		CO3	Demonstrate Swarm and Evolutionary Algorithms
19CS3022R	SOFT COMPUTING	CO4	Illustrate Hybrid Fuzzy-Neural- Evolutionary- Swarm Models
		CO5	Demonstration of neuro, fuzzy, evolutionary, and swarm algorithms using open source tools
	ARTIFICIAL NEURAL NETWORKS	CO1	Understand and build basic network representations, topologies and models
		CO2	Apply various techniques for training and optimizing neural networks
j.		CO3	Analyse different techniques related to network stochastics
19CS3026R		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		CO1	Able to understand and remember the concepts of Perception, Back Propagation, PCA, Singular Value Decomposition
	DEEP LEARNING	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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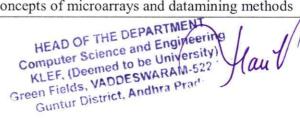
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		CO1	Understand cognitive computing is, and how it differs from traditional approaches
	COCNITIVE	CO2	Applying the primary tools associated with cognitive computing
19CS3270R	COGNITIVE COMPUTING	CO3	Develop a project that leverages cognitive computing
		CO4	Analyse and discuss the business implications of cognitive computing
91 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 -		CO5	able to implement cognitive computing programs using IBM Watson
		CO1	Understand image representation and modelling.
		CO2	Understand image transformation methods.
	PERCEPTION AND	CO3	Apply and Interpret image processing algorithms.
19CS3271R	COMPUTER VISION	CO4	Build and evaluate face detection and recognition algorithms.
		CO5	Evaluate a multitude of image processing techniques and algorithms.
		CO1	Understanding the video signals and its characteristics
	DIGITAL VIDEO PROCESSING	CO2	Understanding the motion analysis, its detection and restoration of video with quality
19CS3278R		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.
		CO1	Understand the concepts of Cloud Environments
,	MACHINE	ÇO2	Demonstrate the working of Sample Pre-processing models
19CS3282R	LEARNING ON CLOUD	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
		CO 1	Understanding the basic concepts of Cloud and Devops
19CS3286R	8	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
	CLOUD DEVOPS	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



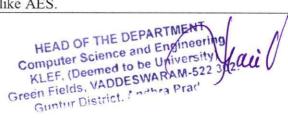
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		CO2	Apply computational model on sparse disease incidence data to infer transmission probability, period of infectivity and reproduction number
		CO3	Design a low cost surveillance and infection control policy using an efficient computational model
		CO4	Design a computational model for epidemic spread using Machine Learning concepts
		CO5	Build and Inspect tools associated Epidemiology using R
		CO1	Understand approaches to syntax and semantics in NLP
	NATUDAL	CO2	Apply the statistical estimation and statistical alignment models
19CS3273R	NATURAL LANGUAGE	CO3	Analyse grammar formalism and context free grammars
1900027510	PROCESSING	CO4	Apply Rule based Techniques, Statistical Machine translation (SMT), word alignment
		CO5	Inspect and evaluate language processing methods using python
0	9CS3274R 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.
19CS3274R		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.
		CO1	Understanding modelling of various types of data
		CO2	Understanding Visualization fundamentals
100020510	DATA	CO3	Applying methods and tools for Non-Spatial Data Visualization
19CS3051S	VISUALISATION TECHNIQUES	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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19CS3056S		CO1	Apply Functions and Lambdas on purely functional programs using generic types, recursion, pattern matching and higher-order functions.
	FUNCTIONAL & CONCURRENT	CO2	Apply Algebraic Data Types to model and use infinite sequences with lazy evaluation, functional programming with objects and classes
	PROGRAMMING	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
		CO1	Illustration of Warehouse & Mining, ETL, OLAP & OLTP, Data Cube Operations and Data Warehouse architecture
		CO2	Demonstration of Data Pre-processing through different methods
19CS3052R	DATA WAREHOUSING & MINING	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
	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
19CS3275S		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.
		CO1	Understand optimization methods and Apply analytics using R
	DIG D ATTA	CO2	Apply blind search method and Local Search method for real world problems
19CS3276R	BIG DATA OPTIMIZATION	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
			Apply concepts of microarrays and datamining methods

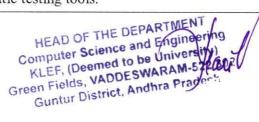


Course Code	Course Title	CO NO	Description of the Course Outcome
		CO4	Analyse pattern matching techniques of sequence alignment and identification
		CO5	Implement the lab experiments to store and analysis of biological data
		CO1	Understanding the video signals and its characteristics
		CO2	Understanding the motion analysis, its detection and restoration of video with quality
19CS3278R	DIGITAL VIDEO PROCESSING	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.
		CO1	Understand the models of Epidemiology and applications of computational science in Epidemiology
10.0000000	COMPUTATIONAL EPIDEMIOLOGY	CO2	Apply computational model on sparse disease incidence data to infer transmission probability, period of infectivity and reproduction number
19CS3272R		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
		CO1	Understand the fundamentals of query optimization and database recovery protocols.
10000000	ADVANCED	CO2	Apply emerging database technologies and distributed databases.
19CS3279R	DATABASES	CO3	Analyse and Discriminate object oriented and relational database systems.
		CO4	Analyse multimedia databases.
		CO5	Build and Evaluate advanced database applications
		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
19CS3280R	GRAPH & WEB ANALYTICS	CO3	Analysing Web Analytics Strategy- website traffic analysis, audience identification and segmentation analysis, Emerging Analytics
	6	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.

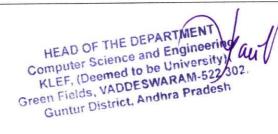


Course Code	Course Title	CO NO	Description of the Course Outcome
		CO3	Apply different algorithms of public key cryptosystem for ensuring secured communication.
		CO4	Apply Security engineering principles and respective algorithms to meet authentication and integrity.
		CO5	Analyse various cryptographic 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.
		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.
19CS3042R	NETWORK & INFRASTRUCTUR E SECURITY	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.
	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
19CS3045R		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.
		CO1	Apply Forensic Science and Digital Forensics
		CO2	Apply OS and File System Forensics
19CS3259S	DIGITAL	CO3	Analyse Digital Evidence and Network Forensics
	FORENSICS	CO4	Analyse Web Forensics and Mobile Device Forensics
		CO5	Implementing the concepts of Digital Forensics
		CO1	Understand Database Users, Roles related to User Administration and Java concepts
	DATABASE &	CO2	Apply Data Encryption and Database Vaults
19CS3260R	SYSTEM	CO3	Apply secret password Encryption & Decryption.
	SECURITY	CO4	Apply Data Encryption for the Data in Transit.
		CO5	Design Secure Database Schema
19CS3261R	PROGRAMMING	CO1	Understanding Ethereum block chain and using wallet for interacting with network
	FOR SMART CONTRACTS	CO2	Learn and use solidity programming language to build smart contracts
		1	HEAD OF THE DEPARTMENT  Computer Science and Engineering  Computer Science and Engineering  KLEF, (Deemed to be University)  KLEF, (Deemed to be University)  Green Fields, VADDESWARAM 522 302  Guntur District, Andhra Pradesh

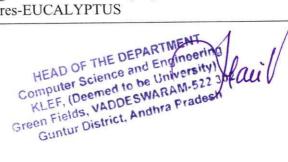
Course Code	Course Title	CO NO	Description of the Course Outcome
		CO3	Building advanced smart contracts with various test setups and try-catch assertions.
		CO4	Build interactive front end for smart contracts and use Contracts design patterns.
		CO5	Implement lab experiments through project-based learning on building smart contracts
		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.
19CS3262R	SECURE SOFTWARE ENGINEERING	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.
	WEB SECURITY	CO1	Understand and discuss about Web Security Concepts
		CO2	Identify different techniques involved in protecting privacy and principles of Web Security.
19CS3264R		CO3	Deploy SSL server Certificates, client side digital certificates and Microsoft's Authenticode
19CS3204K		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
		CO1	Understand challenges and technologies for wireless networks
	WWD DV DGG	CO2	Understand architecture and sensors.
19CS3265R	WIRELESS SENSOR NETWORKS	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.



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
		CO1	Perceive and discuss about User Experience design process.
		CO2	Recognize User Interface and differentiate from User Experience and principles of User Interface.
19CS3064R	UX DESIGN	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
	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.
19CS3256S		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.
		CO1	Understanding the concept of software project management process
	SOFTWARE PROJECT MANAGEMENT	CO2	Illustrate the various rules and guidelines that involved to improve the time, Cost, Quality, management aspects in software project management.
19CS3257R		СОЗ	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

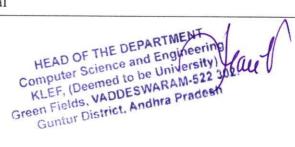


Course Code	Course Title	CO NO	Description of the Course Outcome
		CO2	Build C#.net desktop applications using ADO.NET
		CO3	Applying the concepts of ASP.NET Standard Server controls for visual programming application development
		CO4	Build the Visual programming applications using MVC, Page and State management and master pages.
		CO5	Develop the programs for desktop, web and enterprise application development using Visual Programming Techniques.
		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
19CS3258R	SOFTWARE RELIABILITY	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
		CO1	Introduction to Kotlin, Layouts, and Navigations
	CROSS- PLATFORM DEVELOPMENT FRAMEWORKS	CO2	Connect to internet, Database Connectivity and Build APK
19CS3255R		CO3	Development of Flutter Application using DART
.,		CO4	Build dynamic flutter application with Firebase and REST Operations
		CO5	Lab experiments on android application development
		CO1	Apply Functions and Lambdas on purely functional programs using generic types, recursion, pattern matching and higher-order functions.
19CS3056S	FUNCTIONAL & CONCURRENT	CO2	Apply Algebraic Data Types to model and use infinite sequences with lazy evaluation, functional programming with objects and classes
	PROGRAMMING	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
		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
19CS3037A	CLOUD INFRASTRUCTUR	CO3	Understand Cloud Service Availability, Resiliency and dynamic scaling
	E & SERVICES	CO4	Analyse Networking and security Services for Cloud Deployment and Management
		CO5	Developing Cloud services using Open Cloud Architectures-EUCALYPTUS

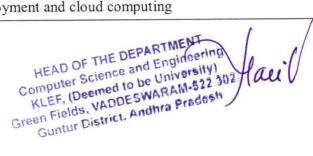


Course Code	Course Title	CO NO	Description of the Course Outcome
		CO6	Implementing public cloud Application on Amazon Web Services
		CO1	Understand the design of multiprocessor and distributed Operating Systems. Analyse distributed file system.
		CO2	Analyse the scheduling Real time and Parallel Applications on Heterogeneous Distributed Systems. Analyse three basic approaches for implementing distributed mutual exclusion
19CS3032R	ADVANCED OPERATING SYSTEMS	CO3	Understand Replication - preventing and accepting divergence. Analyse Deadlock detection in distributed systems.
	313123	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 consensuses and Fault Handling.
		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.
19CS3281S	CLOUD & SERVERLESS	CO3	Manage application functionalities using Server less runtimes and Server less databases.
	COMPUTING	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.
87		CO6	Skill based -Build a real world and scalable full stack application using Server less technologies.
		CO1	Understand fundamentals of computer design
	ADVANCED	CO2	Understand instruction level parallelism
19CS3251R	COMPUTER	CO3	Apply thread level parallelism
	ARCHITECTURE	CO4	Analyse memory and I/O
		CO5	Develop programs on computer architectures
		CO1	Understand fundamental principles behind parallel algorithm design and demonstrate the ability to differentiate among interconnection networks models and communication operations.
19CS3252R	PARALLEL ALGORITHMS	CO2	Analyse parallel algorithms for sorting and Computational Geometry
	ALGORITHMS	CO3	Design and Analysis of Parallel Computational algorithms
		CO4	Apply parallel algorithms for Graphs and Search
			HEAD OF THE DEPARTMENT Computer Science and Engineering KLEF, (Deemed to be University KLEF, (Deemed to be University Green Fields, VADDESWARAM-522 Guntur District, Andhra Pradesk

Course Code	Course Title	CO NO	Description of the Course Outcome
		CO5	Develop parallel algorithms using OpenMP, MPI and OpenCL
		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
19CS3253R	EDGE COMPUTING	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
		CO1	Analyse the performance of GPU memory hierarchy and MPI programming
	HIGH PERFORMANCE COMPUTING	CO2	Develop parallel programs using OpenCL library and understand FPGA-Based Supercomputer
19CS3038R		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
		CO1	Illustrate the concepts of Game design and development.
		CO2	Understanding the use of mathematical and geometrical concepts in Game Programming.
19ĊS3071S	PROGRAMMING FOR GAME	CO3	Explain the Core architectures of Game Programming.
	DEVELOPMENT	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
		CO1	Perceive and discuss about User Experience design process
19CS3064R	UX DESIGN	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



Course Code	Course Title	CO NO	Description of the Course Outcome
		CO1	To understand Basics of Augmented Reality and Interactions. Fundamentals of Augmented, Mixed Reality and its features P
	AR & VR	CO2	To understand Basics of Virtual Reality and Interactions. Fundamental Concept and Components of Virtual Reality
19CS3266S	APPLICATION DEVELOPMENT	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
		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.
	BUSINESS OF GAMES & ENTREPRENEURS HIP	CO2	Explore the mechanism behind gaming production and teamwork with foundation in some of the project management tools and techniques
19CS3267R		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
		CO1	Remembering the definition of Video Games and Design Components
	PRINCIPLES OF	CO2	Understand the Game Concepts and its world
19CS3268R	GAME DESIGN	CO3	Applying the Story telling Character and user interface Design
		CO4	Analysing the Game Play to its mechanics and balancing
		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
19CS3117S	IOT SENSING AND ACTUATING DEVICES	CO3	Analyse different generation of sensors for the development of IoT based Networks
170031110		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

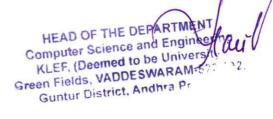


Course Code	Course Title	CO NO	Description of the Course Outcome
	IOT ENGINEERS	CO2	Understand different cloud infrastructures and service models and virtualization
		CO3	Apply the concept of Data Analytics by using AWS cloud
		CO4	Analyse the statistical data analysis and methods for evaluation
		CO5	Able to evaluate the communication between IoT devices and cloud (AWS).by measuring parameters
		CO1	Understanding the video signals and its characteristics
		CO2	Understanding the motion analysis, its detection and restoration of video with quality
19CS3278R	DIGITAL VIDEO PROCESSING	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.
		CO1	Understand challenges and technologies for wireless networks
		CO2	Understand architecture and sensors.
19CS3265R	WIRELESS SENSOR NETWORKS	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
		CO1	Describe the Edge/Fog Computing and infer the opportunities and challenges
2	z*	CO2	Examine the Architecture of Edge Computing and explore the issues that are being addressed by the industry
19CS3253R	EDGE COMPUTING	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
		CO1	Perceive and discuss about User Experience design process
		CO2	Recognize User Interface and differentiate from User Experience and principles of User Interface.
19CS3064R	UX DESIGN	CO3	Focusing and distinguishing about Components of UI design process with Interactive Devices.
		CO4	Determine graphic design techniques and psychology principles of User Experience
	,		HEAD OF THE DEPARTMENT  Computer Science and Engineering  Computer Science and Engineering  KLEF, (Deemed to be University)  Green Fields, VADDESWARAM-522 309  Guntur District, Andhra Pradesh

Course Code	Course Title	CO NO	Description of the Course Outcome
		CO5	Designing wire frames using Adobe XD, UXPressia and Whimsical
		CO1	Identify the Need of DevOps in SDLC and Cloud Infrastructure in DevOps, Apply Version Control System to track the latest version of Software
	CONTINUOUS	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.
19CS3060R	DELIVERY & DEVOPS	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.
	5	CO5	Build and Inspect the Tools associated to DevOps Life Cycle.
		CO1	Understand C for Embedded Systems. Analyse ARM processor and interrupt architecture
	EMBEDDED SYSTEMS	CO2	Apply Modern Assembly Language Programming with the ARM Processor
19CS3115R		CO3	Apply I/O Synchronization and Interrupt Programming. Program the STM32F4xx chip peripherals: I/O ports, ADCs, UARTs, and Timers
TA.		CO4	Understand Analog Interfacing and Program the STM32F4xx chip peripherals: DACs, SPIs, and I2Cs
ž.		CO5	Apply Embedded Systems Programming on ARM Cortex-M3/M4 Processor
		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.
19CS3234R	APPLICATION DEVELOPMENT ON CLOUD	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.
	GOV VITTO	CO1	Design Resilient Architectures
19CS3235R	SOLUTIONS ARCHITECTING	CO2	Design High-Performing Architectures
17003233R	ON CLOUD	CO3	Design Secure Applications and Architectures
	B	CO4	Design Cost-Optimized Architectures NT  HEAD OF THE DEPARTMENT  Computer Science and Engineering  Computer Science to be University  Computer National Computer (Deemed to be WARAM-522 302)  KLEF, (Deemed to be WARAM-522 302)  KLEF, (Deemed to be WARAM-522 302)  Green Fields, VADDESMARAM Pradesh  Guntur District, Andhra Pradesh

Course Code	Course Title	CO NO	Description of the Course Outcome
		CO5	Designing solutions to the architecture of Cloud
		CO1	Apply Machine Learning Techniques using Decision Trees to solve Real World Problems
		CO2	Build Bayesian models for solving Classification and Prediction problems
19CS3232R	MACHINE LEARNING	CO3	Apply Neural Network and Genetic Algorithm techniques to solve Classification, Prediction problems
	ELAKKING	CO4	Demonstrates Learning First Order Rules, Analytical Learning ,Explanation-Based Learning and reinforcement learning
		CO5	Implement Machine Learning Techniques using Python Language
		CO1	Understand the modelling of various types of data
		CO2	Understand the Visualization fundamentals
19CS3233R	DATA VISUALIZATION	CO3	Apply methods and tools for Non-Spatial Data Visualization
17033233K	TECHNIQUES	CO4	Apply methods for Scientific / Spatial Data Visualizatio and Web data visualization
		CO5	Build and Evaluate data visualization through Python & Tableau.
		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
19CS3036R	CLOUD INFRASTRUCTUR	CO3	Analyse Cloud Service Availability, Resiliency and dynamic scaling
.e.	E & SERVICES	CO4	Use Networking and Security Services. Automate cloud Infrastructure, Deployment, and Management Hands-On Cloud Administration. Implement, monitor,
		CO5	and manage important cloud services and components including IaaS and PaaS
		CO1	Analyse Distributed Computations, Graph Algorithms, Causality and Time, Message Ordering and group communication
	PARALLEL & DISTRIBUTED COMPUTING	CO2	Analyse Coordination Algorithms, Consistency and Replication, Global state and snapshot recording algorithms, Self-stabilization, Fault-Tolerant Message- Passing Distributed Systems
19CS2210R		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 Frame work.
	1	ı	HEAD OF THE DEPARTMENT Computer Science and Engineering Computer Science and Engineering KLEF, (Deemed to be University) KLEF, (Deemed to be University) KLEF, VADDESWARAM-522 Green Fields, VADDESWARAM-Fradesh Guntur District, Andhra Pradesh

Course Code	Course Title	CO NO	Description of the Course Outcome
		CO1	Introduction to Kotlin, Layouts, and Navigations
	CROSS-	CO2	Connect to internet, Database Connectivity & Build APK
19CS3230R	PLATFORM	CO3	Development of Flutter Application using DART
17C53230K	DEVELOPMENT FRAMEWORKS	CO4	Build dynamic flutter application with Firebase and REST Operations
		CO5	Lab experiments on android application development
		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
19CS3231R	VISUAL	CO3	Applying the concepts of ASP.NET Standard Server controls for visual programming application development
	PROGRAMING	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.
	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
19CS3214R		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
		CO1	Understand the various types of signals, systems and their frequency domain transformation.
19CS3116R	SIGNAL	CO2	Understand the design methodology of different filters and their realizations.
) cosition	PROCESSING	CO3	Apply signal processing approaches for extraction of information present in the natural signals.
		CO4	Apply machine learning approaches for processing of signals.
		CO1	Outline the principles of cryptography by various attacks and apply different classic encryption techniques and algorithms like DES.
19CS3040R	CRYPT ANALYSIS & CYBER	CO2	Illustrate the principles of block cipher and apply algorithms like AES.
	DEFENSE	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.



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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Computer Science and Engineering
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Green Fields, VADDESWARAM-522 362.
Guntur District, Andhra Pradesh

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
18CS4OA7	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



HEAD OF THE DEPARTMENT
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