Koneru Lakshmaiah Education Foundation

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Department of Artificial Intelligence and Data Science

Y22 – B. Tech

S No	Course Code	Course Title	CO NO	Description of the Course Outcome	BTL	Mapped PO & PSOs-
1	23AD3211	Cloud Computing	CO1	Employing and relate the features of Scalable Computing and System models for Distributed and Cloud Environment	3	PO5/PSO2
			CO2	Operating and Applying Implementation levels of Virtualization mechanisms in Distributed and Cloud Environment	3	PO5,PO3
			CO3	"Choosing and Sketch out Estimate Service models and Architectural Design for Resource management in Distributed and Cloud Environment "	3	PO2,PO4
			CO4	"Interpreting and demonstrating Ubiquitous feature in Cloud environment and Cloud Software Programming Environments "	3	PO2,PO3
2	23AD2211	Cryptography and Security	CO1	Understand the principles of cryptography by analyzing various attacks and apply different classic encryption techniques.	3	PO1, PSO2
			CO2	Understand the principles of block cipher and apply algorithms like DES, AES.	3	PO5, PSO2
			CO3	Understand and apply different algorithms of public key crypto system for ensuring secured communication and authentication.	3	PO5, PSO2

				CO4	Understand the concept of elliptic curve and its applications to cryptography. Apply hash algorithms for security.	3	PO5, PSO2
				CO5	Implement various cryptographic algorithms so as to analyze the achievability of security goals like Confidentiality, integrity, authentication.	3	PO5, PSO2
						4	PO1, PSO2

3	22AD2226	Image and video processing	CO1	Interpret Fundamentals of Image processing and Image Transforms	2	PO1, PO2, PSO1
			CO2	Analyze various Image Processing Techniques	3	PO2, PSO1
			CO3	Analyze various basic Steps of Video Processing	3	PO7, PSO1, PO3
			CO4	illustrate different 2-D Motion Estimation techniques	3	PO2, PSO1
			CO5	Demonstrate various image and video processing tools	5	PO9, PO5, PO6, PSO2
4	23CS3273RA	Natural Language Processing	CO1	Understand and apply approaches to syntax and semantics in NLP	3	PO1, PO2, PSO2
			CO2	Apply the statistical estimation and statistical alignment models	3	PO3, PO2, PSO2
			CO3	Analyze grammar formalism and context free grammars	4	PO3, PO2, PSO1
			CO4	Analyze Rule based Techniques, Statistical Machine translation (SMT), word alignment	4	PO3, PO2, PSO1
			CO5	Inspect and Evaluate Language Processing Methods using python	5	PO5
5	23AD3113	Real Time Operating System	CO1	Describe the Basics Of Real-Time Concepts- Architecture, RTOS building blocks	2	PO1, PO2

			CO2	Illustrate various CPU scheduling algorithms and Thread concepts apply synchronization algorithms for solving the complex Engineering problems.	3	PO1, PO3
			CO3	Illustrate the Inter Process Communication and Pipes Memory Management	3	PO4
			CO4	Demonstrate the case studies and Kernel Design Issues	3	PO2
			CO5	"Develop knowledge and practical skills through case studies of various RTOS. "	6	PO5
7	23AD2223	Soft Computing	CO1	Interpret fuzzy logic system	2	PO1
			CO2	Analyze Artificial Neural Network Models	3	PO2,PSO1
			CO3	Demonstrate Swarm and Evolutionary Algorithms	3	PO1,PO2,PSO1
			CO4	Illustrate Hybrid Fuzzy- Neural- Evolutionary- Swarm Models	3	PO2,PSO1
			CO5	Demonstration of neuro, fuzzy, evolutionary, and swarm algorithms using open source tools	3	PO1,PO5
8	23AD3207 R/A/P	Data Science Visualizatio n	CO1	Understand Data science, data collection, and data preprocessing	2	PO1/PSO2
			CO2	Applying descriptive statistical sampling techniques to explore the various real world data sets	3	PO1/PSO2
			CO3	Build data wrangling models with data science libraries like NumPy and Pandas	4	PO4/PSO2
			CO4	Applying various data visualization tools to explore the data	4	PO4/PSO2

			CO5	Implement various data science and visualization techniques to real world problems using Python	5	PO4/PSO2
10	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.	2	PO1,PO3, PSO2
			CO2	Understand concepts of ecosystems and learn methods for conservation of habitats and biodiversity.	2	PO2,PO3, PO5,PSO2
			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.	2	PO3, PO9,PSO2
			CO4	Recognize the knowledge on environmental legislation, disaster management and EIA process.	2	PO3, PO8,PO9,PSO2
11	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	3	PO2, PSO1
			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	3	PO2, PSO1
			CO3	To Understand the Usage of electronic health records and clinical decision support systems to inform healthcare decisions and improve patient outcomes	3	PO2, PSO1
			CO4	To Understand the ethical and legal issues related to medical data analytics, including data privacy and security, informed consent, and regulatory compliance	3	PO2, PSO1

12	23AD320 6R/P/A	Big Data Analytics	CO1	Illustrate the concepts of big data, Initial exploration of analysis of data and Data visualization.	2	PO1,PO2,PSO1
			CO2	Apply Initial exploration of data and advanced data analytics by using R	3	PO2,PO3,PSO1
			CO3	Apply advanced algorithms & Statistical modeling for big data using HDFS, HIVE, and PIG.	3	PO2,PO3,PSO1
			CO4	Apply advanced SQL functions for in-database analytics by MADlib, Greenplum along with common deliverables of analytics life cycle project	3	PO3,PO4,PSO1
			CO5	Build and Evaluate the Big Data Analytical problems using R, Hadoop, HIVE Programming concepts.	4	PSO1,PO3,PO4
13	22CS2205 A/R	DESIGN & ANALYSIS OF ALGORITH MS	CO1	Apply concepts of mathematics to find space and time complexities of various algorithms including string matching algorithms	3	PO1 ,PO2,PO5 , PSO2
			CO2	Analyze the problems that can be solved by using Divide and Conquer and Greedy Method	4	PO1 ,PO2,PO5 , PSO2

			CO3	Analyze the problems that can be solved by using Dynamic Programming and Backtracking	4	PO1 ,PO2,PO5 , PSO2
			CO4	Analyze the problems that can be solved by using Branch and Bound and NP-Hard Graph problems	4	PO1 ,PO2,PO5 , PSO2
			CO5	Analyze the various design techniques to solve any real-world problems.	4	PO1 ,PO2,PO5 , PSO2
14	23AD2121	DATABASE MANAGEMENT SYSTEMS	CO1	Illustrate the functional components of DBMS and Design an ER Model for a database.	2	PO1,PO3, PSO2
			CO2	Design a relational model for a database & Implement SQL concepts and relational algebra.	3	PO2,PO3, PO5,PSO2
			CO3	Implement PL/SQL programs, normalization techniques, indexing to construct and access database	3	PO3, PO9,PSO2
			CO4	Analyze the importance of transaction Processing, concurrency control and recovery techniques.	4	PO3, PO8,PO9,PSO2
			CO5	Mongo DB: Introduction to NOSQL, CURD-INDEXING,AGGREGATE. Distributed database: Replication, Sharding, Performance analysis.	5	PO3, PO5,PSO1
			CO6	Develop a database and implement SQL queries and PL/SQL programs to do various operations on data.	5	PO3, PO5,PSO1
15	23AD3105 R/A/P	DEEP LEARNING	CO1	Apply optimization algorithms to solve neural networks	3	" PO1,PO2, PSO2"
			CO2	Apply CNN model and its variants to real time data	3	" PO2,PO3,PO4, PSO1, PSO2"
			CO3	Able to apply Sequence models -RNN & LSTM	3	" PO1, PSO2,PO3, PSO2"
			CO4	construct the attention networks and Generative Neural models	3	" PO2,PO3,PO4, PSO2"
			CO6	Implement basic Neural Networks, optimization algorithms , various types of auto encoders, batch normalization, convolutional neural networks , RNN and LSTM	5	" PO2, PO3,PO4, PSO1, PSO2"

			CO7	Implement Deep learning case studies using keras and pytorch	5	PO3, PO4, PO5, PSO2
16	22AD3206 R/A/P	Data Science & Visualization	CO1	Understanding data science, data collection, and data pre-processing	2	" PO1,PO2, PSO2"
			CO2	Applying descriptive statistical sampling techniques to explore the various real world data sets	2	" PO2,PO3,PO4, PSO1, PSO2"
			CO3	Build data wrangling models with data science libraries like numpyand pandas	3	" PO1, PSO2,PO3, PSO2"
			CO4	Applying various data visualization tools to explore the data	3	" PO2,PO3,PO4, PSO2"
			CO5	Implement Various Data Science and Visualization Techniques toReal World Problems using Python	4	" PO1,PO2, PSO2"
17	22AD2203A /P/R	Datawarehousing and Data Mining	CO1	Illustration of Warehouse & Mining, ETL, OLAP & OLTP, Data Cube Operations and Data Warehouse architecture control mechanism.	2	PO2,PO3,PSO2
			CO2	Demonstration of Data Preprocessing through different methods	2	PO2,PO3,PSO2
			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	3	PO2,PO3,PSO2

			CO4	Build different Clustering Models using the predefined dataset.	3	PSO2,PO2,PO3
			CO5	"Implementation of warehousing and mining algorithms using suitable tools and programming languages "	5	PO5,PSO2,PO3
18	22AD2102	INTRODUC TION TO AI AND DS	CO1	Understand the concepts of intelligent agents and various search algorithms, to solve real-world problems.	3	PO1, PO2, PSO2
			CO2	Analyse satisfaction problems, discover knowledge using logic, and analyse reasoning techniques to make informed decisions in uncertain environments.	4	PO2,PO3, PSO1
			CO3	Classifiy various Machine Learning algorithms, Examine CNN and Deep Learning techniques	4	PO1, PO3, PSO2
			CO4	Contrast various Data Visualization Techniques, Analyse Data analytics techniques, Discover the insights from complex datasets.	4	PO3, PO5, PSO2
			CO5	Evaluate performance measures, different types of data analytics including descriptive, diagnostic, predictive and prescriptive analytics	5	PO2,PO3, PSO1
			CO6	Examine AI for Data science lab in the python environment.	4	PO3, PO5, PSO2
19	23AD2203P	Machine Learning	CO1	Understand the basic concepts of machine learning	3	" PO1,PO2,PSO2" "
			CO2	"Build SVM Algorithm for solving Classification and Prediction problems	3	" PO1,PO3,PSO2" "
			CO3	Apply Ensemble methods to solve classification problem	3	" PO1,PO2,PSO2" "
			CO4	Analyze different categories of clustering algorithms	4	" PO1,PO3,PSO2" "
			CO5	Evaluation of EM based and Reinforcement learning models	4	PO1,PO3,PSO2
			CO6	"Implement Machine Learning Techniques	4	PO3, PO4, PO5, PSO2

					4	PO3, PO4, PO5, PSO2
				using Python Language		
			CO7	Develop machine learning applications using using Python Language	4	PO3, PO4, PO5, PSO2
20	23EC2210R /23EC2210A /23EC2210P	Network Protocols and Security	CO1	Apply the knowledge of Communitiation to analyze different network topologies	3	PO1, PO2, PO3, PSO2
			CO2	Analysis of Network layer protocols and Routing algorithms	4	PO2, PO3, PSO2
			CO3	Analysis of Trasport Layer protocols and Congestion control techniques	4	PO2, PO3, PSO2
			CO4	Analysis of different cyber security attacks and	4	PO2, PO3, PSO2
			CO5	Analyze different Enterprise Network protocols	4	PO2,PO5, PSO2
			CO6	Analysis of different protocols with different topologies in networks	4	PO2, PO5, PSO2
			CO7	Analysis of different enterprise network protocols using Cisco Packet Tracer	4	PO2, PO5, PSO2
21	22MT2103R 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.	3	PO2, PSO1
			CO2	To formulate the real world problems in terms of random processes using multivariate distribution functions	3	PO2, PSO1
			CO3	To understand the role of Statistical tests of significance in stochastic process	3	PO2, PSO1
			CO4	To formulate Stochastic process in terms of Markov chains and solve problems in queueing systems, and network	3	PO2, PSO1

22	23CI2001	ADAPTIVE SOFTWARE ENGINEERING	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.	3	PSO2,PO1,PO2,PO3
			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	3	PSO2,PO2,PO3,PO4
			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.	4	PSO2,PO2,PO3,PO5
			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.	4	PSO2,PO1,PO2,PO3
23	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.	3	PO1, PO2, PSO2
			CO2	Analyse satisfaction problems, discover knowledge using logic, and analyse reasoning techniques to make informed decisions in uncertain environments.	4	PO2,PO3, PSO1
			CO3	Apply and analyse various Machine Learning algorithms, Examine CNN and Deep Learning techniques	4	PO1, PO3, PSO2

			CO4	Apply various Data Visualization Techniques, Analyse Data analytics techniques, Discover the insights from complex datasets.	4	PO3, PO5, PSO2
			CO5	Evaluate performance measures, different types of data analytics including descriptive, diagnostic, predictive and prescriptive analytics	5	PO2,PO3, PSO1
			CO6	Examine AI for Data science lab in the python environment.	4	PO3, PO5, PSO2
24	21CS2109 A/P/R	Operating systems (OS)	CO1	Understand subsystem components of the Kernel and apply the CPU Scheduling algorithms.	2	PSO2, PO3, PO4.
			CO2	Understand memory and process virtualization and Paging, apply Page Replacement Algorithms.	2	PSO2, PO3, PO4
			CO3	Apply the knowledge of persistence concepts, Redundant disk arrays, File System Implementation, Inter-process Communication and Distributed Systems. Apply Disk Scheduling Algorithms..	3	PSO2, PO3, PO4.
			CO4	Apply different Lock Algorithms & Solve Synchronization Problems	3	PSO2, PO3,PO4
			CO5	Understands Real-Time Systems and Security (A/P)	4	PSO2, PO3, PO4.
			CO6	Apply Unix System Calls. Use C Programming Language to implement Operating System Concepts (Practical)	4	PSO2, PO3, PO2.
25	22SDAD01R/ A/P	Application development using java	CO1	Apply computational intelligence techniques using Python to solve complex problems.	3	PO1,PO5/PSO2
			CO2	Implement and evaluate various computational	4	PO4, PO5/PSO2

				intelligence algorithms, such as genetic algorithms, fuzzy logic, and neural networks, using Python.			
26	23TBAI01	Computational Intelligence Using Python (CIP)	CO1	Construct FA for different languages and regular expressions.	3	3	
			CO2	Construct Context Free Grammars for different languages. And analyze the role of the Lexical Analyzer	3	3	
			CO3	Construct different top-down and bottom-up parsers and define syntaxdirected definition and translation schemes	3	3	
			CO4	Generate intermediate code, target code and apply different code optimization techniques	3	3	

26	23TBA102	Cloud based AI Tools	CO1	Apply various cloud-based AI tools and platforms, such as AWS SageMaker, Azure Machine Learning, and GCP AI Platform to develop, train, evaluate, and deploy AI models in the cloud	3	PO2,PO4,PSO2
			CO2	Design AI applications to handle large datasets, manage data pipelines, and efficiently store and access data	5	PO3,PO5,PSO2
27	23SDAD11R/A/P	Autonomous Vehicle Systems	CO1	Identify the need of Autonomous Driving	3	PO1, PO2, PSO2
			CO2	Build a drone using autonomous system	3	PO1, PO3, PSO2
			CO3	Apply Deep Learning in Autonomous Driving Perception	3	PO1, PO2, PSO2
28	22MT210	Mathematical Programming	CO1	Apply various methods for finding the optimal solution of Linear Programming Problem	3	PO1,PO2
			CO2	Apply Integer and Fractional programming approaches for solving optimization problems	3	PO1,PO2,PSO1
			CO3	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.	3	PO2,PO3,PSO1
			CO4	To apply and understand the search and optimization methodologies applicable to the resolution of multi-disciplinary decision problems, under a decision support framework.	3	PO2,PO3,PSO1