Malad Kandivli Education Society's

NAGINDAS KHANDWALA COLLEGE (Autonomous)

Reaccredited by NAAC with 'A' Grade (3rd Cycle) | ISO 9001:2015 Certified

Programme Code: PMSCIT
Post Graduate Programme: Master of Science Information Technology (MSc IT)
Programme

Objectives of the programme

The curriculum is framed to accomplish the following program objectives by the end of study.

1. To provide maximum practical experience to enrolled students in order to help them choose their path and pace according to their aptitude and ability.
2. To prepare the students with the capabilities of independently designing and executing research projects and apply their knowledge to come up with technical solutions to problems.
3. To facilitate inclusive development of the student technically, managerially and individually through various support courses along with the core subjects

Program Outcome:

- To inculcate scientific and research aptitude.
- To inculcate inquisitiveness, scientific and logical thinking and problem solving skills.

Program Specific Outcome:

- To develop logic and problem solving skills towards the requirements of the society and develop software tools in the field.
- To create an exposure to the emerging areas in the field of technology.

SEMESTER –I

Core   1: Advanced Database Systems
Objectives: Introduce basic concepts and major techniques in DBMS implementations. These include concepts and techniques for data storage, query processing, fragmentation, and concurrency control and transaction management.

Learning Outcome: Upon completion of this course, learner should be able to:
- Explain in detail DBMS architecture.
- Explain in detail query processing and techniques involved in query optimization.
- Explain the principles of concurrency control and fragmentation.

Core 2: Distributed Systems
Objectives: Given the knowledge of operating systems and sequential program design, the students will be able to design and develop fault tolerant and efficient distributed algorithms to solve large problems where data and control is distributed over different nodes.

Learning Outcome:
Learners will be able to:
1. Identify the advantages and challenges in designing distributed algorithms for different primitives like mutual exclusion, deadlock detection, agreement, etc.
2. Design and develop distributed programs using sockets and RPC/RMI.
3. Analyze different algorithms and techniques for the design and development of distributed systems subject to specific design and performance constraints

Core 3: Data Analysis Tools
Objectives: The main goal of this course is to help students learn, understand, and practice different distribution graph, and basic statistics techniques.

Learning Outcome: Learner will be able to understand and apply statistical knowledge in daily life applications.

Core 4: Software Testing
Objectives: To study fundamental concepts in software testing and to discuss various software testing issues and solutions in software unit test, integration and system testing.
Learning Outcome: At the end of this course learner will be able to:
- List a range of different software testing techniques and strategies and be able to apply specific (automated) unit testing method to the projects
- Distinguish characteristics of structural testing methods.
- Demonstrate the integration testing which aims to uncover interaction and compatibility problems as early as possible.

SEMESTER II

Core 5: Mobile Computing
Objectives: To enable students to compare and contrast multiple division techniques, mobile communication systems, and existing wireless networks.

Learning Outcome: After successful completion of this course, learner will be able to analyze security, energy efficiency, mobility, scalability, and their unique characteristics in mobile networks.

Core 6: Advanced Computer Networks

Objectives: This module introduces learner to computer networks and concentrates on building a firm foundation for understanding Data Communications and Computer Networks.

Learners are also introduced to the areas of Network Security. This module provides the learner with fundamental knowledge of the various aspects of computer networking and enables students to appreciate recent developments in the area.

Learning Outcome: Upon completion of this module, learners will be able to:
1. Have a good understanding of the OSI Reference Model
2. Analyze the requirements for a given organizational structure and select the most appropriate networking architecture and technologies;

3. Specify and identify deficiencies in existing protocols, and then go onto formulate new and better protocols;
4. Have a working knowledge of datagram and internet socket programming

Core 7: Cloud Computing and Ubiquitous System
Objectives: To learn how to use Cloud Services, to implement Virtualization, to build Private Cloud.

Learning Outcome: Analyze the Cloud computing setup with its vulnerabilities and applications using different architectures. Design different workflows according to requirements and apply map reduce programming model. Apply and design suitable Virtualization concept, Cloud Resource Management and design scheduling algorithms.

Core 8: Data Mining with Introduction to Data Science
Objectives: To identify the scope and essentiality of Data Mining, to analyze data, choose relevant models and algorithms for respective applications, to study spatial and web data mining, to develop research interest towards advances in data mining.

Learning Outcome: Identify appropriate data mining algorithms to solve real world problems, compare and evaluate different data mining techniques like classification, prediction, clustering and association rule mining

SEMESTER –III

Core 9: Embedded Systems
Objectives: To have knowledge about the basic working of a microcontroller system and its programming in assembly language and C language, to provide experience to integrate hardware and software for microcontroller applications systems.

Learning Outcome:
Learners will be able to:
- To acquire knowledge about microcontrollers embedded processors and their applications.
- To understand the internal architecture and interfacing of different peripheral devices with Microcontrollers and to write the programs for microcontroller.
- Foster ability to understand the role of embedded systems in industry.

Core 10: Information Security Management
Objectives:
- To provide an understanding of principal concepts, major issues, technologies and basic approaches in information security.
- Gain familiarity with prevalent network and distributed system attacks, defences against them and forensics to investigate the aftermath.
- Develop a basic understanding of cryptography, how it has evolved and some key encryption techniques used today.

- Develop an understanding of security policies (such as authentication, integrity and confidentiality), as well as protocols to implement such policies in the form of message exchanges.

Learning Outcome:
On successful completion of the module learner will be able to:
- To master information security governance, and related legal and regulatory issues
- To be familiar with how threats to an organization are discovered, analysed, and dealt with.
- To be familiar with network security threats and counter measures
- To be familiar with advanced security issues and technologies (such as DDoS attack detection and containment, and anonymous communications,)

DSE 1: Elective 1: Artificial Neural Networks
Objectives:
- To introduce the neural networks for classification and regression.
- To give design methodologies for artificial neural networks.
- To offer neural network implementations in R Programming
- To demonstrate neural network applications on real-world tasks.

Learning Outcome:
On successful completion of this module, learner will be able to:
- understand the differences between networks for supervised and unsupervised learning;
- design single and multi-layer feed-forward neural networks;
- program linear and nonlinear models for data mining;
- analyse the performance of neural networks.

DSE 1: Elective 1: Virtualization
Objectives: To understand the concept of virtual machine in detail and implement the technology for Servers.

Learning Outcome:
After learning the course the learner should be able to
• Understanding Virtual machines and Implementation of virtual machines
• Understanding virtualization and various ways of using virtualization

DSE 2: Elective 2: Digital Image Processing
Objectives:
- To study the image fundamentals and mathematical transforms necessary for image processing.
- To study the image enhancement techniques
- To study image restoration procedures.
- To study the image compression procedures.

Learning Outcome:
Learners will be able to:
- Review the fundamental concepts of a digital image processing system.

- Analyse images in the frequency domain using various transforms.
- Evaluate the techniques for image enhancement and image restoration.
- Categorize various compression techniques.

DSE 2: Elective 2: Ethical Hacking

Objectives: To understand the Technical foundation of cracking and ethical hacking, aspects of security, importance of data gathering, foot printing and system hacking evaluation of computer security, practical tasks will be used to re-enforce and apply theory to encourage an analytical and problem based approach to ethical hacking

Learning Outcome: A learner passing this module should be able to:
- Identify and analyse the stages an ethical hacker requires to take in order to compromise a target system.
- Identify tools and techniques to carry out a penetration testing.
- Critically evaluate security techniques used to protect system and user data.

SEMESTER IV

Core 11: Artificial Intelligence

Objectives: To create appreciation and understanding of both the achievements of AI learner will able to:
- Demonstrate knowledge of the building blocks of AI as presented in terms of intelligent agents and the theory underlying those achievements.
- To introduce the concepts of a Rational Intelligent Agent and the different types of Agents that can be designed to solve problems
- To impart basic proficiency in representing difficult real life problems in a state space representation so as to solve them using AI techniques like searching and game playing.
- To create an understanding of the basic issues of knowledge representation and Logic and blind and heuristic search, as well as an understanding of other topics such as minimal, resolution, etc. that play an important role in AI programs.

Learning Outcome:
- Demonstrate knowledge of the building blocks of AI as presented in terms of intelligent agents.
- Analyze and formalize the problem as a state space, graph, design heuristics and select amongst different search or game based techniques to solve them.
- Develop intelligent algorithms for constraint satisfaction problems and also design intelligent systems for Game Playing

Core 12: IT Infrastructure Management

Objectives: The objective of this course is to provide a foundational level of understanding of the ITIL 4 framework, key elements, concepts and terminologies associated with ITIL service lifecycle, and how it has evolved to adopt modern technologies and operational processes.

Learning Outcome: Learners will understand ITIL Framework and its components.

DSE 3: Elective 1 Intelligent Systems

Objectives: To create appreciation and understanding of both the achievements of AI learner will able to:

- To introduce the concepts of a Rational Intelligent Agent and the different types of Agents that can be designed to solve problems
- To create an understanding of the basic issues of knowledge representation and Logic and blind and heuristic search, as well as an understanding of other topics such as minimal, resolution, etc. that play an important role in AI programs.

Learning Outcome:

- Demonstrate knowledge of the building blocks of AI as presented in terms of intelligent agents.
- Analyse and formalize the problem as a state space, graph, design heuristics and select amongst different search or game based techniques to solve them.
- Develop intelligent algorithms for constraint satisfaction problems and also design intelligent systems for Game Playing

DSE 3: Elective 1 Real time Embedded System

Objectives: To have knowledge about the basic working of a microcontroller system and its programming in assembly language and C language, to provide experience to integrate hardware and software for microcontroller applications systems.

Learning Outcome:

Learners will be able to:

- To acquire knowledge about microcontrollers embedded processors and their applications.
- To understand the internal architecture and interfacing of different peripheral devices with Microcontrollers and to write the programs for microcontroller.
- Foster ability to understand the role of embedded systems in industry.

DSE 3: Elective 1 Computer Forensics

Objectives:

- To provide an understanding Computer forensics fundamentals
- To analyse various computer forensics technologies
- To provide computer forensics systems
- To identify methods for data recovery.
- To apply the methods for preservation of digital evidence.

Learning Outcome:

- Understand the definition of computer forensics fundamentals.
- Describe the types of computer forensics technology.
- Analyse various computer forensics systems.
- Illustrate the methods for data recovery, evidence collection and data seizure.

DSE 4: Elective 2 Design of Embedded Control System

Objectives: To have knowledge about the basic working of a microcontroller system and its programming in assembly language and C language, to provide experience to integrate hardware and software for microcontroller applications systems.

Learning Outcome:
Learners will be able to:
- To acquire knowledge about microcontrollers embedded processors and their applications.
- To understand the internal architecture and interfacing of different peripheral devices with Microcontrollers and to write the programs for microcontroller.
- Foster ability to understand the role of embedded systems in industry.

DSE 4: Elective 2 Advanced Image Processing

Objectives:
- To study the image fundamentals and mathematical transforms necessary for image processing.
- To study the image enhancement techniques
- To study image restoration procedures.
- To study the image compression procedures.

Learning Outcome:
Learners will be able to:
- Review the fundamental concepts of a digital image processing system.
- Analyse images in the frequency domain using various transforms.
- Evaluate the techniques for image enhancement and image restoration.
- Categorize various compression techniques.

DSE 4: Elective 2 Cloud Management

Objectives: To learn how to use Cloud Services, to implement Virtualization, to build Private Cloud.

Learning Outcome: Analyze the Cloud computing setup with its vulnerabilities and applications using different architectures. Design different workflows according to requirements and apply map reduce programming model. Apply and design suitable Virtualization concept, Cloud Resource Management and design scheduling algorithms.

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