Koneru Lakshmaiah Education Foundation
(Category -1, Deemed to be University estd. u/s. 3 of the UGC Act, 1956)
Accredited by **NAAC** as '**A++**' ❖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 Computer science and Engineering

Program: B.Tech -CSE

Academic Year: 2018-2019

COURSE CODE	COURSE TITLE	CO. NO	DESCRIPTION OF THE COURSE OUTCOME
18UC1101	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 and mensuration and also problems on finding volume and surface areas.
		CO4	Analyze the given conditions and finding out the directions, problems related to symbols and notations, numbers or letters. Analyze 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.
18GN1107	COCURRICULAR ACTIVITY -1	CO1	Communicate effectively in the gathering
		CO2	Demonstrate their interpersonal and communication skills
		CO3	Understand and work effectively as an individual in a Team
		CO4	Improve their creativity in developing useful models
18UC1202	ENGLISH PROFICIENCY	CO1	Identify the structure and usage of phrases, clauses and sentences along with the techniques of learning vocabulary, concord and sentence equivalence and apply the strategies in different contexts.
		CO2	Identify formats and parameters of writing skills and apply in product and process descriptions.

HEAD OF THE DEPARTMENT
Computer Science and Engineering
KLEF, (Deemed to be University)
Green Fields, VADDESWARAM
Guntur District, Andhra

COURSE CODE	COURSE TITLE	CO. NO	DESCRIPTION OF THE COURSE OUTCOME
		CO3	Apply the methods of fundamental concepts of tabulation, line-graphs, bar-graphs and pie charts in Data Interpretation and statements in Data Sufficiency
		CO4	Identify the basic symbols and notations to find out the hidden analogy to solve sequences
18GN1107	COCURRICULAR ACTIVITY -2	CO1	Communicate effectively in the gathering
		CO2	Demonstrate their interpersonal and communication skills
		CO3	Understand and work effectively as an individual in a Team
		CO4	Improve their creativity in developing useful models
18UC2103	PROFESSIONAL COMMUNICATION SKILLS	CO1	Identify the structure of sentences with the techniques of Etymology and apply in everyday conversations. Able to write Paragraphs, Letters, have the knowledge of Sentence completion and the Creativity
		CO2	Identify and Develop Inter-personal Communication skills and Cultural Sensitivity and apply them in the Corporate world to secure the best jobs in the industry
		CO3	Apply the Arithmetic concepts Time & Work and Time & Distance
		CO4	Understand the techniques used to take decision making based on data, understanding the logical connectives and implications, data analysis of by using Venn diagrams
18UC2204	APTITUDE BUILDER - 1	CO1	To recall the key concepts of conversations/communication.Vocabulary related to the job description and product launching
		CO2	To acquaint with the specific traits found in different cultures.
		CO3	Understand the various concepts related to Numbers
		CO4	Understand the various tasks related to Cubes.

HEAD OF THE DEPARTMENT
Computer Science and Engineering
KLEF, (Deemed to be University)
Green Fields, VADDESWARAM-522 502.
Guntur District, Andhra Pradesh

COURSE CODE	COURSE TITLE	CO. NO	DESCRIPTION OF THE COURSE OUTCOME
18UC3105	APTITUDE BUILDER - 2	CO1	To enhance the verbal aptitude and language comprehension of the students.
		CO2	To improve aptitude, problem solving skills and reasoning ability of the students
		CO3	To develop skills that enable students to identify quickly the critical issues and logically derived conclusions from written facts or data.
		CO4	To understand the Number and Letter Series, Number and Letter Analogy, Coding and decoding, Odd man out, Selections
18SC1103	SINGLE VARIABLE CALCULUS AND MATRIX ALGEBRA	CO1	Model physical phenomena by first order ordinary differential equation and obtain its analytical solution.
		CO2	Model a physical phenomena as second order ordinary differential equation corresponding to LCR circuit and obtain its analytical solution.
		CO3	Expand a periodic function as a Fourier series.
		CO4	Model a physical phenomena by system of linear algebraic equations and solve it using analytical & numerical methods.
18SC1104	FOUNDATIONS OF COMPUTATIONAL MATHEMATICS	CO1	Understand the concepts of Ratios, Proportion, Variation, Percentages
		CO2	Determine the areas of regular solids
		CO3	Solve the Simple & Quadratic Equations , and convert Fractions into Decimals
		CO4	Calculate the roots of algebraic and transcendental equations by using Bisection method and Newton Raphson method
18SC1105	LOGIC AND REASONING	CO1	Deductions,Connectives,Binarylogic
		CO2	Clocks, calendar , Non-verbal reasoning
		CO3	venn diagram , cubes and Number and letter series
		CO4	Puzzles, Coding and Decoding, Blood Relations
18CS1003	WORKSHOP PRACTICE FOR	CO1	Prepare wooden Lap T, Plus joints and operate

COURSE CODE	COURSE TITLE	CO. NO	DESCRIPTION OF THE COURSE OUTCOME
	COMPUTER ENGINEERS		conventional Lathe, Drilling, and Surface grinding machines
		CO2	Prepare square and L fits and use arc welding equipment and tools to prepare butt joint and lap joint for joining mild steel metal flats in a safe manner
		CO3	Fabricate parts made of sheet metal and demonstrate the ability to melt and pour molten material into dies
		CO4	Demonstrate the ability to execute stair-case lighting and godown lighting house wiring connections
		CO5	Demonstrate the ability of fabricating a product involving multiple trade skills (atleast three trades)
18MT1201	MULTIVARIATE CALCULUS	CO1	Evaluate the Partial derivatives of function of several variables, total differentiation, and their applications, Adopting the chain rule
		CO2	Evaluate Line-integral ,double and triple integrals
		CO3	directional derivative of a scalar point functions, divergence and curl of vector functions and related applications
		CO4	Formation of partial differential equations and solutions of first- order linear differential equations.
18CY1001	ENGINEERING CHEMISTRY	CO1	Outline the concept of Electrode potential and redox equilibrium to the analysis and design of Electrochemical cells
		CO2	Examine the Mechanism of Corrosion of Metallic structures.
		CO3	Generalize water quality parameters and analysis of Hardness and alkalinity in context of BFW.
		CO4	Describe the role of chemical kinetics in the formation and destruction of ozone in the atmosphere.
18SC2008	DISCRETE MATHEMATICS	CO1	Understand the notion of mathematical thinking, mathematical proofs, and algorithmic thinking, and be able to apply them in problem solving.

HEAD OF THE DEPARTMENT
Computer Science and Engineering
KLEF, (Deemed to be University)
Green Fields, VADDESWARAM-522 502.
Guntur District, Andhra Pradesh

COURSE CODE	COURSE TITLE	CO. NO	DESCRIPTION OF THE COURSE OUTCOME
		CO2	Understand the basics of discrete probability and number theory, and be able to apply the methods from these subjects in problem solving.
		CO3	Be able to use effectively algebraic techniques to analyze basic discrete structures and algorithms.
		CO4	Understand some basic properties of graphs and related discrete structures, and be able to relate these to practical examples
18UC0009	ECOLOGY AND 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
18PH4101	QUANTUM PHYSICS FOR ENGINEERS	CO1	Remember the role of electronic energy band structures of solids in governing various electrical and optical properties of materials.
		CO2	Remembering Bohr's atomic model, photoelectric effect and Compton shift
		CO3	Remembering orbital angular momentum and electron spin.
		CO4	Demonstrate an understanding of the basic principles of the special theory of relativity
18SC1101	PROBLEM SOLVING AND COMPUTER PROGRAMMING	CO1	Understanding the various steps in problem solving, Use C-programming control statements and loops.
		CO2	Apply suitable searching and sorting techniques to solve various problems
		CO3	Apply stack and Queue datastructures to solve real world problems
		CO4	Apply linked List and tree data structures to solve real world problems
		CO5	Practice all the programs based on searching , sorting stack, Queue, list and tree

HEAD OF THE DEPARTMENT
Computer Science and Engineering
KLEF, (Deemed to be University)
Green Fields, VADDESWARAM-522 502
Guntur District, Andhra Pradesh

COURSE CODE	COURSE TITLE	CO. NO	DESCRIPTION OF THE COURSE OUTCOME
18SC1106	TECHNICAL SKILL - 1 (CODING)	CO1	Introduction to Servelets: Lifecycle of a Serverlet, JSDK The Servelet API, The javax.servelet Package, Reading Servelet parameters, Reading Initialization parameters.
		CO2	The javax.servelet HTTP package, Handling Http Request & Responses, Using Cookies-Session Tracking, servlet chaining-Security Issues.Common Gateway Interface (CGI), Lifecycle of a Servlet, deploying a servlet,
		CO3	Introduction to JSP The Problem with Servelet. The Anatomy of a JSP Page, JSP Processing. JSP Application Design with MVC Setting Up and JSP Environment: Installing the Java Software Development Kit, Tomcat Server & Testing Tomcat
		CO4	JSP Application Development: Generating Dynamic Content, Using Scripting Elements Implicit JSP Objects, Conditional Processing – Displaying Values Using an Expression to Set an Attribute, Declaring Variables and Methods Error Handling and Debugging Sharing Data Between JSP pages, Requests, and Users Passing Control and Date between Pages – Sharing Session and Application Data – Memory Usage Considerations.
18EC1101	DIGITAL SYSTEM DESIGN	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
		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, FPGA and CPLD
		CO5	Analyse the digital IC logic for combinational and sequential circuits implementation.
18SC1202	DATA STRUCTURES	CO1	Apply measures of efficiency on algorithms and Analyze different Sorting Algorithms.

HEAD OF THE DEPARTMENT
Computer Science and Engineering
KLEF, (Deemed to be University)
Green Fields, VADDESWARAM-522 502.
Guntur District, Andhra Pradesh

COURSE CODE	COURSE TITLE	CO. NO	DESCRIPTION OF THE COURSE OUTCOME
		CO2	Analyze and compare stack ADT and queue ADT implementations using linked list and applications.
		CO3	Analyze the linked implementation of Binary, Balanced Trees and different Hashing techniques.
		CO4	Analyze different representations, traversals, applications of Graphs and Heap organization.
18SC1207	TECHNICAL SKILL - 2 (CODING)	CO1	Apply the concepts of basic programming to solve the basic problems, pattern based problems
		CO2	Build solutions for problems on Numbers and array based problems , functions, recursion
		CO3	Solve problems solutions for character/string based problems and pointers
		CO4	Build solutions to programs on Data structures concepts.
		CO5	Hacker rank problem solved
18EC1002	ENGINEERING GRAPHICS & DESIGN FOR ELECTRONIC AND COMPUTER ENGINEERS	CO1	Construct and Interpret drawing scale to visualize the geometries of Engineering objects using points, lines both manually and by AutoCAD
		CO2	Draw projection of planes, solids and Generate the sectional views of solids both manually and by AutoCAD
		CO3	Draw Engineering curves and develop the lateral surface of solids both manually and by AutoCAD
		CO4	Build orthographic projections, create isometric sketches and identify standard features both manually and by AutoCAD
		CO5	Draft appropriate Electrical and Electronics symbols , with PCB structure and house wiring layouts
18SC2009	OBJECT ORIENTED PROGRAMMING	CO1	Apply the concepts of classes and objects through Java Language
		CO2	Apply access control, Inheritance, Abstract classes
		CO3	Apply Interfaces, Exception Handling, Packages,.

HEAD OF THE DEPARTMENT
Computer Science and Engineering
KLEF, (Deemed to be University)
Green Fields, VADDESWARAM-522 502,
Guntur District, Andhra Pradesh

COURSE CODE	COURSE TITLE	CO. NO	DESCRIPTION OF THE COURSE OUTCOME
		CO4	Apply multi threading, i/o ,collection framework and event driven programming.
		CO5	Practical/Skilling
18CS2111	MICROPROCESSORS	CO1	Understanding 8086 architecture and concepts
		CO2	Apply 8086 instruction set to write ALP
		CO3	Understand 80x86 microprocessors concepts
		CO4	Understand Pentium architecture and microcontrollers
		CO5	Students will be able to apply and analyse 8086 Assembly language programs
18TS303	PLACEMENT TRAINING	CO1	React Native Environment Setup, Learning and applying Core React Native Components
		CO2	Demonstrate concepts of React Native components and apply to provide navigation and to create React Native APIs
		CO3	Applying advanced React Native concepts to build User friendly Apps
		CO4	Getting knowledge about Firebase and developing React Native projects by integrating Firebase with React native
18EC1202	COMPUTER ORGANIZATION & ARCHITECTURE	CO1	Illustrate the functionality of the computer, functional units - control unit, memory unit, the arithmetic and logic unit, design of ALU and different programming languages.
		CO2	Categorize the CPU operations, instruction execution unit, addressing modes and instruction set. Outline the concepts of micro-operations and RTL operations and the concepts of main, cache and virtual memory organizations.
		CO3	Distinguish different types of I/O subsystems and I/O transfer techniques.

HEAD OF THE DEPARTMENT
Computer Science and Engineering
KLEF, (Deemed to be University)
Green Fields, VADDESWARAM-522 502.
Guntur District, Andhra Pradesh

COURSE CODE	COURSE TITLE	CO. NO	DESCRIPTION OF THE COURSE OUTCOME
		CO4	Analyze the design issues of RISC and CISC CPUs and the design issues of pipeline architectures.
18CS2102	OPERATING SYSTEMS	CO1	Understanding the basic algorithms for subsystem components
		CO2	Understand memory and process virtualization
		CO3	Design and solve synchronization problems, and multi-threading libraries
		CO4	Understand persistence concepts
		CO5	Develop application programs using different platforms and languages
18CS2103	SOFTWARE ENGINEERING	CO1	Understand the software development life cycle and associated process models and Reverse Engineering.
		CO2	Illustrate Requirement modeling 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
18CS2204	COMPUTER NETWORKS AND SECURITY	CO1	Outline OSI and TCP/IP reference models and classify the Error control mechanisms like CRC and 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 functionalies of transport layer like TCP Connection management and congestion control.
		CO4	Infer the functionality of DNS, HTTP and SMTP protocols. Apply Encryption algorithms like DES and RSA on the given examples.
18CS2205	DATABASE MANAGEMENT SYSTEMS	CO1	Distinguish centralized computing and distributed computing detailing formal model of a distributed message passing system. The complexity measures of message passing

HEAD OF THE DEPARTMENT
Computer Science and Engineering
KLEF, (Deemed to be University)
Green Fields, VADDESWARAM-522
Guntur District, Andhra Pradesh

COURSE CODE	COURSE TITLE	CO. NO	DESCRIPTION OF THE COURSE OUTCOME
			between systems presenting important abstractions for designing distributed programs
		CO2	Identify the leader by coordinating among processors, elaborating formal models for shared memory system and memory requirement for solving mutual exclusion problem.
		CO3	Utilize DSM model for inter process communication showing relationship between various types of shared objects. Identify clock synchronization problem applying tight bounds to synchronize clocks.
		CO4	Examine the process of realizing reliable fault tolerance in distributed system reflecting the specific type of faulty behavior. Illustrate simulation that makes Byzantine failures appear to be crash failures
		CO5	Experiment with laboratory programs and develop a small project along with his/her team members.
18CS2206	ARTIFICIAL INTELLIGENCE	CO1	Understand the problem, well defined problems and their solutions, Uninformed and Informed search.
		CO2	Game playing with adversarial search. Constraint satisfaction problems
		CO3	Building Knowledge and reasoning :- propositional logics, first order logic, forward and backward reasoning, resolution.
		CO4	Analyzing uncertainty using Bayes theorm, Hidden Markov model and Kalman filters.
		CO5	Solving AI problems in the laboratory
18CS3210	ENTREPRISE PROGRAMMING	CO1	Understanding the basic concepts of JavaScript functions and validation and event handling of dynamic web pages and Apply the fundamentals of JDBC API
		CO2	Build the web applications using Java Servlets and JSP
		CO3	Applying the concepts of Hibernate for an enterprise application development

HEAD OF THE DEPARTMENT
Computer Science and Engineering
KLEF, (Deemed to be University)
Green Fields, VADDESWARAM-522 502.
Guntur District, Andhra Pradesh

COURSE CODE	COURSE TITLE	CO. NO	DESCRIPTION OF THE COURSE OUTCOME
		CO4	Build the enterprise applications using Spring.
		CO5	Develop the programs for enterprise application development.
18CS3211	DATA SCIENCE	CO1	Understand Data science, Exploratory Data Analysis, Data Extraction, Wrangling
		CO2	Understanding Probability and Probability distribution,
		CO3	Analyse the linear and logistic regression *solutions for real world problems*
		CO5	Implementing Data science algorithms using Python
18CS3109	DISTRIBUTED COMPUTING	CO1	Understand basics of distributed systems, various Hadoop components and message passing algorithms.
		CO2	Analyse various leader election algorithms in ring network.
		CO3	Apply clock synchronization techniques in a distributed environment
		CO4	Analyse various read/write registers based on distributed shared memory model.
		CO5	Develop various Hadoop map-reduce programs
18CS2207	ANALYSIS & DESIGN OF ALGORITHMS	CO1	Understand time and space complexity, computation of complexity for problems solvable by divide and conquer technique
		CO2	Apply greedy and dynamic algorithm design methodologies to solve problems.
		CO3	Apply state space tree methods for solving searching problems.
		CO4	Distinguish between P and NP classes of problems and solve complex problems.
		CO5	Analyse and apply suitable design technique to solve given real world problems.

HEAD OF THE DEPARTMENT
Computer Science and Engineering
KLEF, (Deemed to be University)
Green Fields, VADDESWARAM-522 30
Guntur District, Andhra Pradesh

COURSE CODE	COURSE TITLE	CO. NO	DESCRIPTION OF THE COURSE OUTCOME
18CS3108	AUTOMATA THEORY & COMPILER DESIGN	CO1	Understand finite automata, its variations, Regular expressions and Construct FA for different languages and regular expressions.
		CO2	Analyze the role of the Lexical Analyzer and Construct Context Free Grammars for different languages.
		CO3	Define syntax directed definition and translation schemes, and Construct different top-down and bottom-up parsers.
		CO4	Generate intermediate code, target code and apply different code optimization techniques
18TS309	TECHNICAL SKILLING(PFSD+COMP .CODING)	CO5	Analyse and apply suitable design technique to solve given real world problems
18IE2246	INDUSTRIAL TRAINING	CO1	Remember the Engineering Concepts
		CO2	Understand the Process completely
		CO3	Apply the concept of science to solve the case study
		CO4	Analyze the solutions available for the real-world industrial problems
		CO5	use of modern tools to solve industrial tasks and Evaluate the models
18IE3247	TERM PAPER	CO5	An illustration of logic, and in organizing the information on the topic, gathering the data, processing, analyzing, and summarizing.
18IE4048	PROJECT (PART I)	CO5	Btl-3 Project Implementation
18IE4049	PROJECT (PART II)	CO5	Project - II
18IE4050	PRACTICE SCHOOL	CO5	PRACTICE SCHOOL
18IE4051	INTERNSHIP	CO1	Internship
		CO2	Understanding
		CO3	Applying
		CO4	Analyzing

HEAD OF THE DEPARTMENT
Computer Science and Engineering
KLEF, (Deemed to be University)
Green Fields, VADDESWARAM-522 502
Guntur District, Andhra Pradesh

COURSE CODE	COURSE TITLE	CO. NO	DESCRIPTION OF THE COURSE OUTCOME
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 Federal Government as defined by the Indian Constitution
		CO4	To understand the Indian Judicial System and Election System of India.
18UC0010	UNIVERSAL HUMAN VALUES & PROFESSIONAL ETHICS	CO1	Realize and Understand the basic aspiration, harmony in the human being.
		CO2	Envisage the roadmap to fulfill the basic aspiration of human beings.
		CO3	Analyze the profession and his role in this existence.
		CO4	Understand the profession and his role in this existence.
18CS3251S	CLOUD COMPUTING	CO1	Understand cloud computing and NIST reference models
		CO2	Understand the Software as a Service, Platform as a Service and Infrastructure as a Service.
		CO3	Apply and Understand the need of virtualization in cloud and pros and cons of virtualization

HEAD OF THE DEPARTMENT
Computer Science and Engineering
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
		CO4	Apply cloud security mechanisms to enhance the security on cloud premises.
		CO5	implementation of cloud services on open sources tools
18CS3254	ADVANCED OPERATING SYSTEMS	CO1	llustrate the principles and types of Advance Operating Systems
		CO2	Understand the concepts of Mutual exclusion and its protocols of Distributed operating system
		CO3	Analyze the Algorithms in Distributed Deadlock
		CO4	Make use of the protocols of Distributed Fault Handling Systems
		CO5	Build the AOS Concepts of Threads, mutual exclusion and distributed scheduling by Java
18CS3253S	CLOUD SYSTEM INFRASTRUCTURE	CO1	Understand the Cloud Computing Techniques and Virtualization on cloud platforms
		CO2	Analyse and Apply AWS Services
		CO3	Understand Programming, management console and storage on AWS, AWS Security and Compliances and analyse AWS computing and Marketplace
		CO4	Analyse AWS networking and databases and AWS billing and dealing disaster
		CO5	Develop Cloud services using Amazon Web Services
18CS3242	PARALLEL ALGORITHMS	CO1	Understand fundamental principles behind parallel algorithm design and demonstrate the ability to differentiate among interconnection networks models and communication operations
		CO2	Analyze parallel algorithms for sorting and Computational Geometry
		CO3	Design and Analysis of Parallel Computational algorithms

HEAD OF THE DEPARTMENT
Computer Science and Engineering
KLEF, (Deemed to be Univ...)
Green Fields, VADDESWARAM...
Guntur District, And...

COURSE CODE	COURSE TITLE	CO. NO	DESCRIPTION OF THE COURSE OUTCOME
		CO4	Apply parallel algorithms for Graphs and Search problems and analyze its performance
		CO5	Develop parallel algorithms using OpenMP, MPI and OpenCL
18CS3150	ADVANCE COMPUTER ARCHITECTURE	CO1	Understand the 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
18CS3248	EDGE COMPUTING	CO1	Define 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	Determine the Middleware needed for Edge Computing and its Security Requirements
		CO4	Using the Edge/Fog Computing in various real-time projects
18CS3037S	WEB ENGINEERING	CO1	Understand the design of Single-Page App and how Angular facilitates their development.
		CO2	Applying DB operations to store, retrieve, and modify data in the MongoDB NoSQL database
		CO3	Build an HTTP server using the core modules in Node.js and Create modules to organize the server
		CO4	Build an Express Server using Middleware
		CO5	Applying the MEAN concepts to Build full stack application
18CS3038		CO1	Design test cases suitable for a software development for different domains.

HEAD OF THE DEPARTMENT
Computer Science and Engineering
KLEF, (Deemed to be University)
Green Fields, VADDESWARAM
Guntur District, Andhra Pradesh

COURSE CODE	COURSE TITLE	CO. NO	DESCRIPTION OF THE COURSE OUTCOME
	SOFTWARE VERIFICATION & VALIDATION	CO2	Identify 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 test planning based on the document using automatic testing tools.
		CO4	Document test plans and test cases designed
		CO5	Test the software application completely and make it sure that it's performing well and as per the specifications
18CS3230S	CONTINUOUS DELIVERY & DEVOPS	CO1	Introduction to DevOps, Understand the Culture of DevOps and Tools of DevOps with respect to its Life Cycle. Demonstrate continuous integration with Jenkins.
		CO2	Building the Code and Configuring the Build Pipeline. Examine the Examine the Installation and Configuration of Chef.
		CO3	Examine the Installation and Configuration of Docker and Deployment of applications.
		CO4	Analyse the Application Deployment and Build infrastructure applications and orchestrating application deployment
		CO5	Examine and Inspect the Design and Building of Web Based and Open Source Applications of DevOps Life Cycle on Windows and Ubuntu.
18CS3233	UI/UX DESIGN	CO1	Understand 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 UserExperience
		CO5	Designing wire frames using Adobe XD, UXPressia and Whimsical

HEAD OF THE DEPARTMENT
Computer Science and Engineering
KLEF, (Deemed to be University)
Green Fields, VADDESWARAM-522502
Guntur District, Andhra Pradesh

COURSE CODE	COURSE TITLE	CO. NO	DESCRIPTION OF THE COURSE OUTCOME
18CS3131	DESIGN PATTERNS	CO1	Understand how Test Driven Development and Refactoring work in software design and maintenance
		CO2	Understanding Structural and Creational Patterns for effective design of a system
		CO3	Apply Behavioural design pattern and Anti-patterns for system design
		CO4	Understand the design patterns in an object oriented language along with clean coding principles to a real world application.
		CO5	Develop Programs on concepts of Design patterns in JAVA
18CS3236	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	Identify the guidelines that are involved to improve the Configuration, Human Resource time, Communications management aspects in software project management.
		CO5	Utilize GIT BASH and deploy the files to GIT HUB
18CS3166S	MACHINE LEARNING	CO1	Apply Machine Learning Techniques using Decision Trees to solve RealWorld 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

HEAD OF THE DEPARTMENT
Computer Science and Engineering
KLEF, (Deemed to be University)
Green Fields, VADDESWARAM-522 502.
Guntur District, Andhra Pradesh

COURSE CODE	COURSE TITLE	CO. NO	DESCRIPTION OF THE COURSE OUTCOME
18CS3270	SOFT COMPUTING	CO1	Interpret fuzzy logic system
		CO2	Analyze 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
18CS3074S	DEEP LEARNING	CO1	To be able to understand and remember the concepts of Perceptron, Back Propagation, Nesterov Accelerated GD, Stochastic GD, AdaGrad, RMSProp
		CO2	To be able understand auto encoders- and apply Regularization, Denoising, Sparse, Contractive, Vectorial Representation of Words Convolutional Neural Networks, LeNet, AlexNet, ZF-Net, VGGNet, GoogLeNet, ResNet
		CO3	Build RCNN, Fast RCNN, Faster RCNN, LSTMs Encoder Decoder ,Backpropagation Through Time (BPTT)
		CO4	Able to Apply Markov Networks , Markov Chains , Backpropagation Through Time (BPTT), RBM models and Generative Adversarial Networks (GANs)
		CO5	Able to implement neural networks CNN, RNN RBMs, GAN models for real time applications
18CS3167	NATURAL LANGUAGE PROCESSING	CO1	Understand approaches to syntax and semantics in NLP
		CO2	Apply the statistical estimation and statistical alignment models
		CO3	Analyze grammar formalism and context free grammars
		CO4	Apply Rule based Techniques, Statistical Machine translation (SMT), word alignment, phrase-based translation
		CO5	Implementing NLP algorithms using python

HEAD OF THE DEPARTMENT
Computer Science and Engineering
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
18CS3168	PERCEPTION & COMPUTER VISION	CO1	Simplifying and modelling image representation and model
		CO2	Apply image transformation methods
		CO3	Interpret image processing algorithms
		CO4	Build and analyze face detection and recognition algorithms
		CO5	Evaluating and implement computer vision techniques by means of PYTHON and OPENCV
18CS3158	COGNITIVE COMPUTING	CO1	Understand what cognitive computing is, and how it differs from traditional approaches
		CO2	Applying the primary tools associated with cognitive computing
		CO3	Applying cognitive computing concepts
		CO4	Understand the fundamentals of query optimization and database recovery protocols.
18CS3262S	DATA VISUALIZATION	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.
18CS3159	DATA WAREHOUSING & MINING	CO1	Understand stages in building a Data Warehouse
		CO2	Analyze pre processing techniques for data cleansing multi-dimensional modelling techniques
		CO3	Analyze and evaluate performance of algorithms for Association Rules.
		CO4	Analyze Classification and Clustering algorithms
		CO5	Evaluate mining techniques like classification, clustering and association rules on data objects

HEAD OF THE DEPARTMENT
Computer Science and Engineering
KLEF, (Deemed to be University)
Green Fields, VADDESWARAM-522 502
Guntur District, Andhra Pradesh

COURSE CODE	COURSE TITLE	CO. NO	DESCRIPTION OF THE COURSE OUTCOME
18CS3065S	BIG DATA ANALYTICS	CO1	Understand the concepts of big data, Initial exploration of analysis of data and Data visualization.
		CO2	Understand Initial exploration of data and advanced data analytics by using R
		CO3	Apply advanced algorithms & Statistical modeling 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	Build and Evaluate the Big Data Analytical problems using R, Hadoop, HIVE Programming concepts.
18CS3064	BIG DATA OPTIMIZATION	CO1	Understand optimization methods and analytics using R programming
		CO2	Apply blind search and local search methods for solving optimization problems
		CO3	Analyze and compare population-based search methods for solving real world problems
		CO4	Analyze applications of genetic programming to solve problems like Travelling Salesman Problem
		CO5	Implement optimization algorithms using R Programming
18CS3260	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	Python for graph and web analytics

COURSE CODE	COURSE TITLE	CO. NO	DESCRIPTION OF THE COURSE OUTCOME
18CS3158	ADVANCE DATABASES	CO1	Understand the fundamentals of query optimization and database recovery protocols.
		CO2	Analyze emerging database technologies and distributed databases.
		CO3	Discriminate object oriented and relational database systems.
		CO4	Analyze multimedia databases.
18CS3175S	CRYPTANALYSIS & CYBER DEFENCE	CO1	Understand the principles of cryptography by analyzing various attacks and apply different classic encryption techniques.
		CO2	Understand the principles of block cipher and apply algorithms like DES, AES.
		CO3	Understand and apply different algorithms of public key crypto system for ensuring secured communication and authentication.
		CO4	Understand the concept of elliptic curve and its applications to cryptography. Apply hash algorithms for security.
		CO5	Implement various cryptographic algorithms so as to analyze the achievability of security goals like Confidentiality, integrity, authentication and also Justify the possibility of cryptanalysis attack with each algorithm.
18CS3279	NETWORK SECURITY	CO1	Apply security concepts Message Authentication code, digital signature schemes and issues in Symmetric Key Distribution to handle attacks.
		CO2	Apply directory service, Hardware procedures for digital certificate and techniques of user authentication.
		CO3	Apply the standardization schemes to maintain security in Web Commerce.
		CO4	Apply the security concepts in Email and IP.
		CO5	Apply Security concepts and analyse their performance using networking tools.
18CS3176S	DIGITAL FORENSICS	CO1	Apply Forensic Science and Digital Forensics
		CO2	Apply OS and File System Forensics
		CO3	Analyze Digital Evidence and Network Forensics

HEAD OF THE DEPARTMENT
Computer Science and Engineering
KLEF, (Deemed to be University)
Green Fields, VADDESWARAM-522 502
Guntur District, Andhra Pradesh

COURSE CODE	COURSE TITLE	CO. NO	DESCRIPTION OF THE COURSE OUTCOME
		CO4	Analyze Web Forensics and Mobile Device Forensics
		CO5	Implement the concepts of Digital Forensics
18CS3278	DATABASE & SYSTEMS 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
18CS3084	BLOCKCHAIN & CRYPTO CURRENCIES	CO1	Understand needs of Cryptographic Hashes for Bitcoin and its concepts.
		CO2	Recognizing the significance of Bitcoin and apply different consensus algorithms for cashless transactions.
		CO3	Understand the components of Blockchain and recognize the need for Hyperledger Fabric.
		CO4	Understand the different applications and analyzing the need of Blockchain Security.
		CO5	Creation of Merkle trees, block chain, Wallet structure, address structure
18CS3281	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
18CS3140S	PROGRAMMING FOR GAME DEVELOPMENT	CO1	Illustrate the concepts of Game design and development.

HEAD OF THE DEPARTMENT
Computer Science and Engineering
KLEF, (Deemed to be University)
Green Fields, VADDESWARAM-522 502
Guntur District, Andhra Pradesh

COURSE CODE	COURSE TITLE	CO. NO	DESCRIPTION OF THE COURSE OUTCOME
		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
18CS3233	UI/UX DESIGN	CO1	Understand 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 UserExperience*
		CO5	Designing wire frames using Adobe XD, UXPressia and Whimsical
18CS3286S	AR & VR APPLICATION DEVELOPMENT	CO1	To understand Basics of Augmented Reality and Interactions. Fundamentals of Augmented , Mixed Reality and its features
		CO2	To understand Basics of Virtual Reality and Interactions. Fundamental Concept and Components of Virtual Reality
		CO3	To apply AR/VR on android applications, Creating a sample augmented and virtual 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

HEAD OF THE DEPARTMENT
Computer Science and Engineering
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
18CS3287	DIGITAL MEDIA PROCESSING	CO1	Understand the concept of Digital Media Processing & Algorithms, Embedded systems and Applications
		CO2	Analyse and simulating widely used image processing tools
		CO3	Analyze the concept of Digital Speech and Audio Processing
		CO4	Create and apply the concept Digital Video Processing
		CO5	Apply embedded processing applications using MAT Lab tool
18CS3288	PRINCIPLES OF GAME DESIGN	CO1	Understanding Video Games and Design Components
		CO2	Discuss Game Concepts and its world
		CO3	Illustrate Story telling Character and user interface Design
		CO4	Analyze the Game Play its mechanics and balancing
18CS3289	BUSINESS OF GAMES & ENTREPRENEURSHIP	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 fundamentals of game production and teamwork with foundation in some of the project management tools and techniques
		CO3	Discover presentation skills and how to best position it or to get a job or interest people in the project.
		CO4	Understand and Explore the skills required to be an entrepreneur and know the rules and regulations to start a company
18EM3110	FUNDAMENTALS OF INTERNET OF THINGS	CO1	Develop applications using MCU and interfacing LED, Buzzers

HEAD OF THE DEPARTMENT
Computer Science and Engineering
KLEF, (Deemed to be University)
Green Fields, VADDESWARAM-522 502
Guntur District, Andhra Pradesh

COURSE CODE	COURSE TITLE	CO. NO	DESCRIPTION OF THE COURSE OUTCOME
		CO2	Develop applications using MCU and interfacing LCD, DC motor
		CO3	Develop applications using MCU and communicate the data form serial window to MCU
		CO4	Develop applications using MCU and transfer the data to the cloud
18SC3108	IOT TECHNICAL SKILLS	CO1	Develop applications using MCU and interfacing LED, Buzzers
		CO2	Develop applications using MCU and interfacing LCD, DC motor
		CO3	Develop applications using MCU and communicate the data form serial window to MCU
		CO4	Develop applications using MCU and transfer the data to the cloud
18EM3107	IOT SENSING AND ACTUATING DEVICES	CO1	Understand the role of sensor and actuators in real time aspects and Analog and Digital Actuators.
		CO2	Analyse the role of signal conditioning circuits and Impedance Matching circuits
		CO3	Understand different generation of sensors for the development of IoT based Networks
		CO4	Analyze the role of different Energy sources and power management in IoT
		CO5	IoT application with sensors and actuators
18CS3285S	CLOUD COMPUTING FOR IOT ENGINEERS	CO1	Introduction to cloud computing: Definition, architecture, deployment models, characteristics, and Cloud Storage. Evolution of cloud, services, projects and challenges, Cloud provider, SAAS, PAAS, IAAS and Others, Organizational scenarios of clouds, Administering & Monitoring cloud services, benefits, and limitations, Comparison among SAAS, PAAS, IAAS. IoT Complete Architectural Stack – IoT enabling Technologies – IoT Challenges.

HEAD OF THE DEPARTMENT
Computer Science and Engineering
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
		CO2	Storage Cloud Virtualization: Introduction to virtualization, concept, and properties of virtualization, CPU virtualization, memory virtualization, I/O virtualization, storage virtualization working with cloud-based storage, Exploring Cloud Backup Solutions, Cloud Storage Interoperability.Sensors and Hardware for IoT : A Case study with any one of the IOT boards and data acquisition from sensors.
		CO3	Introduction to AWS, benefits of AWS, AWS services, Creating an AWS Account, Storing data in the cloud: Concept of an object store, Amazon S3, Backup data, Storing objects programmatically. Using S3 for static web hosting, Internals of the object store. Protocols for IOT: A Case Study with MQTT/CoAP usage-IoT privacy, security and vulnerability solutions
		CO4	"IoT / Cloud Convergence -Infrastructure-as-a-Service (IaaS) IoT/Clouds: improving performance through load balancing, system and storage redundancy, cloud based NAS devices, Rackspace IaaS , Platform-as-a-Service (PaaS): Characterises for PaaS, benefits of PaaS solutions, NetSuite as a PaaS IoT/Clouds, Software-as-a-Service (SaaS) IoT/Clouds: understanding multitenant nature of SaaS Solutions, open SaaS solutions, carbonate SaaS for data backup. Case studies with architectural analysis: IoT app
		CO5	Able to design and implement the communication between IoT device and cloud (AWS).
18EM4108	INTERNET OF THINGS: ARCHITECTURES AND PROTOCOLS	CO1	To Understand the Architectural Overview of IoT
		CO2	To Understand the IoT Reference Architecture and Real World Design Constraints
		CO3	To Apply the various IoT Protocols in Datalink and Network layers
		CO4	To Apply the various IoT Protocols in Transport and Session Layers
		CO5	Laboratory
18EM4109	WIRELESS SENSOR NETWORK	CO1	Understand the concepts of Wireless sensor networks, challenges, and limitations of wireless sensor networks

HEAD OF THE DEPARTMENT
Computer Science and Engineering
KLEF, (Deemed to be University)
Green Fields, VADDESWARAM-522 502
Guntur District, Andhra Pradesh

COURSE CODE	COURSE TITLE	CO. NO	DESCRIPTION OF THE COURSE OUTCOME
		CO2	Understand the MAC layer protocol for energy-efficient design of WSN
		CO3	Analyze the data dissemination and gateway concepts in WSN
		CO4	Understanding the concept of time synchronization, Localization, and positioning in WSN
		CO5	Development of different application using wsn concepts
18EM4201	SECURITY IN INTERNET OF THINGS	CO1	Understand the security requirements of IoT
		CO2	Understand the cryptographic fundamentals for IoT
		CO3	Understand the privacy and trust models for IoT
		CO4	Analyse various Cloud IoT Security controls
		CO5	Demonstration of experiments on various crypto algorithms and cryptanalysis in Internet of Things
18CS3248	EDGE COMPUTING	CO1	Define 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	Determine the Middleware needed for Edge Computing and its Security Requirements
		CO4	Using the Edge/Fog Computing in various real-time projects
18CS40A6	FUNDAMENTALS OF D B M S	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.

HEAD OF THE DEPARTMENT
Computer Science and Engineering
KLEF, (Deemed to be University)
Green Fields, VADDESWARAM-522 3...
Guntur District, Andhra Pradesh

COURSE CODE	COURSE TITLE	CO. NO	DESCRIPTION OF THE COURSE OUTCOME
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
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	Undestanding 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

HOD-CSE

HEAD OF THE DEPARTMENT
Computer Science and Engineering
KLEF, (Deemed to be University)
Green Fields, VADDESWARAM-522 502
Guntur District, Andhra Pradesh