Koneru Lakshmaiah Education Foundation
(Category -1, Deemed to be University estd. u/s. 3 of the UGC Act, 1956)
❖ Approved by AICTE ❖ ISO 21001:2018 Certified
Campus: Green Fields, Vaddeswaram - 522 302, Guntur District, Andhra Pradesh, INDIA.
Phone No. +91 8645 - 350 200; www.klef.ac.in; www.klef.edu.in; www.kluniversity.in
Admin Off: 29-36-38, Museum Road, Governorpet, Vijayawada - 520 002. Ph: +91 - 866 - 3500122, 2576129

Department of Bachelor of Computer Applications

Academic Year :2025-2026

S. No	COURSE CODE	COURSE TITLE	CO. No.	Course Outcome
1	25MT1101	MATHEMATICS FOR COMPUTER SCIENCE	CO1	Ability to apply the conceptualize the basic concepts of Matrices and its Applications
			CO2	Ability to apply the applications of truth tables to logic gates usage in digital circuit design and identify the logical expressions and their minimization techniques for logical circuit Optimization
			CO3	Ability to identify the operations on sets and properties. Relations and functions
			CO4	Ability to apply Graph and Graph theory applications in Circuits and Networking Theory
2	23MT2101	PROBABILITY AND STATISTICS	CO1	Apply Central Tendency and dispersion in Data Analysis
			CO2	Apply Correlation and Regression in Real-World Problem Solving
			CO3	Apply probability concepts and distributions to solve real-world problems
			CO4	Apply Hypothesis Testing in Real-World Problem Solving
3	25CA1101	COMPUTER ORGANIZATION	CO1	Understanding the fundamental concepts and techniques used in digital electronics and using K-Maps for Boolean Expression simplification
			CO2	Model the building blocks of Combinational and Sequential circuits and explaining registers and its usage.
				Analyze the basic concepts of computer organization: structure and operation of computers and their peripherals the design of the functional units of a digital computer system.

K. Lavanya

Academic Professor – I/C

HOD-BCA

Dr. K. BHAGAVAN
HOD BCA
KLEF, VADDESWARAM

	25CA1101	COMPUTER ORGANIZATIO N		Classify the working of the Central Processing Unit. Design and evaluate the performance of memory systems
4	25CA1102	COMPUTATIONAL THINKING FOR STRUCTURED DESIGN	CO1	Understand different concepts of C programming constructs for creating programs.
			CO2	Illustrate different control structures and Arrays.
			CO3	Experiment with functions and pointers for solving realworld problems.
			CO4	Analyze the working of structures and different file handling methods
			CO5	Evaluate solutions for programs using basic and advanced concepts of C language.
5	23CA1103	OPERATING SYSTEM	CO1	Discuss Operating System Functionalities, Types of Operating Systems, Computer Architecture support to Operating Systems.
			CO2	Explain the Process and CPU Scheduling.
			CO3	Demonstrate Process Synchronization and Deadlocks
			CO4	Illustrate Memory management ,Fragmentation and file system
6	25CA1204R	DATABASE MANAGEMENT SYSTEMS	CO1	Understanding Database and File System and Applying different kinds of data models with functional components of DBMS
			CO2	Applying design, SQL, PL/SQL and corelating appropriate strategies for optimization of queries with Tuple Relational Calculus and Domain Relational Calculus
			CO3	Analyzing normal forms based on functional dependency and Apply normalization techniques to eliminate redundancy with the ACID properties
			CO4	Analyzing and apply in Identifying variety of methods for effective processing of given queries
			CO5	Implement SQL queries and PL/SQL programs to do various operations on data.

Academic Professor – I/C

HOD-BCA

Dr. K. BHAGAVAN
HOD BCA
KLEF, VADDESWARAM

7	25CA1205R	DATASTRUCTURES	CO1	Understanding the fundamental data structure is crucial for designing efficient algorithms and solving complex problems in computer science.
			CO2	Apply the Basic operations sorting, searching, insertion and deletion of data for arrays and linked list. Stacks and queues are essential building blocks in computer science, providing structured ways to organize data based on specific access patterns.
			CO3	Analyze real time problems and design solutions using Trees and Graphs. Trees and graphs are fundamental data structures that excel at representing hierarchical and network relationships between elements.
			CO4	Analyze the strengths and weaknesses of different searching and sorting techniques, you can select the most appropriate algorithm for your specific needs, leading to efficient and well-performing software solutions
			CO5	Evaluating programs to demonstrate the functionality of different data structures, sorting algorithms, searching algorithms, etc.
8	25CA2106	COMPUTER NETWORKS	CO1	Understand the fundamentals of computer networks and data communication.
			CO2	Understand and Analyze the fundaments of Data Communication
			CO3	Analyze the IEEE Standards, Data Link Layer and Evaluate design issues in networks.
			CO4	Analyze Internet Transport Protocols and Evaluate different types of protocol, Evaluate various types of Network Devices and different types of Networks.
9	25CA2107	INTRODUCTION TO AI AND DATA SCIENCE	CO1	Understand the core AI concepts.
			CO2	Use Python for different types of learning and NLP.
			CO3	Understand basic concepts of data science
			CO4	Apply different types of machine learning algorithms
			CO5	Experiment with various cloud services using web services Cloud for building and deploying applications

K. Kiran Kumar

Academic Professor – I/C

HOD-BCA

Dr. K. BHAGAVAN
HOD BCA
KLEF, VADDESWARAM

10	25CA2208	NETWORK AND INFRASTRUCTURE SECURITY	CO1	Estimate the knowledge and skills required to protect your organization\'s network from physical security threats and understand the security considerations of copper and optical media.
			CO2	Explain the role of routers and switches in network security, Analyze lookup and classification algorithms used in routers, Configure packet scheduling and fair queuing mechanisms.
			CO3	Apply security best practices for wireless communication in distributed systems and implement a holistic approach to securing distributed and networked systems.
			CO4	Analyze the types of vulnerabilities and attacks in web applications and algorithms designed against them, and implement advanced security measures for web and DNS systems.
			CO5	Apply security concepts and analyze their performance using networking tools.
11	25CA2209	SOFTWARE ENGINEERING	CO1	Demonstrate the requirement of software development for various applications.
			CO2	Utilize some of the Process Models in software engineering for software development.
			CO3	Identify stakeholders requirements, multiple viewpoints, eliciting requirements pts, Extreme Programming, SAFE Methodology
			CO4	Examine a wide range of testing techniques used in software development to ensure comprehensive understanding and application.
12	25CA2210R	DESIGN AND ANALYSIS OF ALGORITHMS	CO1	Understand the fundamentals of algorithmic problem-solving, including techniques such as divide and conquer, and recognize their significance in solving computational problems efficiently.
			CO2	Apply and evaluate the applicability of the Greedy Method to different types of optimization problems, including the Knapsack Problem, Job Sequencing with Deadlines, Minimum-cost Spanning Trees, and Optimal Merge Patterns.
			CO3	Develop proficiency in formulating dynamic programming solutions by breaking down complex problems into smaller sub problems, solving them recursively, and storing intermediate results to avoid redundant computations.

Academic Professor – I/C

HOD-BCA

Dr. K. BHAGAVAN
HOD BCA
KLEF, VADDESWARAM

			CO4	Analyze the relationship between backtracking and other algorithmic paradigms, such as dynamic programming and branch and bound, understanding when each approachis most suitable for solving optimization problems.
			CO5	Analyze and apply suitable design technique to solve given real world problems
13	25CA3111	AI Tools for IT Managers	CO1	Understand AI categories and identify strategic areas for AI Adoption in IT.
			CO2	Use low-code AI tools for automation and process enhancement in business contexts.
			CO3	Design effective prompts and apply LLM tools to automate routine IT workflows.
			CO4	Evaluate and manage ethical risks associated with AI adoption in IT systems.
14	25CA3111R	CONTINUOUS DELIVERY AND DEPLOYMENT WITH 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	Analyze 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	Analyze need of Containerization in SDLC and Examine the Kubernetes Pod Configuration.
			CO4	Inspect Configuration Management using Infrastructure as Code, Analyze Continuous Monitoring and Container Orchestration process.
			CO5	Build and Inspect the Tools associated to DevOps Life Cycle
15	25CA3213	FINTECH & BLOCKCHAIN DEVELOPMENT	CO1	Understand the concept of Fintech, its origin and evolution, and how Fintech solutions effectively address various challenges faced by customers and organizations
			CO2	Apply business models, strategies, frameworks, tools & technologies to transform banks
			CO3	Apply about the different types of Blockchain and consensus algorithms.
			CO4	Apply the different types of crypto currencies & its importance and Blockchain applications

Academic Professor – I/C

HOD-BCA

Dr. K. BHAGAVAN
HOD BCA
KLEF, VADDESWARAM

16	25SDCA01R	FRONT END DEVELOPMENT FRAMEWORK FOR UI DEVELOPMENT	CO1	Understand foundational UI/UX design concepts, principles of effective UI.
			CO2	Demonstrate the fundamentals of web development using HTML5, CSS3, JavaScript, responsive design principles.
			CO3	Explain JavaScript and ES6+ features including arrow functions, let/const, restructuring, spread/rest, and modules.
			CO4	Apply front-end frameworks and their use cases, compare React, Angular and with GitHub.
			CO5	Experiment with User Interface Tool to develop an App or website pages and deploying applications.
17	25SDCA02	OBJECT ORIENTED PROGRAMMING	CO1	Understand the basic concepts of Object-Oriented Programming, Data types, Operators and Type Conversion.
			CO2	Design and implement programs using standard design patterns to solve general problems.
			CO3	Choose the best type of Inheritance, creation of packages and interfaces to implement multiple inheritances.
			CO4	Build and Analyze Java applications using exceptions, formatted and unformatted I/O Streams.
			CO5	Use an integrated development environment to write, compile, run, and test simple object-oriented Java programs that solve real-world problems.
			CO6	Evaluating the programs with integrated development environment to write, compile, run, and test simple object-oriented Java programs that solve real-world problems.

Academic Professor – I/C

HOD-BCA

Dr. K. BHAGAVAN
HOD BCA
KLEF, VADDESWARAM

18	25SDCA03R	WEB DEVELOPMENT USING PYTHON	CO1	Understand the basic programming skills in core Python
			CO2	Apply the advanced modules in Python to build Object Oriented Applications
			CO3	Build python application to connect with the database and perform CRUD operations
			CO4	Analyze Web forms and Application in Django
			CO5	Create Web Applications in Python using Django Framework
19	25SDCA04R	FULL STACK APPLLICATION DEVELOPMENT	CO1	Develop a responsive frontend using React, Bootstrap, and modern JavaScript.
			CO2	Apply the RESTful backend using Spring Boot and perform CRUD operations with MySQL.
			CO3	Examine the communication between React frontend and Spring Boot backend using REST APIs.
			CO4	Analyze the full-stack CRUD application, GitHub for version control and project management.
			CO5	Develop a working full-stack CRUD project (e.g., User Manager app) which can be added to their portfolio.
20	25SDCA05	CLOUD INFRASTRUCTURE & SERVICES	CO1	Introduction to Cloud Infrastructure and Virtualization
			CO2	Illustrate Core Cloud Services – Compute, Storage, and Networking
			CO3	Demonstrating the Infrastructure Provisioning, Automation, and Monitoring
			CO4	Summarize Security, Compliance, and Integration in Cloud Environments
			CO5	Analyse Cloud Deployment, DevOps Integration.
21	25SDCA06R	MOBILE APPLICATION DEVELOPMENT	CO1	Discuss various concepts of mobile app design programming that make it unique from programming for other platforms,
			CO2	Apply Android concepts and user Interface components for mobile app programming
			CO3	Apply Background tasks and Design Activities, communication between activities
			CO4	Apply data requirements and background data storage for mobile app development

Academic Professor – I/C

HOD-BCA

DR. K. BHAGAVAN
HOD BCA
KLEF, VADDESWARAM

			CO5	Evaluate a mobile application through publishing and testing.
22	25IE1001	SUMMER INTERNSHIPPROGRAM-1	CO1	To apply various aspects related to initial visit
			CO2	To apply various aspects related to interim visit
			CO3	To apply various aspects related to final visit
			CO4	To apply various aspects related to Viva Presentation
23	25IE2002	SUMMER INTERNSHIP PROGRAM-2	CO1	Understand with explore career alternatives prior to graduation
			CO2	Understand with hands-on learning experience even as they gain a glimpse into real world, giving them a front seat to a potential career choice.
			CO3	Understand the abilities and career alternatives prior to graduation
			CO4	Understand with explore career opportunities alternatives prior to graduation
24	25IE3204	PROJECT	CO1	Organize literature search to review current knowledge and developments in the chosen technical area
			CO2	Analyze detailed technical work in the chosen area using one or more of: theoretical studies computer simulations hardware construction.
			CO3	Evaluate progress reports or maintain a professional journal to establish work completed, and to schedule additional work within the time frame specified for the project
25	25CA22C1	CLOUD ARCHITECTURES	CO1	Classify cloud computing importance and services
			CO2	Demonstrate the various cloud services & models.
			CO3	Explain Virtualization approaches & Web Services
			CO4	ApplycloudservicesusingNetworksecurityCloudtoutilizecloudresources
			CO5	ExperimentwithvariouscloudservicesusingwebservicesCloudforbuildingand deploying applications

Academic Professor – I/C

HOD-BCA

Dr. K. BHAGAVAN
HOD BCA
KLEF, VADDESWARAM

26	25CA231C2	CLOUD SERVERLESS COMPUTING	CO1	Describe Cloud computing and cloud service scheduling hierarchy.
			CO2	DescribingtheFunctions-as-a-serviceandEvent-drivenprogramming.Develop Scalable Models Using Server less Architectures.
			CO3	DemonstratingtheapplicationfunctionalitiesusingServerlessruntimesandServerless databases
			CO4	Apply Server less Programming Practices and Patterns. Architect, Build, and Operate the server less applications
27	25CA31C3	CLOUD NATIVE APPLICATION DEVELOPMENT	CO1	Classify cloud computing importance and services
			CO2	Demonstrate the various cloud services & models, fundamentals of cloud-native application development
			CO3	Explain Web services, build and deploy simple micro services using containers
			CO4	Apply cloud services using cloud platforms, DevOps tools, and serverless computing
			CO5	Experiment with various cloud services using web services Cloud for building gand deploying applications
28	25CA32C4	CLOUD SECURITY	CO1	Cloud security is vital because it protects sensitive data, keeps critical applications running smoothly, ensures compliance with regulations, and builds trust with customers by safeguarding their information.
			CO2	Cloud security goes beyond firewalls, encompassing multiple layers to protect data. This includes identity and access management (IAM) to control who sees what, encryption to scramble data, data loss prevention (DLP) to monitor for leaks,
			CO3	Cloud environments, while convenient, introduce new security risks. Misconfigured settings, weak access controls, and insecure APIs can create openings for attackers to steal data
			CO5	Achieving a seamless cloud security model involves creating a unified environment where security measures are integrated throughout the cloud infrastructure.

Academic Professor – I/C

HOD-BCA

Dr. K. BHAGAVAN
HOD BCA
KLEF, VADDESWARAM

29	25CA22A1	MACHINE LEARNING	CO1	Demonstrate the in-depth exploration of the various types of machine learning and the diverse ways in which models can be represented and gain comprehensive understanding of supervised, unsupervised, and reinforcement learning.
			CO2	Apply multiple linear regression approach on complex data sets effectively and it will give an immersive knowledge on multiple linear regression
			CO3	Interpreting a comprehensive introduction to multiple linear regression analysis, focusing on both the theoretical foundations and practical applications and will learn to build, interpret, and validate multiple linear regression models.
			CO4	Analyzing regression coefficients within the context of various regression models and learn how to estimate, interpret, and validate regression coefficients, gaining insights into their practical implications in statistical modeling and data analysis.
			CO5	Evaluate applications using classification techniques.
30	25CA31A2	DATA MANAGEMENT & BIG DATA ANALYTICS	CO1	Make use of appropriate data preprocessing methods to prepare data for mining and perform association rule mining.
			CO2	Utilize appropriate classification and clustering techniques to analyze patterns.
			CO3	Develop basic Hadoop workflows for distributed storage and processing of large datasets.
			CO4	Build YARN-based execution workflows with scheduling, and monitoring interfaces.
31	25CA31A3	DEEP LEARNING	CO1	Apply with various Convolutional models of deep learning
			CO2	Utilize the You Only Look Once(YOLO) framework for object detection and localization.
			CO3	Apply Recurrent Neural Networks for Sequence Learning for real time applications
			CO4	Apply various Generative Adversarial Networks to find fake and real images

Academic Professor – I/C

HOD-BCA

Dr. K. BHAGAVAN
HOD BCA
KLEF, VADDESWARAM

			CO5	Experimental model architectures for different applications with different modalities such as image, text and time series data and implement with pytorch and keras
32	25CA32A4	NATURAL LANGAUGE PROCESSING AND LARGE LANGUAGE MODELS	CO1	Understand the scope, challenges, and applications of NLP
			CO2	Understand Statistical Models and embeddings for text-based tasks
			CO3	Apply LLMs function and how to interface with them.
			CO4	Evaluating the fundamentals, training methods, prompting techniques, and practical usage of Large Language Models (LLMs),
33	25CA22S1	CYBER SECURITY AND ETHICAL HACKING	CO1	Understand Information Systems and Cyber Security
			CO2	Build measures for various types of security threats and electronic payment systems
			CO3	Identify the security issues involved in developing secure information systems
			CO4	Apply different ethical hacking methods
			CO5	Evaluate various cryptographic algorithms
34	25CA31S2	CYBER FORENSICS	CO1	Outline digital evidence following established procedures, analyze recovered data for traces of cybercrime, and effectively present findings for further investigation
			CO2	Analyze complex digital evidence from various sources (Windows, Linux, networks, mobile devices) using advanced forensic techniques (packet analysis, intrusion detection, steganography
			CO3	Examineadvancedforensictechniquessuchascross-driveanalysis,liveanalysis, deleted file recovery, stochastic forensics, password cracking methods
			CO4	Inspect legal principles and best practices to effectively handle corporate espionage, digital evidence, and cybercrime incidents

Academic Professor – I/C

HOD-BCA

Dr. K. BHAGAVAN
HOD BCA
KLEF, VADDESWARAM

35	25CA31S3	MALWARE ANALYSIS	CO1	Illustrate the Goals of Malware Analysis and Creating fake networks
			CO2	Demonstrate the usage of virtual machines in the context of malware analysis.
			CO3	Apply the concept of exception handling in the context of malware analysis. How can it be used to identify and analyze malware activity
			CO4	Develop a plan for analyzing malware persistence mechanisms
			CO5	Practical Reverse Engineering: x86, x64, ARM, Windows Kernel, Reversing Tools.
36	24UC1103	LANGUAGE SKILLS	CO1	Understand the essential listening, speaking and reading skills
			CO2	Apply and produce essential writing and non-verbal communication skills
37	25UC1203	DESIGN THINKING AND INNOVATION	CO1	Understand the importance of Design thinking mindset for identifying contextualized problems
			CO2	Analyze the problems statement by empathizing with user
			CO3	Develop ideation and test the prototypes made
			CO4	Explore the fundamentals of entrepreneurship skills for transforming the challenge into an opportunity
38	25UC2105	COMMUNICATION SKILLS	CO1	To Understand the essential career skills, including resume writing, interview techniques
			CO2	Apply a comprehensive understanding of essential team skills, preparing them for successful collaboration and contribution in professional team environments.
			CO3	Analyze multivariate statistical visual representations, such as dendrograms, scree plots, QQ plots, and PP plots.
			CO4	Examine the visualizations by adding annotations such as text, mathematical expressions, lines, arrows, shaded shapes, and error bars.
39	25FL3058	JAPANESE LANGUAGE	CO1	Classify Hiragana, Katakana, and basic Kanji characters used in greetings and simple scripts

Academic Professor – I/C

HOD-BCA

Dr. K. BHAGAVAN
HOD BCA
KLEF, VADDESWARAM

			CO2	Apply their knowledge of essential daily expressions, numbers, months, dates, time, body parts, colors, and common vocabulary to effectively communicate in basic everyday situations
			CO3	Utilize their understanding of present, past, and future tenses, along with the ability to construct interrogative sentences,to express themselves in various timeframes and ask questions effectively in different conversational contexts.pen_spark
			CO4	Develop their knowledge of verbs, including negative conjugations, and prepositions to discuss hobbies, deliver self-introductions, and navigate basic interview scenarios in Japanese
40	25UC0026	HUMAN VALUES,GENDER EQUALITY & PROFESSIONAL ETHICS	CO1	Understanding the basic concepts of value Education
			CO2	Gain basic understanding of the principles in harmony among the humanbeings
			CO3	Gain knowledge in the concept of Harmony in the family and society
			CO4	Acquire knowledge in the concepts of harmony in the nature
41	25UC0009	ECOLOGYAND ENVIRONMENT	CO1	Discuss natural resources and importance of environmental science.
			CO2	Describe various ecosystems and applications of biodiversity.
			CO3	Identify and discuss causes, preventive measures of environmental pollution.
			CO4	Summarize constitutional acts for environmental science, knowledge on solid waste management and disaster management.
42	25UC0008	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 Federal government as defined by the Indian Constitution.

Academic Professor – I/C

HOD-BCA

Dr. K. BHAGAVAN
HOD BCA
KLEF, VADDESWARAM

			CO4	To understand the Indian Judicial system and election commission of india
			CO5	Analyze various cyber security threats

Academic Professor – I/C

HOD-BCA

Dr. K. BHAGAVAN
HOD BCA
KLEF, VADDESWARAM