Department of Computer Science and Engineering

Program: M.Tech- Computer Science and Engineeering

Regulation: R19   **Course Outcomes**   **No. of Courses: 35**

I-Sem	Course: Mathematical Foundations of Computer Science
CO-1	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.
CO-2	Able to perform and analyze of sampling, means, proportions, variances and estimates the maximum likelihood based on population parameters.
CO-3	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
CO-4	Design various ciphers using number theory.
CO-5	Apply graph theory for real time problems like network routing problem.

I-Sem	Course:Advanced Data structures & Algorithms
CO-1	Ability to write and analyze algorithms for algorithm correctness and efficiency
CO-2	Master a variety of advanced abstract data type (ADT) and data structures and their Implementation
CO-3	Demonstrate various searching, sorting and hash techniques and be able to apply and solve problems of real life
CO-4	Design and implement variety of data structures including linked lists, binary trees, heaps, graphs and search trees
CO-5	Ability to compare various search trees and find solutions for IT related problems

I-Sem	Course:Big Data Analytics
CO-1	Illustrate on big data and its use cases from selected business domains.
CO-2	Interpret and summarize on No SQL, Cassandra
CO-3	Analyze the HADOOP and Map Reduce technologies associated with big data analytics and explore on Big Data applications Using Hive.
CO-4	Make use of Apache Spark, RDDs etc. to work with datasets
CO-5	Assess real time processing with Spark Streaming.

I-Sem	Course:Digital Image Processing
CO-1	Demonstrate the components of image processing

CO-2	Explain various filtration techniques.
CO-3	Apply image compression techniques.
CO-4	Discuss the concepts of wavelet transforms
CO-5	Analyze the concept of morphological image processing.

I-Sem	Course:Advanced Operating Systems
CO-1	Illustrate on the fundamental concepts of distributed operating systems, its architecture and distributed mutual exclusion.
CO-2	Analyze on deadlock detection algorithms and agreement protocols.
CO-3	Make use of algorithms for implementing DSM and its scheduling.
CO-4	Apply protection and security in distributed operating systems
CO-5	Elaborate on concurrency control mechanisms in distributed database systems

I-Sem	Course:Advanced Computer Networks
CO-1	Illustrate reference models with layers, protocols and interfaces
CO-2	Describe the routing algorithms, Sub netting and Addressing of IP V4and IPV6
CO-3	Describe and Analysis of basic protocols of computer networks, and how they can be used to assist in network design and implementation.
CO-4	Describe the concepts Wireless LANS, WIMAX, IEEE 802.11, Cellular telephony and Satellite networks
CO-5	Describe the emerging trends in networks-MANETS and WSN

I-Sem	Course: Internet of Things
CO-1	Summarize on the term 'internet of things' in different contexts.
CO-2	Analyze various protocols for IoT.
CO-3	Design a PoC of an IoT system using Rasperry Pi/Arduino
CO-4	Apply data analytics and use cloud offerings related to IoT
CO-5	Analyze applications of IoT in real time scenario

I-Sem	Course: Object Oriented Software Engineering
CO-1	Apply the Object Oriented Software Development Process to design software
CO-2	Analyze and Specify software requirements through a SRS documents.

CO-3	Design and Plan software solutions to problems using an object-oriented strategy.
CO-4	Model the object oriented software systems using Unified Modeling Language (UML)
CO-5	Estimate the cost of constructing object oriented software.
I-Sem	**Course: Research Methodology and IPR**
CO-1	Formulate research problem.
CO-2	Analyze literature review and find research gaps to finalize research objectives.
CO-3	Identify the need of ethics in research.
CO-4	Identify the need of IPR of research projects for economic growth and social benefits.
CO-5	Apply basic data analytics techniques: probability distribution, linear regression, ANOVA
I-Sem	**Course: Advanced Data Structures & Algorithms Lab**
CO-1	Identify classes, objects, members of a class and relationships among them needed for a specific problem.
CO-2	Examine algorithms performance using Prior analysis and asymptotic notations.
CO-3	Organize and apply to solve the complex problems using advanced data structures (like arrays, stacks, queues, linked lists, graphs and trees.)
CO-4	Apply and analyze functions of Dictionary
CO-5	Implement List ADTs and their operations.
I-Sem	**Course: Advanced Computing Lab**
CO-1	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.
CO-2	Development and use of s IoT technology in Societal and Industrial Applications
CO-3	Skills to undertake high quality academic and industrial research in Sensors and IoT
II-Sem	**Course: Machine Learning**
CO-1	Domain Knowledge for Productive use of Machine Learning and Diversity of Data.
CO-2	Demonstrate on Supervised and Computational Learning
CO-3	Analyze on Statistics in learning techniques and Logistic Regression

CO-4	Illustrate on Support Vector Machines and Perceptron Algorithm
CO-5	Design a Multilayer Perceptron Networks and classification of decision tree
II-Sem	**Course: MEAN Stack Technologies**
CO-1	Identify the Basic Concepts of Web & Markup Languages.
CO-2	Develop web Applications using Scripting Languages & Frameworks.
CO-3	Make use of Express JS and Node JS frameworks
CO-4	Illustrate the uses of web services concepts like restful, react js.
CO-5	Adapt to Deployment Techniques & Working with cloud platform
II-Sem	**Course: Advanced Databases and Mining**
CO-1	Analyze on normalization techniques
CO-2	Elaborate on concurrency control techniques and query optimization.
CO-3	Summarize the concepts of data mining, data warehousing and data preprocessing strategies
CO-4	Apply data mining algorithms.
CO-5	Assess various classification & cluster techniques
II-Sem	**Course: Ad Hoc & Sensor Networks**
CO-1	Explain the Fundamental Concepts and applications of ad hoc and wireless sensor networks
CO-2	Discuss the MAC protocol issues of ad hoc networks
CO-3	Enumerate the concept of routing protocols for ad hoc wireless networks with respect to TCP design issues
CO-4	Analyze & Specify the concepts of network architecture and MAC layer protocol for WSN
CO-5	Discuss the WSN routing issues by considering QoS measurements
II-Sem	**Course: Soft Computing**
CO-1	Elaborate fuzzy logic and reasoning to handle uncertainty in engineering problems.
CO-2	Make use of genetic algorithms to combinatorial optimization problems
CO-3	Distinguish artificial intelligence techniques, including search heuristics, knowledge representation, planning and reasoning

CO-4	Formulate and apply the principles of self-adopting and self organizing neuro fuzzy inference systems.
CO-5	Evaluate and compare solutions by various soft computing approaches for a given problem

II-Sem	Course: Cloud Computing
CO-1	Interpret the key dimensions of the challenge of Cloud Computing.
CO-2	Examine the economics, financial, and technological implications for selecting cloud computing for own organization.
CO-3	Assessing the financial, technological, and organizational capacity of employer's for actively initiating and installing cloud-based applications.
CO-4	Evaluate own organizations' needs for capacity building and training in cloud computing-related IT areas
CO-5	To Illustrate Virtualization for Data-Center Automation.

II-Sem	Course: Principles of Computer Security
CO-1	Describe the key security requirements of confidentiality, integrity, and availability, types of security threats and attacks and summarize the functional requirements for computer security.
CO-2	Explain the basic operation of symmetric block encryption algorithms, use of secure hash functions for message authentication, digital signature mechanism
CO-3	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.
CO-4	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
CO-5	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.

II-Sem	Course:High Performance Computing
CO-1	Design, formulate, solve and implement high performance versions of standard single threaded algorithms
CO-2	Demonstrate the architectural features in the GPU and MIC hardware accelerators.
CO-3	Design programs to extract maximum performance in a multicore, shared memory execution environment processor.
CO-4	Analyze Symmetric and Distributed architectures

CO-5	Develop and deploy large scale parallel programs on tightly coupled parallel systems using the message passing paradigm.	
II-Sem	**Course:Machine Learning with Python Lab**	
CO-1	Implement procedures for the machine learning algorithms	
CO-2	Design Python programs for various Learning algorithms	
CO-3	Apply appropriate data sets to the Machine Learning algorithms	
II-Sem	**Course:MEAN Stack Technologies Lab**	
CO-1	Identify the Basic Concepts of Web & Markup Languages.	
CO-2	Develop web Applications using Scripting Languages & Frameworks.	
CO-3	Creating & Running Applications using JSP libraries.	
III-Sem	**Course:Deep Learning**	
CO-1	Demonstrate the basic concepts fundamental learning techniques and layers.	
CO-2	Discuss the Neural Network training, various random models.	
CO-3	Explain different types of deep learning network models.	
CO-4	Classify the Probabilistic Neural Networks.	
CO-5	Implement tools on Deep Learning techniques.	
III-Sem	**Course:Social Network Analysis**	
CO-1	Demonstrate social network analysis and measures.	
CO-2	Analyze random graph models and navigate social networks data	
CO-3	Apply the network topology and Visualization tools.	
CO-4	Analyze the experiment with small world models and clustering models.	
CO-5	Compare the application driven virtual communities from social network Structure.	
III-Sem	**Course:Python Programming**	
CO-1	Understand and comprehend the basics of python programming.	
CO-2	Demonstrate the principles of structured programming and be able to describe, design, implement, and test structured programs using currently accepted methodology.	

CO-3	Explain the use of the built-in data structures list, sets, tuples and dictionary.	
CO-4	Make use of functions and its applications.	
CO-5	Identify real-world applications using oops, files and exception handling provided by python	
III-Sem	**Course:Principles of Cyber Security**	
CO-1	Apply cyber security architecture principles.	
CO-2	Describe risk management processes and practices.	
CO-3	Appraise cyber security incidents to apply appropriate response	
CO-4	Distinguish system and application security threats and vulnerabilities.	
CO-5	Identify security tools and hardening techniques	
III-Sem	**Course:Internet of Things**	
CO-1	Summarize on the term 'internet of things' in different contexts.	
CO-2	Analyze various protocols for IoT.	
CO-3	Design a PoC of an IoT system using Rasperry Pi/Arduino	
CO-4	Apply data analytics and use cloud offerings related to IoT.	
CO-5	Analyze applications of IoT in real time scenario	
III-Sem	**Course:Machine Learning**	
CO-1	Domain Knowledge for Productive use of Machine Learning and Diversity of Data.	
CO-2	Demonstrate on Supervised and Computational Learning	
CO-3	Analyze on Statistics in learning techniques and Logistic Regression	
CO-4	Illustrate on Support Vector Machines and Perceptron Algorithm	
CO-5	Design a Multilayer Perceptron Networks and classification of decision tree	
III-Sem	**Course:Digital Forensics**	
CO-1	Understand relevant legislation and codes of ethics	
CO-2	Computer forensics and digital detective and various processes, policies and procedures	
CO-3	E-discovery, guidelines and standards, E-evidence, tools and environment.	

AVANTHI INSTITUTE OF ENGINEERING AND TECHNOLOGY
(Approved by A.I.C.T.E., New Delhi, & Permanently Affiliated to J.N.T.U-GV, Vizianagaram)
NAAC "B++" Accredited Institute
Cherukupally (Village), Near Tagarapuvalasa Bridge, Vizianagaram (Dist) -531162.
www.aietta.ac.in,   principal@aietta.ac.in

CO-4	Email and web forensics and network forensics
CO-5	Acquire knowledge of various digital forensic tools

III-Sem	**Course:Next Generation Databases**
CO-1	Explore the relationship between Big Data and NoSQL databases
CO-2	Work with NoSQL databases to analyze the big data for useful business applications.
CO-3	Work with different data models to suit various data representation and storage needs.
CO-4	Identify security threats in database systems.
CO-5	Solve Complex Problems in a Team of database works.

III-Sem	**Course:(Dissertation) Dissertation Phase – I and Phase – II**
CO-1	Ability to synthesize knowledge and skills previously gained and applied to an in-depth study and execution of new technical problem.
CO-2	Capable to select from different methodologies, methods and forms of analysis to produce a suitable research design, and justify their design.
CO-3	Ability to present the findings of their technical solution in a written report.
CO-4	Presenting the work in International/ National conference or reputed journals.
CO-5	Apply the research methodology tools for data collection and analysis.

III-Sem	**Course:Audit 1 and 2: English For Research Paper Writing**
CO-1	Understanding basic Sanskrit language
CO-2	Ancient Sanskrit literature about science & technology can be understood
CO-3	Being a logical language will help to develop logic in students

III-Sem	**Course:Audit 1 and 2: Constitution of India**
CO-1	Discuss the growth of the demand for civil rights in India for the bulk of Indians before the arrival of Gandhi in Indian politics.
CO-2	Discuss the intellectual origins of the framework of argument that informed the conceptualization of social reforms leading to revolution in India.
CO-3	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
CO-4	Discuss the passage of the Hindu Code Bill of 1956

CO-5	Apply the knowledge in strengthening of the constitutional institutions like CAG, Election Commission and UPSC for sustaining democracy.	
III-Sem	**Course:Audit 1 and 2: Pedagogy Studies**	
CO-1	What pedagogical practices are being used by teachers in formal and informal classrooms in developing countries?	
CO-2	What is the evidence on the effectiveness of these pedagogical practices, in what conditions, and with what population of learners?	
CO-3	How can teacher education (curriculum and practicum) and the school curriculum and guidance materials best support effective pedagogy?	
III-Sem	**Course:Audit 1 and 2: Stress Management By Yoga**	
CO-1	Develop healthy mind in a healthy body thus improving social health also	
CO-2	Improve efficiency	
CO-3	Intellectual and philosophical understanding of the theory of yoga and basic related Hindu scriptures will be developed.	
III-Sem	**Course:Audit 1 and 2: Personality Development Through Life Enlightenment Skills**	
CO-1	Study of Shrimad-Bhagwad-Geeta will help the student in developing his personality and achieve the highest goal in life	
CO-2	The person who has studied Geeta will lead the nation and mankind to peace and prosperity	
CO-3	Study of Neetishatakam will help in developing versatile personality of students	

Principal

PRINCIPAL

AVANTHI INSTITUTE OF ENGG. & TEC

Cherukupally (V), Near Tagarapuvalasa Bridg

Bhogapuram (M), Vizianagaram (D)-5311€