



JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA

Kakinada-533003, Andhra Pradesh, India

M.Tech in Computer Science and Engineering

Mathematical Foundations of Computer Science

Code: R19MCS1151

CO	Course Outcomes	Knowledge Level (K)#
CO1	To apply the basic rules and theorems of probability theory such as Baye's Theorem, to determine probabilities that help to solve engineering problems and to determine the expectation and variance of a random variable from its distribution.	K3
CO2	Able to perform and analyze of sampling, means, proportions, variances and estimates the maximum likelihood based on population parameters.	K4
CO3	To learn how to formulate and test hypotheses about sample means, variances and proportions and to draw conclusions based on the results of statistical tests.	K6
CO4	Design various ciphers using number theory.	K6
CO5	Apply graph theory for real time problems like network routing problem.	K3

Advanced Data Structures & Algorithms

Code: R19MCS1152

CO	Course Outcomes	Knowledge Level (K)#
CO1	Ability to write and analyze algorithms for algorithm correctness and efficiency	K4
CO2	Master a variety of advanced abstract data type (ADT) and data structures and their Implementation	K3
CO3	Demonstrate various searching, sorting and hash techniques and be able to apply and solve problems of real life	K2
CO4	Design and implement variety of data structures including linked lists, binary trees, heaps, graphs and search trees	K6
CO5	Ability to compare various search trees and find solutions for IT related problems	K5



JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA
Kakinada-533003, Andhra Pradesh, India
M.Tech in Computer Science and Engineering

Big Data Analytics

Code: R19MCS1153

CO	Course Outcomes	Knowledge Level (K)#
CO1	Illustrate on big data and its use cases from selected business domains.	K2
CO2	Interpret and summarize on No SQL, Cassandra	K2
CO3	Analyze the HADOOP and Map Reduce technologies associated with big data analytics and explore on Big Data applications Using Hive.	K4
CO4	Make use of Apache Spark, RDDs etc. to work with datasets.	K3
CO5	Assess real time processing with Spark Streaming.	K5

Digital Image Processing

Code: R19MCS1153

CO	Course Outcomes	Knowledge Level (K)#
CO1	Demonstrate the components of image processing	K2
CO2	Explain various filtration techniques.	K5
CO3	Apply image compression techniques.	K3
CO4	Discuss the concepts of wavelet transforms.	K6
CO5	Analyze the concept of morphological image processing.	K4



JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA

Kakinada-533003, Andhra Pradesh, India

M.Tech in Computer Science and Engineering

Advanced Operating Systems

Code: R19MCS1153

CO	Course Outcomes	Knowledge Level (K)#
CO1	Illustrate on the fundamental concepts of operating systems, its architecture and process management.	K2
CO2	Analyses on memory management concepts including page replacement algorithms.	K4
CO3	Elaborate on Process synchronisation mechanisms and deadlocks in operating systems.	K6
CO4	Make use of Distributed systems for implementing synchronisation.	K3
CO5	Apply protection and security in operating systems.	K3

ADVANCED COMPUTER NETWORKS

Code: R19MCS1154

CO	Course Outcomes	Knowledge Level (K)#
CO1	Illustrate reference models with layers, protocols and interfaces.	K2
CO2	Describe the routing algorithms, Sub netting and Addressing of IP V4and IPV6.	K4
CO3	Describe and Analysis of basic protocols of computer networks, and how they can be used to assist in network design and implementation.	K3
CO4	Describe the concepts Wireless LANS, WIMAX, IEEE 802.11, Cellular telephony and Satellite networks	K6
CO5	Describe the emerging trends in networks-MANETS and WSN	K2



JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA

Kakinada-533003, Andhra Pradesh, India

M.Tech in Computer Science and Engineering

Internet of Things

Code: R19MCS1154

CO	Course Outcomes	Knowledge Level (K)#
CO1	Summarize on the term 'internet of things' in different contexts.	K2
CO2	Analyze various protocols for IoT.	K4
CO3	Design a PoC of an IoT system using Rasperry Pi/Arduino	K6
CO4	Apply data analytics and use cloud offerings related to IoT.	K3
CO5	Analyze applications of IoT in real time scenario	K4

Object Oriented Software Engineering

Code: R19MCS1154

CO	Course Outcomes	Knowledge Level (K)#
CO1	Apply the Object Oriented Software-Development Process to design software	K3
CO2	Analyze and Specify software requirements through a SRS documents.	K4
CO3	Design and Plan software solutions to problems using an object-oriented strategy.	K6
CO4	Model the object oriented software systems using Unified Modeling Language (UML)	K3
CO5	Estimate the cost of constructing object oriented software.	K6



JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA

Kakinada-533003, Andhra Pradesh, India

M.Tech in Computer Science and Engineering

Research Methodology and IPR

Code: R19MCS1155

CO	Course Outcomes	Knowledge Level (K)#
CO1	Understand research problem formulation.	K3
CO2	Understand that today's world is controlled by Computer, Information Technology, but tomorrow world will be ruled by ideas, concept, and creativity.	K4
CO3	Understanding that when IPR would take such important place in growth of individuals & nation, it is needless to emphasis the need of information about Intellectual Property Right to be promoted among students in general & engineering in particular.	K3
CO4	Analyze research related information	K6
CO5	Understand that IPR protection provides an incentive to inventors for further research work and investment in R & D, which leads to creation of new and better products, and in turn brings about, economic growth and social benefits.	K3

Advanced Data Structures & Algorithms Lab

Code: R19MCS1156

CO	Course Outcomes	Knowledge Level (K)#
CO1	Identify classes, objects, members of a class and relationships among them needed for a specific problem.	K2
CO2	Examine algorithms performance using Prior analysis and asymptotic notations.	K4
CO3	Organize and apply to solve the complex problems using advanced data structures (like arrays, stacks, queues, linked lists, graphs and trees.)	K3
CO4	Apply and analyze functions of Dictionary	K3



JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA

Kakinada-533003, Andhra Pradesh, India

M.Tech in Computer Science and Engineering

Advanced Computing Lab

Code: R19MCS1157

CO	Course Outcomes	Knowledge Level (K)#
CO1	The student should have hands on experience in using various sensors like temperature, humidity, smoke, light, etc. and should be able to use control web camera, network, and relays connected to the Pi.	K2
CO2	Development and use of s IoT technology in Societal and Industrial Applications.	K4
CO3	Skills to undertake high quality academic and industrial research in Sensors and IoT.	K3
CO4	To classify Real World IoT Design Constraints, Industrial Automation in IoT.	K3

English for Research Paper Writing

Code: R19MCS1158

CO	Description	Knowledge Level (K)#
CO1	Understand that how to improve your writing skills and level of readability	K2
CO2	Learn about what to write in each section	K3
CO3	Understand the skills needed when writing a Title	K5

Disaster Management

Code: R19MCS1158

CO	Description	Knowledge Level (K)#
CO1	Learn to demonstrate a critical understanding of key concepts in disaster risk reduction and humanitarian response.	K2
CO2	Critically evaluate disaster risk reduction and humanitarian response policy and practice from multiple perspectives.	K3
CO3	Develop an understanding of standards of humanitarian response and practical relevance in specific types of disasters and conflict situations.	K5
CO4	Critically understand the strengths and weaknesses of disaster management approaches, planning and programming in different countries, particularly their home country or the countries they work.	K3



JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA

Kakinada-533003, Andhra Pradesh, India

M.Tech in Computer Science and Engineering

Sanskrit for Technical Knowledge

Code: R19MCS1158

CO	Description	Knowledge Level (K)#
CO1	To get a working knowledge in illustrious Sanskrit, the scientific language in the world	K2
CO2	Learning of Sanskrit to improve brain functioning	K3
CO3	Learning of Sanskrit to develop the logic in mathematics, science & other subjects	K5
CO4	The engineering scholars equipped with Sanskrit will be able to explore the huge knowledge from ancient literature	K3

Value Education

Code: R19MCS1158

CO	Description	Knowledge Level (K)#
CO1	Knowledge of self-development	K2
CO2	Learn the importance of Human values	K3
CO3	Developing the overall personality	K5

Machine Learning

Code: R19MCS1251

CO	Description	Knowledge Level (K)#
CO1	Explain the definition and usage of the term 'the internet of things' in different contexts.	K2
CO2	Demonstrate on various network protocols used in IoT.	K2
CO3	Analyze on various key wireless technologies used in IoT systems, such as WiFi, 6LoWPAN, Bluetooth and ZigBee.	K4
CO4	Illustrate on the role of big data, cloud computing and data analytics in IoT system.	K5
CO5	Design a simple IoT system made up of sensors, wireless network connection, data analytics and display/actuators, and write the necessary control software.	K6



JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA

Kakinada-533003, Andhra Pradesh, India

M.Tech in Computer Science and Engineering

MEAN Stack Technologies

Code: R19MCS1252

CO	Description	Knowledge Level (K)#
CO1	Identify the Basic Concepts of Web & Markup Languages.	K3
CO2	Develop web Applications using Scripting Languages & Frameworks.	K3
CO3	Make use of Express JS and Node JS frameworks	K3
CO4	Illustrate the uses of web services concepts like restful, react js.	K2
CO5	Adapt to Deployment Techniques & Working with cloud platform.	K6

Advanced Databases and Mining

Code: R19MCS1253

CO	Description	Knowledge Level (K)#
CO1	Analyze on normalization techniques.	K4
CO2	Elaborate on concurrency control techniques and query optimization.	K6
CO3	Summarize the concepts of data mining, data warehousing and data preprocessing strategies.	K2
CO4	Apply data mining algorithms.	K3
CO5	Assess various classification & cluster techniques.	K5

Ad Hoc & Sensor Networks

Code: R19MCS1253

CO	Description	Knowledge Level (K)#
CO1	Explain the Fundamental Concepts and applications of ad hoc and wireless sensor networks	K2
CO2	Discuss the MAC protocol issues of ad hoc networks	K6
CO3	Enumerate the concept of routing protocols for ad hoc wireless networks with respect to TCP design issues	K3
CO4	Analyze & Specify the concepts of network architecture and MAC layer protocol for WSN	K4
CO5	Discuss the WSN routing issues by considering QoS measurements	K6



JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA

Kakinada-533003, Andhra Pradesh, India

M.Tech in Computer Science and Engineering

Soft Computing

Code: R19MCS1253

CO	Description	Knowledge Level (K)#
CO1	Elaborate fuzzy logic and reasoning to handle uncertainty in engineering problems.	K6
CO2	Make use of genetic algorithms to combinatorial optimization problems	K3
CO3	Distinguish artificial intelligence techniques, including search heuristics, knowledge representation, planning and reasoning.	K4
CO4	Formulate and apply the principles of self-adopting and self organizing neuro fuzzy inference systems.	K6
CO5	Evaluate and compare solutions by various soft computing approaches for a given problem	K5

Cloud Computing

Code: R19MCS1254

Course Outcomes		Knowledge Level (K)#
CO1	Interpret the key dimensions of the challenge of Cloud Computing	K2
CO2	Examine the economics, financial, and technological implications for selecting cloud computing for own organization.	K4
CO3	Assessing the financial, technological, and organizational capacity of employer's for actively initiating and installing cloud-based applications	K5
CO4	Evaluate own organizations' needs for capacity building and training in cloud computing-related IT areas.	K5
CO5	To Illustrate Virtualization for Data-Center Automation.	K2



JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA

Kakinada-533003, Andhra Pradesh, India

M.Tech in Computer Science and Engineering

Principles of Computer Security

Code: R19MCS1254

CO	Description	Knowledge Level (K)#
CO1	Describe the key security requirements of confidentiality, integrity, and availability, types of security threats and attacks and summarize the functional requirements for computer security.	K4
CO2	Explain the basic operation of symmetric block encryption algorithms, use of secure hash functions for message authentication, digital signature mechanism	K5
CO3	Discuss the issues involved and the approaches for user authentication and explain how access control fits into the broader context that includes authentication, authorization, and audit	K2
CO4	Explain the basic concept of a denial-of-service attack, nature of flooding attacks, distributed denial-of-service attacks and describe how computer security vulnerabilities are a result of poor programming practices	K4
CO5	List the steps used to secure the base operating system, specific aspects of securing Unix/Linux systems, Windows systems, and security in virtualized systems and describe the security threats and countermeasures for wireless networks.	K5

High Performance Computing

Code: R19MCS1254

CO	Description	Knowledge Level (K)#
CO1	Design, formulate, solve and implement high performance versions of standard single threaded algorithms.	K6
CO2	Demonstrate the architectural features in the GPU and MIC hardware accelerators.	K2
CO3	Design programs to extract maximum performance in a multicore, shared memory execution environment processor.	K6
CO4	Analyze Symmetric and Distributed architectures.	K4
CO5	Develop and deploy large scale parallel programs on tightly coupled parallel systems using the message passing paradigm.	K6



JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA

Kakinada-533003, Andhra Pradesh, India

M.Tech in Computer Science and Engineering

Machine Learning with Python Lab

Code: R19MCS1255

Course Outcomes		Knowledge Level (K)#
CO1	Implement procedures for the machine learning algorithms	K4
CO2	Design Python programs for various Learning algorithms	K6
CO3	Apply appropriate data sets to the Machine Learning algorithms	K3
CO4	Identify and apply Machine Learning algorithms to solve real world problems	K2

MEAN Stack Technologies Lab

Code: R19MCS1256

CO	Description	Knowledge Level (K)#
CO1	Identify the Basic Concepts of Web & Markup Languages.	K3
CO2	Develop web Applications using Scripting Languages & Frameworks.	K3
CO3	Creating & Running Applications using JSP libraries.	K6
CO4	Creating Our First Controller Working with and Displaying in Angular Js and Nested Forms with ng-form.	K2
CO5	Working with the Files in React JS and Constructing Elements with Data.	K6

Constitution of India

Code: R19MCS1258

CO	Description	Knowledge Level (K)#
CO1	Discuss the growth of the demand for civil rights in India for the bulk of Indians before the arrival of Gandhi in Indian politics.	K6
CO2	Discuss the intellectual origins of the framework of argument that informed the conceptualization of social reforms leading to revolution in India.	K6
CO3	Discuss the circumstances surrounding the foundation of the Congress Socialist Party [CSP] under the leadership of Jawaharlal Nehru and the eventual failure of the proposal of direct elections through adult suffrage in the Indian Constitution.	K6
CO4	Discuss the passage of the Hindu Code Bill of 1956.	K6



JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA

Kakinada-533003, Andhra Pradesh, India

M.Tech in Computer Science and Engineering

Pedagogy Studies

Code: R19MCS1258

CO	Description	Knowledge Level (K)#
CO1	What pedagogical practices are being used by teachers in formal and informal classrooms in developing countries?	K1
CO2	What is the evidence on the effectiveness of these pedagogical practices, in what conditions, and with what population of learners?	K1
CO3	How can teacher education (curriculum and practicum) and the school curriculum and guidance materials best support effective pedagogy?	K1

Stress Management by Yoga

Code: R19MCS1258

CO	Description	Knowledge Level (K)#
CO1	Develop healthy mind in a healthy body thus improving social health also	K4
CO2	Improve efficiency	K2
CO3	achieve overall health of body	K3
CO4	Overcome stress and to maintain peace of mind	K5

Personality Development through Life Enlightenment Skills

Code: R19MCS1258

CO	Description	Knowledge Level (K)#
CO1	Study of Shrimad-Bhagwad-Geeta will help the student in developing his personality and achieve the highest goal in life	K2
CO2	The person who has studied Geeta will lead the nation and mankind to peace and prosperity	K3
CO3	Study of Neetishatakam will help in developing versatile personality of students.	K5



JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA

Kakinada-533003, Andhra Pradesh, India

M.Tech in Computer Science and Engineering

Deep Learning

Code: R19MCS2351

CO	Description	Knowledge Level (K)#
CO1	Demonstrate the basic concepts fundamental learning techniques and layers.	K2
CO2	Discuss the Neural Network training, various random models.	K6
CO3	Explain different types of deep learning network models.	K5
CO4	Classify the Probabilistic Neural Networks.	K2
CO5	Implement tools on Deep Learning techniques.	K3

Social Network Analysis

Code: R19MCS2351

CO	Description	Knowledge Level (K)#
CO1	Demonstrate social network analysis and measures.	K2
CO2	Analyze random graph models and navigate social networks data	K4
CO3	Apply the network topology and Visualization tools.	K3
CO4	Analyze the experiment with small world models and clustering models.	K4
CO5	Compare the application driven virtual communities from social network Structure.	K5



JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA

Kakinada-533003, Andhra Pradesh, India

M.Tech in Computer Science and Engineering

Python Programming

Code: R19MCS2352

CO	Description	Knowledge Level (K)#
CO1	Interpret the fundamental Python syntax and semantics and be fluent in the use of Python control flow statements.	K2
CO2	Express proficiency in the handling of strings and functions.	K2
CO3	Determine the methods to create and manipulate Python programs by utilizing the data structures like lists, dictionaries, tuples and sets.	K3
CO4	Identify the commonly used operations involving file systems and regular expressions.	K2
CO5	Articulate the Object-Oriented Programming concepts such as encapsulation, inheritance and polymorphism as used in Python, NumPy, Pandas	K3

Principles of cyber security

Code: R19MCS2352

CO	Description	Knowledge Level (K)#
CO1	Understand key terms and concepts in security, intellectual property and cyber crimes, trademarks and domain theft.	K4
CO2	Determine computer technologies, digital evidence collection, and evidentiary reporting in forensic acquisition	K3
CO3	Secure both clean and corrupted systems, protecting personal data, securing simple computer networks, and safe Internet usage.	K4
CO4	Incorporate approaches for incident analysis and response	K6



JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA

Kakinada-533003, Andhra Pradesh, India

M.Tech in Computer Science and Engineering

Internet of Things

Code: R19MCS2352

CO	Description	Knowledge Level (K)#
CO1	Summarize on the term 'internet of things' in different contexts.	K2
CO2	Analyze various protocols for IoT.	K4
CO3	Design a PoC of an IoT system using Rasperry Pi/Arduino	K6
CO4	Apply data analytics and use cloud offerings related to IoT.	K3
CO5	Analyze applications of IoT in real time scenario	K4

Artificial Intelligence and Machine learning

Code: R19MCS2352

CO	Description	Knowledge Level (K)#
CO1	Learn the concepts of biological foundations of artificial neural networks	K2
CO2	Identifications of fuzzy and neural network	K3
CO3	Extract features that can be used for a particular machine learning approach in various IOT applications	K4
CO4	To compare and contrast pros and cons of various machine learning techniques and to get an insight of when to apply a particular machine learning approach.	K3
CO5	To mathematically analyze various machine learning approaches and paradigms.	K2