



Koneru Lakshmaiah Education Foundation

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

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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 Internet of Things

Program: B.Tech -Internet of Things

Academic Year:2021-2022

COURSE CODE	COURSE NAME	CO NO	Description of the Course Outcome
20UC1101	Integrated Professional English	CO1	Understand the concepts of grammar and to improve communication skills in reading and writing.
		CO2	Demonstrate the ability in interactive skills of speaking and writing that are better suited for the corporate environment.
		CO3	Understand various strategies of reading and use them in interpreting the text.
		CO4	Apply the concepts of writing to draft corporate letters, emails and memos, reports, etc.
20UC1202	English Proficiency	CO1	Demonstrating different interpersonal skills for employability
		CO2	Distinguishing business essential skills
		CO3	Classifying social media and corporate communication skills
		CO4	Applying analytical thinking skills
21UC2103	Essential Skills for Employability	CO1	Identify and organize sentence structures based on grammar
		CO2	Illustrate specific writing styles
		CO3	Relate intra-personal skills
		CO4	Interpret interpersonal Skills for developing oral communication
21UC2204	Corporate Readiness Skills	CO1	Extend word power for developing effective speaking and writing skills
		CO2	Differentiate critical and general reading skills
		CO3	Interpret inter personal skills
		CO4	Demonstrate necessary skills to be employable
21UC0010	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
20UC0007	Indian Heritage and Culture	CO1	Familiarizing students with various aspects of Indian culture and how they contribute to the concept of Unity in Diversity

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		CO2	Understand the beginnings of Indian History and the developments during the Ancient period
		CO3	Understand the developments in India during the Medieval Age along with how they contributed to Indian civilization
		CO4	Understand the reasons for colonial rule over India and how independence was achieved from British rule
20UC0008	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 commission of india
20UC0009	Ecology & Environment	CO1	Understanding the importance of Environmental education and conservation of natural resources
		CO2	Understanding the Ecosystems, biodiversity
		CO3	Understand global Environmental issues, pollution
		CO4	Understand the knowledge on solid waste management, disaster management and EIA process
21UC0011	Gender Sensitization	CO1	Develop a better understanding of important issues related to gender in contemporary India
		CO2	Sensitize to basic dimensions of the biological, sociological, psychological and legal aspects of gender.
		CO3	Attain a finer grasp of how gender discrimination works in our society and how to counter it.
		CO4	Acquire insight into the gendered division of labor and its relation to politics and economics.
20MT110 1	Mathematics for Computing	CO1	Model a system of equations for real world applications in engineering, physical and biological sciences, computer science, finance, economics and solve them through matrix algebra
		CO2	Model basic and computational techniques on discrete structures like relations, orders, functions & FSM, Lattices, and propositional & predicate logic
		CO3	Model real world structures and their related applications using advanced discrete structures like graphs and trees.
		CO4	Model the given Statistical data for real world applications in Engineering science, Economics and Management.
		CO5	Demonstrate the Aptitude and Reasoning skills (Tests in skilling hours)


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21MT210 2	Mathematics for Engineers	CO1	Apply differential and integral calculus to find maxima & minima of functions, evaluate the integrals and solve the differential equations.
		CO2	Demonstrate the Fourier series and Laplace transforms.
		CO3	Describe probability, Random Variables
		CO4	Explain complex variables, analytic functions and introduction to stochastic process and Algebraic structures.
21MT310 1	Probability and Statistics	CO1	understand the terminologies of basic probability, two types of random variables and their probability functions
		CO2	observe and analyze the behavior of various discrete and continuous probability distributions
		CO3	understand the central tendency, correlation and correlation coefficient and also regression
		CO4	apply the statistics for testing the significance of the given large and small sample data by using t-test, F-test and Chi-square test
		CO5	Implement probability and statistics using R language
21UC1203	Design Thinking and Innovation	CO1	Understand the importance of Design thinking process for contextualized problems
		CO2	Analyze, define, and ideate for solutions
		CO3	Develop and test the prototype made
		CO4	Explore the fundamentals of entrepreneurship skills for transforming the challenge into an opportunity
21CY1001	Science Elective - 2(Engineering Chemistry)	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	Examine water quality and select appropriate purification technique for intended problem
		CO4	Explain the role of chemical kinetics in the formation and destruction of ozone in the atmosphere and predict the connection between molecular behavior and observable physical properties.
		CO5	An ability to analyze and generate experimental skills
21UC3105	Problem Solving Skills-I	CO1	Apply the concepts of mathematical principles besides logic and identifying certain basic mathematical formulae to solve these kinds of problems
		CO2	Formulate the concepts of mathematical principles of equations that contain the data related to real life situations which requires basic logic to


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			analyze
		CO3	Solve concepts of Venn diagrams and number patterns and illustrate logic behind connectives, series, and analogies respectively
		CO4	Differentiate assumptions and arguments in critical reasoning
21UC3206	Problem Solving Skills-II	CO1	Implement problem solving ability through analyzing the given data and formulate solutions for real world problems based on time, travel and wages
		CO2	Determine the fundamental concepts of areas, volumes and derive solutions using simple mathematical principles besides interpreting the data through smart tricks to check the number analytics
		CO3	Estimate inductive reasoning, to categorize the rules-set from a given list of observations and relate them to predict the conclusions according to the given conditions
		CO4	Integrate verbal and non-verbal reasoning and to identify the logic behind the given arrangement based on the given conditions to bring out the possible outcome
21SC1101	Computational Thinking for Structured Design	CO1	Design Basic and Complex Building Blocks for real world problems using structured programming paradigm
		CO2	Translate computational thinking into Logic Design for Solving real world
		CO3	Apply and Analyse CRUD operations on Basic Data Structures using Asymptotic Notations
		CO4	Apply and Analyse CRUD operations on Linear Data Structures using Asymptotic Notations.
		CO5	Apply the structured programming paradigm with logic building skills on Basic and Linear Data Structures for solving real world problems
		CO6	Skill the students in such a way that students will be able to develop logic that help them to create programs as well as applications in C
20EC1101	Digital Logic & Processors	CO 1	Understand numerical and character representations in digital logic,number system, data codes and the corresponding design of arithmetic circuitry. Understanding Logic gates, Logic theorems, Boolean algebra and SOP/POS'S expressions.
		CO 2	Combinational systems design using standard gates and minimization methods
		CO 3	Sequential systems: Design of counters using flip flops.
		CO 4	Understanding PLA's, PAL's, FPGA's, and processors


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		CO5	Analysing and realization of Boolean functions, half adder, encoders, decoders, flip flops, and counters.
20ME110 3	Design Tools Workshop	CO 1	Practice design thinking by developing artistic skills, Visualize and complete his/her innovative design by final drafting using 3D modelling
		CO 2	Understand the concept of web page, web browser, web server, and able to create Static webpages
		CO 3	Understand the concept of report writing using a markup language Latex
		CO 4	Understand the concept of data visualization and creating data visualization dashboards, Understand the basic concept of VR/AR
21SC1209	Design Tools Workshop – II	CO1	Practice the design ideology by 3D printing, 3D scanning techniques
		CO2	Visualize the design ideology by incorporating VR technique and VR technology, Visualize and present his design idea by applying AR technique and Hologram
		CO3	Practice of PCB technology
		CO4	Practice of Arduino based skill with different interfaces
21SC1202	Data Structures	CO1	Understand various sorting algorithms and analyze the efficiency of the algorithms
		CO2	Implement Linear Data Structures and Demonstrate their applications.
		CO3	Understand hashing techniques and Implement tree data structures.
		CO4	Understand graph data structures and apply graphs to solve problems
		COS	Develop and evaluate common practical applications for linear and nonlinear data structures.
21EC1202	Computer Organization & Architecture	CO1	Understand the functionality of CPU functional units - control unit, registers, the arithmetic and logic unit, instruction execution unit
		CO2	Understand the concepts of CPU and the operation of main, cache and virtual memory organizations
		CO3	Understand the concepts of the different types of I/O modules and I/O transfer techniques in computer modules
		CO4	Apply the concept of pipelining in instruction execution and design issues of RISC, CISC and parallel computing architectures
21EL2102	Object Oriented Programming	CO1	Understand basic Concepts of OOP, and apply the concepts of classes and objects through Java
		CO2	Apply access control, Inheritance, Packages.
		CO3	Apply Interfaces, Exception Handling, multi-threading, I/o.
		CO4	Apply collection framework and event driven programming.
		CO5	Apply object-oriented programming concepts to write programs and Analyses requirements and design to implement lab-based project with SDLC in a group of students.


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21EC1203	Design of Basic Electronic Circuits	CO1	Understand the basic electronic components.
		CO2	Understand the basic circuit analysis techniques
		CO3	Understand the active circuit elements and working.
		CO4	Analyse the applications of semiconductor devices
21EC2104	Electronic Devices & Circuit Design	CO1	Understand the BJT operations and a circuit function.
		CO2	Understand the FET operations and circuit functions
		CO3	Understand the Op.-Amp operations and circuit functions
		CO4	Understand the Op-Amp filters and Oscillator circuit functions
21EC2208	Analog and Digital Communication	CO1	Apply the Design concepts of linear and non linear modulation systems
		CO2	Apply different digital modulation Systems.
		CO3	Apply various line coding procedures and signalling schemes to facilitate data communications
		CO4	Analyze different multiple access schemes and different types of networks.
		CO5	Design and analyze analog and digital communication circuits through project-based learning using modern tools.
21IN2101	Processors and Controllers	CO1	Apply knowledge and demonstrate programming proficiency using the various addressing modes and instructions of 8086 microprocessor for the basic mathematical operations
		CO2	Apply knowledge and demonstrate programming proficiency using the various addressing modes and instructions of 8051 microcontroller for basic programs
		CO3	Develop systems by applying the Programming concepts of interfacing the peripheral devices to 8051
		CO4	Apply the concepts of ARM 7 microcontrollers to design basic embedded systems.
		CO5	Analyse the applications of 8051 microcontrollers(S/W&H/W) through Programming and interfacing of various peripherals and Programming of 8086 microprocessor(S/W).
21IN2201	Embedded Systems Design	CO1	Understand the architecture and programming concepts of 8086 Microprocessor
		CO2	Apply the Programming concepts of 8051 Microcontroller
		CO3	Analyse the Interfacing of Peripherals to the 8051 microcontrollers through programming. Understand the basic architectures of PIC and ARM 7 microcontrollers
		CO4	Understand the basic concepts of CORTEX STM-32 microcontroller and RTOS
		CO5	Analyze the applications of programming with 8051 and 8086 on hardware / software. Analyze the applications of programming with Arduino
21EL2203	Database Management Systems	CO1	Illustrate the functional components of DBMS and Design an ER Model for a database.
		CO2	Design a relational model for a database & Implement SQL concepts and relational algebra.


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		CO3	Implement PL/SQL programs, normalization techniques, indexing to construct and access database
		CO4	Analyze 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.
		CO6	Design and query database using database programming skills
21IN2102	Sensors and Actuators	CO1	Apply fundamental principles of sensing technology
		CO2	Apply principles of the various micro sensors and implementation techniques
		CO3	Apply various working principles of actuator and their classifications
		CO4	Apply Practical knowledge with sensor and actuator Interfacing with Microprocessor/controller to build electronic system.
		CO5	Design and develop systems with different sensors and actuators for real-world applications.
21IN3201	Internet Programming and Web Technologies	CO1	Create Static Web pages using basic HTML & apply CSS
		CO2	Apply JavaScript features for form validations and event handling
		CO3	Create databases using MYSQL and apply JDBC concepts to connect to a database
		CO4	Create dynamic web pages using servlets & JSP
		CO5	Design WEB pages considering the user interface, navigation, and interaction with the database
		CO6	Create Web Applications for real-time problems by providing UI and database accessibility.
21IN2203	Data Science and Data Analytics	CO1	Understand Data Science, Exploratory Data Analysis, Data Extraction, Wrangling, Examine the inference from Exploratory data analysis (EDA)
		CO2	Demonstrate by organizing, comparing visualization and simple metrics
		CO3	Demonstrate by organizing comparing visualization and simple metrics
		CO4	Applying Variance, covariance, and correlation on Data Science
		CO5	Implementing Inferential Statistical Analysis
		CO6	Design & Development of various AI & ML Algorithms on Real-Time Applications
21IN2202	IoT Principles & Architecture	CO1	Apply the concepts of IoT Architecture and technologies
		CO2	Apply the logical design of IoT system and communication technologies.
		CO3	Apply IoT networking protocols and Authentication Protocols for IoT Application layer.
		CO4	Apply IoT protocols and programming concepts for real-world problems.


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		CO5	Analyze the diverse application of diverse case studies
21EC2107	AI, ANN Tools and Applications	CO1	To understand the basics of Probability, statistics and its Applications.
		CO2	To Emphasis on the applications and tools of AI
		CO3	To apply the concepts of AI searching techniques and ANN models
		CO4	To Implement AI and ANN Models for real time problems
		CO5	Skill based practice
21IN3101	Cloud Computing for IoT	CO1	To understand the cloud computing services, deployment models, enabling technology and architecture
		CO2	understand and apply different cloud infrastructures virtualization and storage in different virtualization
		CO3	Analyze the concept of Data security and privacy in virtual machine
		CO4	Analyze the different case studies on healthcare, agriculture, and parking system
		CO5	To analyze and integrate sensors reading values and uploading to Azure.
21EC2210	Data Networks & Protocols	CO1	Introduction to Computer networks and Data Link Layer
		CO2	Network layer and Internetworking
		CO3	Transport layer, Session Layer, Presentation Layer and Application Layer
		CO4	Advanced Topics: Cryptography, Advancements in Application layer, Wireless LANs, Network Security
21SC1204	OBJECT ORIENTED PROGRAMMING	CO1	Understand basic Concepts of OOP, and apply the concepts of classes and objects through Java
		CO2	Apply access control, Inheritance, Packages.
		CO3	Apply Interfaces, Exception Handling, multi-threading, I/o.
		CO4	Apply collection framework and event driven programming.
		CO5	Apply object-oriented programming concepts to write programs and Analyses requirements and design to implement lab-based project with SDLC in a group of students.
21AD310 4R	Deep Learning	CO1	Able to understand and remember the concepts of Perception, Back Propagation, PCA, Singular Value Decomposition
		CO2	Able to understand auto encoders- and apply Regularization, Denoising, Sparse, Contractive, Vectoral Representations of words Convolutional Neural Networks, LeNet., VGGNet, GoogleNet, ResNet, Fast RCNN, Faster RCNN, YOLO


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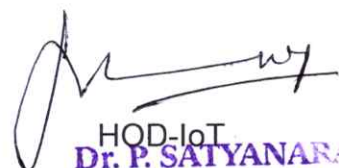
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		CO3	Apply Long Short-Term Memory (LSTM) Restricted Boltzmann Machines, Deep Dream, GRU, Neural style transfer, Deep learning for computer vision, text and sequences.
		CO4	Build Markov models, Markov networks, Markov chains, Variational autoencoders, Autoregressive Models: NADE, MADE, PixelRNN, Generative Adversarial Networks (GANs), how to train DCGAN, limitations of deep learning
		CO5	Implement basic Neural Networks, optimization algorithms, engine vector decomposition, various types of auto encoders, batch normalization, convolutional neural networks
21IN3121	INDUSTRIAL IOT	CO1	Apply the theory and practice related to Industrial IoT Systems
		CO2	Identify, formulate, and solve engineering problems by using Industrial IoT
		CO3	Design and analysis of Cyber-Physical System
		CO4	Implement real field problems by gaining knowledge of Industrial applications with IoT capability.
21CS3253 R	EDGE COMPUTING	CO1	Describe the Edge/Fog Computing and infer the opportunities and application
		CO2	Examine the Architecture of Edge Computing and explore the issues that are being addressed by the industry
		CO3	Interpret the Security Requirements for Edge Computing and its Middleware needed
		CO4	Analyze the applicability and need for Edge/Fog Computing in various real-time projects
		CO5	Implementaion of sensor based IOT applications
21EL3216	Big data Analytics	CO 1	Ability to find and transmit data emanated from different embedded and IoT devices
		CO 2	Ability to use HADOOP and MAP reduce tools in the process of undertaking Analytics
		CO 3	Ability to develop data Modelling, Structuring, and Analytics using "R" Language
		CO 4	Ability to conduct various kinds of analytics on big data especially using text
21IN3224	DATA ANALYTICS AND VISUALIZATION	CO1	Apply the Data Visualization tools to data using Excel and the associated concepts.
		CO2	Apply the Data Visualization tools to data using R and the associated concepts
		CO3	Analyze by applying the Data Visualization tools using Tableau and the associated concepts.
		CO4	Analyze by applying the Data Visualization for various management situations.

Academic Professor I/C


HOD-IoT

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