



# 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  
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## Department of Artificial Intelligence & Data Science

Program: B.Tech – AI & DS


Academic Year :2022-2023

Course Code	Course Title	CO NO	Description of the Course Outcome
23AD3211	Cloud Computing	CO1	Employing and relate the features of Scalable Computing and System models for Distributed and Cloud Environment
		CO2	Operating and Applying Implementation levels of Virtualization mechanisms in Distributed and Cloud Environment
		CO3	"Choosing and Sketch out Estimate Service models and Architectural Design for Resource management in Distributed and Cloud Environment "
		CO4	"Interpreting and demonstrating Ubiquitous feature in Cloud environment and Cloud Software Programming Environments "
23AD2211	Cryptography and Security	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.
22AD2226	Image and video processing	CO1	Interpret Fundamentals of Image processing and Image Transforms
		CO2	Analyze various Image Processing Techniques
		CO3	Analyze various basic Steps of Video Processing
		CO4	illustrate different 2-D Motion Estimation techniques
		CO5	Demonstrate various image and video processing tools
23CS3273RA	Natural Language Processing	CO1	Understand and apply 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	Analyze Rule based Techniques, Statistical Machine translation (SMT), word alignment
		CO5	Inspect and Evaluate Language Processing Methods using python
23AD3113	Real Time Operating System	CO1	Describe the Basics Of Real-Time Concepts- Architecture, RTOS building blocks
		CO2	Illustrate various CPU scheduling algorithms and Thread concepts apply synchronization algorithms for solving the complex Engineering problems. Illustrate the Inter Process
		CO3	Illustrate the Inter Process Communication and Pipes Memory Management
		CO4	Demonstrate the case studies and Kernel Design Issues


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		CO5	"Develop knowledge and practical skills through case studies of various RTOS."
23AD2223	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
23AD3207 R/A/P	Data Science Visualization	CO1	Understand Data science, data collection, and data preprocessing
		CO2	Applying descriptive statistical sampling techniques to explore the various real world data sets
		CO3	Build data wrangling models with data science libraries like NumPy and Pandas with data science libraries like NumPy and Pandas
		CO4	Applying various data visualization tools to explore the data
		CO5	Implement various data science and visualization techniques to real world problems using python
22UC0009	Ecology & Environment (EE)	CO1	Define to articulate basic understanding of the importance of Environmental education and conservation of natural resources. conservation of natural resources and Energy resources.
		CO2	Understand concepts of ecosystems and learn methods for conservation of habitats and biodiversity.
		CO3	Identify critically about individual roles in prevention of pollution. An Environmental Studies will be enabled to do independent research on human interactions with the environment
		CO4	Recognize the knowledge on environmental legislation, disaster management and EIA process
OEAD0003	MEDICAL DATA ANALYTICS	CO1	To Understand principles and concepts of medical data analytics, including the types of data used, data pre-processing techniques, and statistical and machine learning algorithms
		CO2	To formulate statistical and machine learning techniques to analyze medical data, including exploratory data analysis, hypothesis testing, regression and classification, clustering, and deep learning
		CO3	To Understand the Usage of electronic health records and clinical decision support systems to inform healthcare decisions and improve patient outcomes
		CO4	To Understand the ethical and legal issues related to medical data analytics, including data privacy and security, informed consent, and regulatory compliance
23AD3206R/P/A	Big Data Analytics	CO1	Illustrate the concepts of big data, Initial exploration of analysis of data and Data visualization.
		CO2	Apply 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.
22CS2205 A/R	DESIGN & ANALYSIS OF ALGORITHMS	CO1	Apply concepts of mathematics to find space and time complexities of various algorithms including string matching algorithms
		CO2	Analyze the problems that can be solved by using Divide and Conquer and Greedy Method
		CO3	Analyze the problems that can be solved by using Dynamic Programming and backtracking

  
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		CO4	Analyze the problems that can be solved by using Branch and Bound and NP-Hard Graph problems
		CO5	Analyze the various design techniques to solve any real- world problems.
23AD2121	DATABASE MANAGEMENT SYSTEMS	CO1	Illustrate the functional components of DBMS and Design an ER Model for a database
		CO2	Design a relational model for a database & Implement SQL concepts and relational algebra.
		CO3	Implement PL/SQL programs, normalization techniques, indexing to construct and access database
		CO4	Analyze the importance of transaction Processing, concurrency control and recovery techniques.
		CO5	Mongo DB: Introduction to NOSQL, CURD- INDEXING,AGGREGATE. Distributed database: Replication, Sharding, Performance analysis.
		CO6	Develop a database and implement SQL queries and PL/SQL programs to do various operations on data.
23AD3105 R/A/P	DEEP LEARNING	CO1	Apply optimization algorithms to solve neural networks
		CO2	Apply CNN model and its variants to real time data
		CO3	Able to apply Sequence models -RNN & LSTM
		CO4	construct the attention networks and Generative Neural models
		CO5	Implement basic Neural Networks, optimization algorithms, various types of auto encoders, batch normalization, convolutional neural networks , RNN and LSTM
		CO6	Implement Deep learning case studies using keras and pytorch
22AD3206 R/A/P	Data Science & Visualization	CO1	Understanding data science, data collection, and data pre-processing
		CO2	Applying descriptive statistical sampling techniques to explore the various real world data sets
		CO3	Build data wrangling models with data science libraries like numpy and pandas
		CO4	Applying various data visualization tools to explore the data
		CO5	Implement Various Data Science and Visualization Techniques to Real World Problems using Python
22AD2203A/R/P	Datawarehousing and Data Mining	CO1	Illustration of Warehouse & Mining, ETL, OLAP & OLTP, Data Cube Operations and Data Warehouse architecture control mechanism.
		CO2	Demonstration of Data Preprocessing through different methods
		CO3	Apply Different Classification Algorithms to Segregate Input data into different class levels and find out Hidden relationship between transactional dataset using Association Rule Mining
		CO4	Build different Clustering Models using the predefined dataset.
		CO5	"Implementation of warehousing and mining algorithms using suitable tools and programming languages "
22AD2102	INTRODUCTION TO AI AND DS	CO1	Understand the concepts of intelligent agents and various search algorithms, to solve real- world problems.
		CO2	Analyse satisfaction problems, discover knowledge using logic, and analyse reasoning techniques to make informed decisions in uncertain environments.
		CO3	Classify various Machine Learning algorithms, Examine CNN and Deep Learning techniques
		CO4	Contrast various Data Visualization Techniques, Analyse Data analytics techniques, Discover the insights from complex datasets.
		CO5	Evaluate performance measures, different types of data analytics including descriptive, diagnostic, predictive and prescriptive analytics
		CO6	Examine AI for Data science lab in the python environment.
23AD2209P	Machine Learning	CO1	Understand the basic concepts of machine learning


  
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		CO2	"Build SVM Algorithm for solving Classification and Prediction problems
		CO3	Apply Ensemble methods to solve classification problem
		CO4	Analyze different categories of clustering algorithms
		CO5	Evaluation of EM based and Reinforcement learning models
		CO6	"Implement Machine Learning Techniques using python language
		CO7	Develop machine learning applications using using Python Language using Python Language
23EC2210 R/A/P	Network Protocols and Security	CO1	Apply the knowledge of Communitiation to analyze different network topologies
		CO2	Analysis of Network layer protocols and Routing algorithms
		CO3	Analysis of Trasport Layer protocols and Congestion control techniques
		CO4	Analysis of different cyber security attacks and
		CO5	Analyze different Enterprise Network protocols
		CO6	Analysis of different protocols with different topologies in networks
		CO7	Analysis of different enterprise network protocols using Cisco Packet Tracer
22MT2103 R/A	PROBABILI TY, STATICTICS & QUEUEING THEORY	CO1	To understand the importance of probabilistic concepts in a wide spectrum of problems arising in engineering applied science.
		CO2	To formulate the real world problems in terms of random processes using multivariate distribution functions
		CO3	To understand the role of Statistical tests of signficance in stochastic process
		CO4	To formulate Stochastic process in terms of Markov chains and solve problems in queueing systems, and networks
23CI2001	ADAPTIVE SOFTWARE ENGINEER ING	CO1	Understand the fundamental concept of software and software engineering, as well as the nature of the process, including numerous software models with reverse engineering.
		CO2	Apply the demands of users and which methodology will be best suited to meet those needs. They can employ extreme software models to elicit and validate the user's needs. They can also use agile methodologies to design and develop project-based softwares
		CO3	Apply various software methodologies of Scrum, Kanban and SAFe Methodology for developing user-friendly software and also they can able to analyse various software projects by using project Monitoring Tools such as JIRA, Design Patterns - Architectural Patterns - Model Driven Architecture.
		CO4	Analyze numerous testing methodologies for testing diverse software, as well as risk management, project planning, and estimating in order to design and analyse any software project.
22AD2107 R/A/P	Data Driven Artificial Intelligent Systems	CO1	Understand and apply the concepts of intelligent agents and various search algorithms, to solve real-world problems.
		CO2	Analyse satisfaction problems, discover knowledge using logic, and analyse reasoning techniques to make informed decisions in uncertain environments
		CO3	Apply and analyse various Machine Learning algorithms, Examine CNN and Deep Learning techniques
		CO4	Apply various Data Visualization Techniques, Analyse Data analytics techniques, Discover the insights from complex datasets.
		CO5	Evaluate performance measures, different types of data analytics including descriptive, diagnostic, predictive and prescriptive analytics
		CO6	Examine AI for Data science lab in the python environment.
21CS2109 R/A/P	Operating systems (OS)	CO1	Understand subsystem components of the Kernel and apply the CPU Scheduling algorithms.
		CO2	Understand memory and process virtualization and Paging, apply Page Replacement Algorithms.

  
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		C03	Apply the knowledge of persistence concepts, Redundant disk arrays, File System Implementation, Inter- process Communication and Distributed Systems. Apply Disk Scheduling Algorithms..
		C04	Apply different Lock Algorithms & Solve Synchronization Problems
		C05	Understands Real-Time Systems and Security (A/P)
		C06	Apply Unix System Calls. Use C Programming Language to implement Operating System Concepts (Practical)
22SDAD01R/A/P	Application development using java	C01	Apply computational intelligence techniques using Python to solve complex problems.
		C02	Implement and evaluate various computational intelligence algorithms, such as genetic algorithms, fuzzy logic, and neural networks, using Python.
23TBAI01	Computational Intelligence Using Python ( CIP)	C01	Construct FA for different languages and regular expressions.
		C02	Construct Context Free Grammars for different languages. And analyze the role of the Lexical Analyzer
		C03	Construct different top-down and bottom- up parsers and define syntax directed definition and translation schemes
		C04	Generate intermediate code, target code and apply different code optimization techniques
23TBA102	Cloud based AI Tools	C01	Apply various cloud-based AI tools and platforms, such as AWS Sage Maker, Azure Machine Learning, and GCP AI Platform to develop, train, evaluate, and deploy AI models in the cloud
		C02	Design AI applications to handle large datasets, manage data pipelines, and efficiently store and access data
23SDAD11R/A/P	Autonomous Vehicle Systems	C01	Identify the need of Autonomous Driving
		C02	Build a drone using autonomous system
		C03	Apply Deep Learning in Autonomous Driving Perception
22MT210	Mathematical Programming	C01	Apply various methods for finding the optimal solution of Linear Programming Problem
		C02	Apply Integer and Fractional programming approaches for solving optimization problems
		C03	To express a practical problem, such as an engineering analysis or design problem and to optimize a multivariate quadratic function subject to linear constraints on the variables.
		C04	To apply and understand the search and optimization methodologies applicable to the resolution of multi- disciplinary decision problems, under a decision support framework.

  
 Academic Professor / C  
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