Mahatma Gandhi University
MEGHALAYA
www.mgu.edu.in

SYLLABUS MANUAL

INFORMATION TECHNOLOGY
PROGRAMME
# SEMESTER I

<table>
<thead>
<tr>
<th>CODE</th>
<th>SUBJECT</th>
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<tbody>
<tr>
<td>MSIT11</td>
<td>Industrial Management</td>
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<tr>
<td>MSIT12</td>
<td>Analysis and Design of Algorithms</td>
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<td>MSIT13</td>
<td>Advanced Operating System</td>
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<td>MSIT14</td>
<td>Visual Basic Programming</td>
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# SEMESTER II

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<td>MSIT 23</td>
<td>OOAD and UML</td>
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<td>MSIT32</td>
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**SEMESTER IV**

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<td>MSIT42</td>
<td>Component Technologies</td>
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<td>MSIT43</td>
<td>Project</td>
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<td>TOTAL CREDITS</td>
<td>18</td>
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**Electives Stream 1: E-Commerce I**

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<tr>
<td>MSIT3E11</td>
<td>E-Commerce</td>
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<tr>
<td>MSIT3E12</td>
<td>Data Warehousing/ Data Mining</td>
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**Electives Stream 1: E-Commerce II**

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<tr>
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<td>Cyber Laws</td>
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<tr>
<td>MSIT4E12</td>
<td>Application Server</td>
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**Electives Stream 2: Systems and Networking I**

**Electives Stream 2: Systems and Networking II**
Detailed Syllabus

SEMESTER I
MSIT11 --- Industrial Management

UNIT I: Concepts of Management and Organisation

UNIT II: Evolution of Industrial Management
Evolution - Importance of Industrial Management – Scientific Management – Meaning, definitions, principles - Importance and Criticism.

UNIT III: Factory Location
Factors determining location of factory - Steps in location - selection of region - selection of locality - selection of exact site. Technology parks, SEZ etc., Role of government agencies in providing assistance, Location related decisions.

UNIT IV: Plant Layout

UNIT V: Designing Organisational Structures
Basic concepts related to Organisation - Departmentation and Decentralisation

UNIT VI: Types of mechanistic and organic structures of organization
Line organization, Line and staff organization, functional organization, Committee organization, matrix organization, Virtual Organisation, Cellular Organisation, team structure, boundaryless organization, inverted pyramid structure, lean and flat organization structure and their merits, demerits and suitability.

UNIT VII: Materials Management
Objectives, Inventory – functions, types, associated costs.

UNIT VIII: Production
Concept of conversion, processes and value-chain, Types of production systems and relevant layouts, Concept of production planning, MRP I and MRP II, Overview of materials management/purchasing, storage, disposal and inventory control, Plant maintenance: breakdown and reventive maintenance, Industrial safety.
UNIT IX: Inventory Classification Techniques
ABC and VED analysis. Inventory Control Systems-Continuous review system-periodical review system. Stores Management and Stores Records.

UNIT X: Purchase management & Supporting techniques
Purchase management, duties of purchase of manager, associated forms, Concept of work study and development of production standards, Concept of quality, fundamental treatment of SQC, TQM and ISO 9000, Introduction to BIS publications.

UNIT XI: Introduction to PERT / CPM
Project management, network modeling-probabilistic model.

UNIT XII: Evaluation Review Techniques
Types of activity times estimation-programme evaluation review techniques-Critical Pathprobability of completing the project, deterministic model, critical path method (CPM)-critical path calculation-crashing of simple of networks.

Reference Books:
1. The Principles of Industrial Management by John Christie Duncan
2. Industrial Excellence: Management Quality in Manufacturing by Springer

MSIT2 --- Analysis and Design of Algorithms
UNIT I: Introduction Algorithm and Algorithmic
Definition of Algorithm, Definition of Algorithmic, Example of an Algorithm Problems and Instances, Characteristics of an Algorithm Available Tools and Algorithms First Algorithm Second Algorithm Third Algorithm.

UNIT II: Building Blocks of Algorithms
Basic Actions and Instructions Control Mechanisms and Control Structures Procedure and Recursion, Outline of Algorithmics, Understanding the Problem Analyzing the Problem Capabilities of the Computer System.

UNIT III: Approximate vs Exact Solution

UNIT IV: Analyzing And Designing Algorithms

UNIT V: Bubble Sort Algorithm Bubble Sort Algorithm Bubble Sort Analysis Priority Queues
Heaps Heap Sort Heapify Algorithm Heap Sort Algorithm Analysis of Heapify Analysis of Heap Sort Quick Sort Divide and Conquer, Quick Sort Analysis of Quick Sort Way Merge Sort Sorting on Several Keys Binary Trees Complete Binary Tree Full Binary Tree

UNIT VI: Searching
Introduction Linear Search Binary Search Divide and Conquer, General Method, Binary Search, Comparative Study of Linear and Binary Search, Application of Searching, GRAPHS Introduction, Definition of Graph, Shortest Path Algorithms. SPANNING TREE Introduction Minimum Spanning Tree The Greedy Method General Method Prim’s Algorithm Kruskal’s Algorithm Solved Problems
Dijkstra’s Algorithm Shortest Path.

UNIT VII: String Matching

UNIT VIII: Polynomials

UNIT IX: Matrices

UNIT X: Dynamic Programming

UNIT XI: Knapsack
Introduction, Knapsack, Knapsack Problem using Greedy Method, Job Sequencing, Job Sequence with Deadlines, Traveling Salesman, Euclidean, TSP Traveling Salesman Algorithm, Nearest Neighbour Algorithm on TSP, Convex Hull Algorithm Applications, TSP using the Branch and Bound Backtracking.

UNIT XII: Other Algorithms

Reference Books:
1. Introduction to the Design and Analysis of Algorithms (2nd Edition) by Anany Levitin
2. Design and Analysis of Distributed Algorithms by Nicola Santoro

MSIT13 --- Advanced Operating System

UNIT I: An Overview Of Operating System

UNIT II: Operating System Services
UNIT III: Operating System Structure

UNIT IV: Process Management

UNIT V: Operations On Process

UNIT VI: Deadlock
Introduction Deadlock Deadlock characterization Necessary Conditions Resource Allocation Graphs Methods for Handling Deadlocks Deadlock Prevention Deadlock Avoidance Deadlock +Detection and Recovery Ignore Deadlock Let us Sum up Lesson end Activity Keywords Questions for Discussion MEMORY MANAGEMENT Introduction Memory Management Background Binding of Instructions and Data to Memory Dynamic Loading Dynamic Linking Overlays Logical vs Physical Address Space Memory-Management UNIT (MMU) Monoprogramming Multiprogramming

UNIT VII: Memory Allocation

UNIT VII: I/O SYSTEMS

UNIT IX: Storage Structure
Introduction Disk structure Making Tracks Sectors and Clusters Disk scheduling First Come First Served (FCFS) Circular SCAN (C-SCAN) LOOK Circular LOOK (C-LOOK) Disk Management Swap Space Management Pseudo-Swap Space Physical Swap Space.

UNIT X: File-System Interface

UNIT XI: File System Implementation
UNIT XII: Case Studies
Reference Books:
1. Advanced Concepts In Operating Systems by Mukesh Singhal and Niranjan Shivaratri
2. Advanced UNIX Programming by Marc J. Rochkind

MSIT14 --- Visual Basic Programming
UNIT I: Introduction To VB.NET

UNIT II: Control Customization
Introduction, Toolbars, Adding a Toolbar, Selecting the Images for the Buttons, Adding the Buttons, Writing the Button Code Other Toolbar Features, Existing Project, Open an Existing Project, Save an Existing Project Import an Already Existing Form to a Project Add User Control to the Existing Project Inheriting a Form from an Existing Project, Auto Hide, Customizing Windows Placing Control on a Form Simplicity, Positioning of Controls, Consistency, Aesthetics, Shapes and Transparency, Selecting and Resizing Control, Single Control Selection, Multiple Control Selection, Relocating Control Properties of Windows, Docking, Anchoring as an Alternative Resizing Technique, AutoScrolling Forms.

UNIT III: Property Setting
Introduction, Setting Properties of Form and Control, Properties Categories.

UNIT IV: VB.NET Variables
Introduction, VB.Net Variables, Naming Variables, Data Types, The Variant Data Type, Type Conversions Data Type Constant, Building Project, Creating a Project, Writing Code, Opening a Project, Compiling and Executing a Project, Displaying Output, Formatting Currency, Formatting Numbers, Formatting percentages, Formatting Dates and Times, The Format() Function, Formatting Numbers, Formatting Dates and Times’s Values, User-defined Numeric Formats, User-defined Date/Time Formats, Operators, Arithmetic Operators, Addition, Subtraction, Multiplication, Division, Integer Division, Modulo Division, Exponentiation, Operator Precedence, Arithmetic, Assignment Operators, String Operators, String Concatenation, String Assignment Operator, Matching Strings Relational Operators, Logical Operators.

UNIT V: Decision Making
Introduction Conditional Statement If-then Select-Case Looping Do While...End While For Next Nested loops.

UNIT VI: Functions
UNIT VII: Array
Introduction Array Menus and Dialog Boxes Dialog Boxes.

UNIT VIII: VB.NET - Programming

UNIT IX: File Handling
Introduction Files Classification Handling Files using Function and Classes Directory Class File Class File Processing.

UNIT X: VISUAL C++ Programming
Introduction MFC and Windows MFC Fundamentals MFC Class Hierarchy MFC Member and Global Functions MFC Class Member Functions MFC Global Functions Some Important Global Functions.

UNIT XI: Object Properties
Introduction Various Object Properties Constructing Property Pages Adding a Property Sheet Object CPropertyPage Member Functions Modeless Property Sheets MFC Library CObject CArchive CWinApp CWnd CFile CGDIObject CEExcept CDialog CString CEdit CList.

UNIT XII: Document/View Architecture

Reference Books:
1. Programming in Visual Basic 2008 by Julia Case Bradley and Anita

MSIT15-L---Analysis and Design of Algorithms (Lab)
UNIT I: Introduction Algorithm and Algorithmic
Definition of Algorithm, Definition of Algorithmic, Example of an Algorithm Problems and Instances, Characteristics of an Algorithm Available Tools and Algorithms First Algorithm Second Algorithm Third Algorithm.

UNIT II: Building Blocks of Algorithms
Basic Actions and Instructions Control Mechanisms and Control Structures Procedure and Recursion, Outline of Algorithmics, Understanding the Problem Analyzing the Problem Capabilities of the Computer System.

UNIT III: Approximate vs Exact Solution
Choice of Appropriate Data Structures Choice of Appropriate Design Technology Specification
UNIT IV: Analyzing And Designing Algorithms

UNIT V: Bubble Sort Algorithm Bubble Sort Analysis Priority Queues
Heaps Heap Sort Heapify Algorithm Heap Sort Algorithm Analysis of Heap Sort Quick Sort Divide and Conquer, Quick Sort Analysis of Quick Sort Way Merge Sort Sorting on Several Keys Binary Trees Complete Binary Tree Full Binary Tree

UNIT VI: Searching
Introduction Linear Search Binary Search Divide and Conquer, General Method, Binary Search, Comparative Study of Linear and Binary Search, Application of Searching. GRAPHS Introduction, Definition of Graph, Shortest Path Algorithms. SPANNING TREE Introduction Minimum Spanning Tree The Greedy Method General Method Prim’s Algorithm Kruskal’s Algorithm Solved Problems Dijkstra’s Algorithm Shortest Path.

UNIT VII: String Matching

UNIT VIII: Polynomials

UNIT IX: Matrices

UNIT X: Dynamic Programming

UNIT XI: Knapsack
Introduction, Knapsack, Knapsack Problem using Greedy Method, Job Sequencing, Job Sequence with Deadlines, Traveling Salesman, Euclidean, TSP Traveling Salesman Algorithm, Nearest Neighbour Algorithm on TSP, Convex Hull Algorithm Applications, TSP using the Branch and Bound Backtracking.

UNIT XII: Other Algorithm
Introduction, Graph Colouring, Vertex Colouring, Edge Colouring, Face Colouring, Four Colour Theorem Graph, Coloring Algorithm, Finding all m-colorings of Graph, Generating a Next Color, Queens, The N-Queens Algorithm, AND/OR Graph, Game Tree, NP Hard Theory, NP Complete Problem, Approximation Algorithms, PRAM Algorithms, Introduction to Genetic

**Reference Books:**
1. Introduction to the Design and Analysis of Algorithms (2nd Edition) by Anany Levitin
2. Design and Analysis of Distributed Algorithms by Nicola Santoro

**MSIT16-L---Visual Basic Programming (Lab)**

**UNIT I: Introduction To VB.NET**

**UNIT II: Control Customization**
Introduction, Toolbars, Adding a Toolbar, Selecting the Images for the Buttons, Adding the Buttons, Writing the Button Code Other Toolbar Features, Existing Project, Open an Existing Project, Save an Existing Project Import an Already Existing Form to a Project Add User Control to the Existing Project Inheriting a Form from an Existing Project, Auto Hide, Customizing Windows Placing Control on a Form Simplicity, Positioning of Controls, Consistency, Aesthetics, Shapes and Transparency, Selecting and Resizing Control, Single Control Selection, Multiple Control Selection, Relocating Control Properties of Windows, Docking, Anchoring as an Alternative Resizing Technique, AutoScrolling Forms.

**UNIT III: Property Setting**
Introduction, Setting Properties of Form and Control, Properties Categories.

**UNIT IV: VB.NET Variables**
Introduction, VB.Net Variables, Naming Variables, Data Types, The Variant Data Type, Type Conversions Data Type Constant, Building Project, Creating a Project, Writing Code, Opening a Project, Compiling and Executing a Project, Displaying Output, Formatting Currency, Formatting Numbers, Formatting percentages, Formatting Dates and Times, The Format() Function, Formatting Numbers, Formatting Dates and Time’s Values, User-defined Numeric Formats, User-defined Date/Time Formats, Operators, Arithmetic Operators, Addition, Subtraction, Multiplication, Division, Integer Division, Modulo Division, Exponentiation, Operator Precedence, Arithmetic, Assignment Operators, String Operators, String Concatenation, String Assignment Operator, Matching Strings Relational Operators, Logical Operators.

**UNIT V: Decision Making**
Introduction Conditional Statement If-then Select-Case Looping Do While...End While For Next Nested loops.

**UNIT VI: Functions**
Introduction Import Statement MsgBox The MsgBox Function Input Box Function User Defined Calling Functions Built Functions Controls Text Box Controls Label Controls Frame Controls Command Button Check Box Option Button List Box Combo Controls Picture Controls Image Controls.

**UNIT VII: Array**
Introduction Array Menus and Dialog Boxes Dialog Boxes.

**UNIT VIII: VB.NET - Programming**
Introduction Structured Programming File-Level Programming Elements Name space -Level Programming Elements Module-Level Programming Elements Procedure-Level Programming Elements Object-oriented Programming A Namespace A Class An Object Modules Access Types Encapsulation Data Hiding or Abstraction Shared Functions Overloading Inheritance Must Inherit Not Inheritable Overriding Polymorphism Constructors and Destructors Property Routines A
Simple Program.

UNIT IX: File Handling
Introduction Files Classification Handling Files using Function and Classes Directory Class File Class File Processing.

UNIT X: VISUAL C++ Programming
Introduction MFC and Windows MFC Fundamentals MFC Class Hierarchy MFC Member and Global Functions MFC Class Member Functions MFC Global Functions Some Important Global Functions.

UNIT XI: Object Properties
Introduction Various Object Properties Constructing Property Pages Adding a Property Sheet Object CPropertyPage Member Functions Modeless Property Sheets MFC Library CObject CArchive CWinApp CWnd CFile CGDIObject CExcept CDialog CString CEdit CList.

UNIT XII: Document/View Architecture

Reference Books:
1. Programming in Visual Basic 2008 by Julia Case Bradley and Anita

SEMESTER II
MSIT21 --- Software Quality And Testing
UNIT I: Introduction To Software Testing

UNIT II: The Taxonomy Of Bugs
Introduction The Consequences of Bugs The Importance of Bugs How Bugs Affect Us -- Consequences Flexible Severity rather than Absolute Taxonomy for Bugs Requirements, Features and Functionality Bugs Structural Bugs Data Bugs Coding Bugs Interface, Integration and System Bugs Test and Test Design Bugs Software Testing Testing and Design Styles Memory related Bugs Concurrent Bugs.

UNIT III: Software Testing Techniques

UNIT IV: Flow graphs And Path Testing
Introduction Path Testing Basics Motivation and Assumption Control Flow-graphs
Notational Evolution Path Testing Loops Variations Predicates, Path Predicates and Achievable Paths Predicates Predicate Expressions Predicate Coverage Testing Blindness Path Sensitizing Path Instrumentation Problem Link Markers Link Counters Implementation

UNIT V: Transaction Flow Testing

UNIT VI: Data Flow Testing

UNIT VII: Syntax Testing

UNIT VIII: Logic Based Testing
Introduction Motivational Overview Hardware Logic Testing Specification Systems and Languages Knowledge based Systems Overview Decision Tables Definitions and Notation Decision Table Processors Decision Tables as a Basis for Test Case Design Expansion of Immaterial Classes Test Case Design Decision Tables and Structure Path Expressions Boolean Algebra Boolean Equations KV Charts The Problem Introduction to Software Testing Simple Forms Three Variables Four Variables and More Specifications Finding and Translating Logic Ambiguities and Contradictions Don’t-Care and Impossible Terms.

UNIT IX: States, State Graphs And Transition Testing

UNIT X: Testing Specialized Environments, Architecture And Applications

UNIT XI: Testing Tactics And Debugging

UNIT XII: Strategic Issues & UNIT Testing

**Reference Books:**
2. Fuzzing for Software Security Testing and Quality Assurance by Ari Takanen, Jared DeMott

**MSIT22 --- Advanced Networks**

**UNIT I: Introduction To Computer Networks**
Introduction, Use of Computer Networks, Business Use, Scientific Use - Computer Enhanced Collaborative Work (CECW), Network Hardware, Classification Based on Interconnected Computers by Scale, Internetworks, Network Software, Layering the Communications Process, Interfaces and Services

**UNIT II: Reference Models**

**UNIT III: The Physical Layer**
Introduction, Theoretical Basics for Data Communication, Transmission Media, Guided Transmission Media, Twisted Pair (Copper Conductors), Coaxial Cable, Optical Fiber.

**UNIT IV: The Physical Layer-II**

**UNIT V: The Data Link Layer**

**UNIT VI: Data Link Protocols**
High-level Data Link Control (HDLC), Point-to-Point Protocol (PPP), Multiple Access Protocols, Aloha and Slotted Aloha.

**UNIT VII: The Network Layer**

**UNIT VIII: Internetworking**
Introduction, Internetwork, Internet, Routing in the Internetwork, Virtual Circuits, Fragmentation, Network Layer in the Internet, IP Protocol, IP Addresses, Internet Control Protocols.

**UNIT IX: Transport Layer**
UNIT X: Internet Transmission Protocol

UNIT XI: OSI Upper Layers

UNIT XII: Obtaining An Address
Dynamic Host Configuration Protocol (DHCP), Hierarchical Naming, Domain Name System (DNS), Address Resolution Protocol (ARP), Default Gateway, File Transfer Protocol (FTP), Electronic Mail.

Reference Books:
1. Grid Networks: Enabling Grids with Advanced Communication Technology by Franco Travostino

MSIT23 --- OOAD and UML

UNIT I: Object Modeling Concepts

UNIT II: Object and Class Concepts

UNIT III: Structured approach vs. object oriented approach
Introduction Objectives, What is software, High-Quality software, Where does the traditional approach fail, Pitfalls of top down design, How object method succeeds, Merits of object approach, Summary, Objective type questions, Review questions.

UNIT IV: Road Map for OOA and OOD

UNIT V: Unified Modeling Language
Objectives, Introduction, UML and brief background, Architecture of UML, Why is UML powerful, What is a process, Phases and Iterations, Steps in UML, Modeling and UML, Goals of UML, Outside The Scope Of UML.

UNIT VI: UML Modeling elements
Introduction, Objectives, Class, Attribute, Attribute Compartment Attribute Scope, Derived Element, Operation, Object, Interface, Packages.

UNIT VII: Relationships connect modeling elements
Introduction, Objectives, Relationships Notations, Association, Association End, Aggregation, Composition, Generalization, Dependency, Realization, Relationship between Objects.

UNIT VIII: Design Methodology
Introduction, Methodology Preview, OMT as Software Engineering Methodology, OMT Methodology, Problem Statement, ATM Example, System Design, Overview Breaking a System into Sub-systems, Identifying Concurrency, Allocation of Sub-systems

UNIT IX: Management of Data Storage
UNIT X: Unified Modeling Language

UNIT XI: Interface
When to Use: Class Diagrams, How to Draw: Class Diagrams, Relationships between Classes, Component Diagram, Composite Structure Diagram, UML 2.0 Composite Structure Diagram, Deployment Diagram, Package Diagram, Object Diagram, Package, Modeling Groups of Elements: Packages

UNIT XII: Behavioral Modeling In UML

Reference Book
1. Object Oriented Analysis & Design by Atul Kahate
2. Structured System Anal And Design by Isrd, ISRD Group

MSIT24 --- Advanced Java

UNIT I: Introduction to JAVA Programming
Introduction, Higher level Languages, Java: an Introduction, Life cycle of a Java program, Java virtual machine, Programming in Java.

UNIT II: Declaring Variables
Variables, Arrays, Classes in Java, Inheritance in Java, Constructor, Methods, The keyword, his.

UNIT III: Packages and Interfaces
Packages and Interfaces in JAVA Packages, Setting of class path, Interfaces, Modifiers, Access specifiers Rules.

UNIT IV: Exception Handling
Introduction, Exceptions in Java, Try block, Catch block, Throws clause, Finally block.

UNIT V: HTML and Applet Programming

UNIT VI: The class applet
Life cycle of an applet, Incorporating an applet in a HTML page, Passing parameter to Applet, Graphics in Java, Color control, Font Control.

UNIT VII: GUI Concept in JAVA
Introduction, The abstract Windowing toolkit, Layout managers, Nested panels

UNIT VIII: The Java GUI components
Containers, Creating an User Interface, A sample, Deciding layout, Event Handling, Event Handling for buttons, Mouse events.

UNIT IX: Multithreading
Introduction, Creating and managing threads, Life cycle of a thread, Daemon threads, Thread scheduling and, setting the priorities, Thread synchronization, Threadgroup, Problems.

UNIT X: Animation in JAVA
Introduction, Flicker and how to avoid it, Reducing flicker using double-buffering

UNIT XI: Animation using Images
Retrieving and using sounds, Creating applets with double-buffering.
UNIT XII: Concept of Streams
Input and Output Introduction, Concept of Streams, Java.io interfaces, java.awt.print package.

Reference Books:
1. Core Java by Cay S. Horstmann and Gary Cornell
2. Advanced Programming In Java by Noel Kalicharan.

MSIT25-L---OOAD and UML (Lab)

UNIT I: Object Modeling Concepts
Introduction, Basics of Object Oriented System, Object-oriented Analysis, Object-oriented Design,
Object Modeling, Objects, Classes, Relationships between Classes and Objects, Inheritance,

UNIT II: Object and Class Concepts
Aggregation, Generalization, Multiple Inheritances, Derived Data and Constraints, Dynamic

UNIT III: Structured approach vs. object oriented approach
Introduction Objectives, What is software, High-Quality software, Where does the traditional
approach fail, Pitfalls of top down design, How object method succeeds, Merits of object
approach, Summary, Objective type questions, Review questions.

UNIT IV: Road Map for OOA and OOD
Objectives, Various Activities in a Design, OOA Phase, Creating Classes, Assigning Responsibilities,
CRC Modeling, OOA, Checkpoint, OOD Phase, OOD Checkpoint, Software problems, Best practices
of software engineering.

UNIT V: Unified Modeling Language
Objectives, Introduction, UML and brief background, Architecture of UML, Why is UML powerful,
What is a process, Phases and Iterations, Steps in UML, Modeling and UML, Goals of UML, Outside
The Scope Of UML.

UNIT VI: UML Modeling elements
Introduction, Objectives, Class, Attribute, Attribute Compartment Attribute Scope, Derived
Element, Operation, Object, Interface, Packages.

UNIT VII: Relationships connect modeling elements
Introduction, Objectives, Relationships Notations, Association, Association End, Aggregation,
Composition, Generalization, Dependency, Realization, Relationship between Objects.

UNIT VIII: Design Methodology
Introduction, Methodology Preview, OMT as Software Engineering Methodology, OMT
Methodology, Problem Statement, ATM Example, System Design, Overview Breaking a System
into Sub-systems, Identifying Concurrency, Allocation of Sub-systems

UNIT IX: Management of Data Storage
Handling Global Resources, Boundary Conditions, Choosing a Software Control Strategy, Setting
Trade-off Priorities, Common Architectural Styles, Architecture of ATM Systems, Object Design,
Overview, Designing Algorithms, Combining Three Models, Comparison of Methodologies

UNIT X: Unified Modeling Language
Introduction, Basic Concepts, UML, Modeling, Modeling Comments, Modeling Building Blocks
and Properties, Diagrams Overview, UML Notations, Rules of UML, Views of System
Architecture, UML Development Cycle, Structural Modeling, Class Modeling Techniques,

UNIT XI: Interface
When to Use: Class Diagrams, How to Draw: Class Diagrams, Relationships between Classes,
Component Diagram, Composite Structure Diagram, UML 2.0 Composite Structure Diagram, Deployment Diagram, Package Diagram, Object Diagram, Package, Modeling Groups of Elements: Packages

UNIT XII: Behavioral Modeling In UML
Introduction, Behavioral Modeling, Modeling Object Interaction, Interaction Diagrams, Sequence Diagrams, What is a Collaboration?, Interaction Based, Contract Based, State Based, Event Based, Modeling Workflow and Operation, Activity Diagrams,

Reference Book
1. Object Oriented Analysis & Design by Atul Kahate

Semester III
MSIT31 --- Project Management

UNIT I: Project Management Concepts
Introduction, project characteristics, taxonomy of projects, project identification and formulation. Establishing the project and goals. Nature & context of project management; phases of PM, A framework for PM issues, PM as a conversion process, project environment & complexity. Organizing human resources, organizing systems & procedures for implementation. Project direction.

UNIT II: Project Organization & Project Contracts
Introduction, functional organization, project organization, matrix organization, modified matrix organization, pure project organization, selection of project organization structure, project breakdown structures, project contracts, types of contracts, types of payments to contractors.

UNIT III: Project Organizational Behaviors
Identify leadership styles of project managers, Describe techniques used to manage groups and individuals in order to increase the effectiveness of working on a project team, Identify sources of diversity, either corporate or ethnic, that impact project team effectiveness.

UNIT IV: Applied Project Planning
Produce a statement of work (SOW) and decompose overall project goals, Develop a work breakdown structure (WBS), using established tools and techniques, to achieve stated project objectives, Produce a task-flow network, using established tools and techniques, and analyze the contingencies, interrelationships, and critical path(s) of the work elements, Produce a Gantt chart, using established tools and techniques, to schedule the completion of all work elements.

UNIT V: Resource Allocation
Analyze optimal labor utilization for cost effectiveness and schedule efficiency by using a resource allocation chart.

UNIT VI: Project Performance Measurement and Control
Define the concept of earned value performance measurement, Describe how project management information systems (PMIS) are used to monitor, evaluate, and control planned cost and schedule performance.

UNIT VII: Project Appraisal & Cost Estimation
Introduction, technical appraisal, commercial appraisal, economic appraisal, financial appraisal, management appraisal, social cost/benefit analysis, project risk analysis. Cost analysis of the project, components of capital cost of a project, modern approach to project performance analysis.

UNIT VIII: Project Scheduling
Introduction to PERT & CPM, planning and scheduling networks, time estimation, determination of critical path, CPM model, event slacks & floats, PERT model, expected time for activities, expected length of critical path, calculating the project length and variance, PERT & CPM cost accounting systems, lowest cost schedule, crashing of networks, linear programming formulation of event oriented networks, updating of networks, LOB technique.

UNIT IX: Project Evaluation and Termination
Describe the procedure for conducting periodic project performance evaluation audits, Explain how project managers must communicate audit results to customers and management in order to manage expectations, Describe how, as a result of project audits, project managers conduct tradeoff analyses of project performances versus cost and schedule constraints, Identify causes associated with project success and failure.

UNIT X: Project Structure and Governance
Describe how to build and work with cross-functional teams within a project, Support the need for defining the elements of authority, responsibility, and accountability in a project.

UNIT XI: Modification & Extensions of Network Models
Complexity of project scheduling with limited resources, resource leveling of project schedules, resource allocation in project scheduling -- heuristic solution. Precedence networking-examples with algorithm, decision networks, probabilistic networks, computer aided project managementessential requirements of PM software, software packages for CPM. Enterprise- wide PM, using spread sheets for financial.

UNIT XII: Strategic Issues in Project Management
Assess the strategic issues facing a project team, Analyze the approaches to managing a project's strategic issues.

UNIT XIII: The Strategic View of Project Operations
How to accomplish project planning with a strategic perspective, Associate the project's information systems with the strategic need to communicate, Support the strategic values of project control systems.

UNIT XIV: Contract Management Planning
Define contract administration and its role in project management, Explain how contract administration is related to the project's success, steps in planning for contract administration.

UNIT XV: Risk Management Process
Analyze the risk management process cycle within a company, using observation or case study, Defend the role of risk management in overall project management, Identify risk management activities throughout the project life cycle, Identify the risk management process.

UNIT XVI: Adaptations of Risk Management
Risk management from a contractor's viewpoint, the short cuts of risk management, Support crossfunctional representation as optimal for risk management.

Reference Books:
1. Project Management: A Systems Approach to Planning, Scheduling, and Controlling by Harold Kerzner

MSIT32 --- Client server Computing
UNIT I: Client/Server Computing
DBMS concept and architecture, Single system image, Client Server architecture, mainframecentric client server computing, downsizing and client server computing, preserving mainframe
applications investment through porting, client server development tools, advantages of client server computing.

UNIT II: Overview of C/S applications
components, classes, categories.

UNIT III: Overview of C/S computing
Dispelling the Myths, Obstacles- Upfront and hidden, open systems and standards, Standards setting organizations, factors of success.

UNIT IV: Client hardware and software
Client components and operating systems. What is GUI?, Xwindow vs. windowing, database access. Application logic client software products: GUI environments, converting 3270/5250 screens, database access tools.

UNIT V: Client requirements
GUI design standards, Open GUI standards, Interface dependents, testing interfaces, development aides.

UNIT VI: Components of Client/Server application The client
services, request for services, RPC, windows services, fax, print services, remote boot services, other remote services, Utility Services & Other Services, Dynamic Data Exchange (DDE), Object Linking and Embedding (OLE), Common Object Request Broker Architecture (CORBA).

UNIT VII: The server
Detailed server functionality, the network operating system, available platforms, the network operating system, available platform, the server operating system.

UNIT VIII: Server Environment
eight layers of software’s, network management and computing environments, extensions, network operating systems, loadable modules,

UNIT IX: Server operating systems:
OS/2, Windows new technology, UNIX based operating systems.

UNIT X: Server Requirements
Platform independence, transaction processing, connectivity, intelligent database, stored procedures, Triggers, Load Leveling, Optimizer, testing and diagnostics tools, real ability backup and recovery mechanisms.

UNIT XI: Server data management and access tools
Data manager features, data management software, database gateways. LAN hardware and software, Network Operating Systems

UNIT XII: Client/Server Network
connectivity, communication interface technology, Interposes communication, wide area network technologies, network topologies (Token Ring, Ethernet, FDDI, CDDI) network management, Client-server system development: Software, Client–Server System Hardware: Network Acquisition, PC-level processing unit, Macintosh, notebooks, pen, UNIX workstation, x-terminals, server hardware.

UNIT XIII: C/S with distributed objects
Components - CORBA, DCOM, Globe- Comparison of – features like communication, processes, Naming, Synchronization, Caching and replication, fault tolerance and security. C/S and the Internet.

UNIT XIV: Data Storage
magnetic disk, magnetic tape, CD-ROM, WORM, Optical disk, mirrored disk, fault tolerance, RAID, RAID-Disk network interface cards, Network protection devices, Power Protection Devices, UPS, Surge protectors.
UNIT V: Client Server Systems Development

UNIT XVI: Training
Training advantages of GUI Application, System Administrator training, Database Administrator training, End-user training. The future of client server Computing Enabling Technologies, The transformational system

Reference Books:
1. Client/Server Computing for Dummies by Doug Lowe
2. Client/Server Communications Services by Thomas S. Ligon

MSIT33—Project

Semester IV
MSIT41 --- Distributed Database

UNIT I: Features of Distributed Database
Features of Distributed versus Centralized Databases, Principles Of Distributed Databases , Levels Of Distribution Transparency, Reference Architecture for Distributed Databases , Types of Data Fragmentation, Integrity Constraints in Distributed Databases.

UNIT II: Queries
Translation of Global Queries to Fragment Queries, Equivalence Transformations for Queries, Transforming Global Queries into Fragment Queries, Distributed Grouping and Aggregate Function Evaluation, Parametric Queries

UNIT III: Query Optimization

UNIT IV: Introduction To Transaction:
Definition of Transaction, Properties of transaction, types of transaction

UNIT V: Transaction Management
The transaction concept, Goals of transaction management, Characteristics of transactions, Taxonomy of transaction models.

UNIT VI: Management
The Management of Distributed Transactions, A Framework for Transaction Management , Supporting Atomicity of Distributed Transactions, Concurrency Control for Distributed Transactions, Architectural Aspects of Distributed Transactions

UNIT VII: Distributed Database Design
Alternative design Strategies, Distribution design issues, Fragmentation, Allocation.

UNIT VIII: Semantic Data Control
View Management, Data security, Semantic Integrity Control

UNIT IX: Concurrency Control
Concurrency Control, Foundation of Distributed Concurrency Control, Distributed Deadlocks, Concurrency Control based on Timestamps, Optimistic Methods for Distributed Concurrency Control.

UNIT X: Parallel Database Systems
Database servers, Parallel architecture, Parallel DBMS techniques, Parallel execution problems, Parallel execution for hierarchical architecture.
UNIT XI: Interferences and Convoy Effect
Load Balancing, Parallel Execution for Hierarchical Architecture, Problem Formulation, Basic Concepts, Load Balancing Strategy, Performance Evaluation

UNIT XII: Database Administration
Reliability, Basic Concepts, Nonblocking Commitment Protocols, Reliability and concurrency Control, Determining a Consistent View of the Network, Detection and Resolution of nconsistency, Checkpoints and Cold Restart, Distributed Database Administration, Catalog Management in Distributed Databases, Authorization and Protection.

UNIT XIV: Architectural Issues
Alternative Client/Server Architectures, Cache Consistency Object Management, Object Identifier Management, Pointer Swizzling, Object Migration, Distributed Object Storage, Object Query Processing, Object Query Processor Architectures, Query Processing Issues, Query Execution, Transaction Management, Transaction Management in Object DBMSs, Transactions as Objects.

UNIT XIV: Database Integration
Scheme Translation, Scheme Integration, Query Processing Query Processing Layers in Distributed Multi-DBMSs, Query Optimization Issues. Transaction Management Transaction and Computation Model Multidatabase Concurrency Control, Multidatabase Recovery

UNIT XV: Object Orientation And Interoperability
Object Management Architecture CORBA and Database Interoperability Distributed Component Model COM/OLE and Database Interoperability, PUSH-Based Technologies

UNIT XVI: Partitioning
Horizontal Class Partitioning, Vertical Class Partitioning, Path Partitioning, Class Partitioning Algorithms, Allocation, Replication, Alternative Client / Server Architectures, Cache Consistency

Reference Books:
1. Principles of Distributed Database Systems by M. Tamer Ozsu and Patrick Valduriez
2. Distributed Database Management Systems by Saeed K. Rahimi and Frank S. Haug

MSIT42 --- Component Technologies

UNIT I: Introduction to Component Based Development

UNIT II: Properties & Architectures
Software component, objects, fundamental properties of component technology, modules, interfaces, callbacks, directory services, component architecture, components and middleware

UNIT III: Case for Components
The Business Case for Software Components, COTS Myths and Other Lessons Learned in Component-Based Software Development,

UNIT IV: Roles for Component-Based Development
Common High Risk Mistakes in Component-Based Software Engineering, Integrating Architecture, Process, and Organization

UNIT V: Software Component Infrastructure
Software Components and the UML, Component Infrastructures: Placing Software Components in Context, Business Components

UNIT VI: Components and Connectors:
Catalysis Techniques for Defining Component Infrastructures, an Open Process for Component-Based Development, Designing Models of Modularity and Integration.

UNIT VII: Management of CBD
Measurement and Metrics for Software Components, The Practical Reuse of Software Components.

UNIT VIII: Selecting the Right COTS Software

UNIT IX: Maintenance
The Evolution, Maintenance and Management of Component-Based Systems.

UNIT X: Component Technologies

UNIT XI: Java Based Component Technologies
Thread, Java Beans, Events and connections, properties, introspection, JAR files-reflection-object serialization, Enterprise Java Beans, Distributed object models-RMI and RMI-IIOP.

UNIT XII: Corba Component Technologies
Java and CORBA, interface Definition language, object Request Broker, System object model, portable object adapter, CORBA Component model, Containers, application server, model driven architecture.

UNIT XIII: Net Based Component Technologies
COM, Distributed COM, object reuse interfaces and versioning, dispatch interfaces, connectable objects.

UNIT XIV: OLE containers and servers
Active X controls, .NET component, assemblies, app domains, contexts, reflection, remoting.

UNIT XV: Component Frameworks And Development
Connectors, contexts, EJB containers, CLR context and channels, Black Box component framework, directory objects, cross.

UNIT XVI: development environment
component, oriented programming, component design and implementation tools, testing tools, assembly tools.

Reference Books:
1. Components and Devices by Govind P. Agrawal
2. Objects Unencapsulated: Java, Eiffel, and C++ (Object and Component Technology Series) by Ian Joyner (Textbook Binding - Jun 16, 1999)

MSIT43-PROJECT

Elective Stream 1: E-Commerce
MSIT3E11 --- E-Commerce I
UNIT I: E-Commerce
Introduction, Definition of E-Commerce, History of E-Commerce

UNIT II: Electronic Commerce-Frame work
Anatomy of E-Commerce applications, E-Commerce Consumer applications, E-Commerce organization applications.

UNIT III: Types of E-Commerce
UNIT IV: E-Strategy
Information and Strategy, The virtual value chain, seven dimensions of ecommerce strategy, planning E-commerce project, E-commerce strategy and knowledge management, E-Business Strategy and Data Warehousing and Data Mining.

UNIT V: Customer –effective Web design
Requirements of Intelligent Websites, Website Goals and Objectives, planning the budget, analyzing website structure, fixed versus flexible webpage design, choosing a page size, website development tools, design alternatives, outsourcing web design, testing and maintaining websites.

UNIT VI: EDI
Electronic Data Interchange (EDI) features, components

UNIT VII: Electronic payment systems
Digital Token-Based, Smart Cards, Credit Cards, Risks in Electronic Payment systems

UNIT VIII: E-Commerce Marketing Concepts
Basic marketing concepts for internet marketing, Ecommerce marketing and branding strategies, Strengthening the customer relationship.

UNIT 9 Mobile Commerce

UNIT X: Consumer Search and Resource Discovery
Information search and Retrieval, Commerce Catalogues, Information Filtering.

UNIT XI: Multimedia
key multimedia concepts, Digital Video and electronic Commerce, Desktop video processings, Desktop video conferencing.

UNIT XII: Security

Reference Books:
1. E-Commerce 2010 by Kenneth Laudon and Carol Guercio Traver.
2. Electronic Commerce 2010 by Efraim Turban

MSIT3E12 --- Data warehousing / Data Mining
UNIT I: Introduction And Data Warehousing
Introduction, Data Warehouse, Multidimensional Data Model, Data Warehouse Architecture, Implementation, Further Development, Data Warehousing to Data Mining

UNIT II: Classifiers
Decision tree classifiers, Instance-based learners, Bayesian classifiers, Learning hyper planes, Meta learning, Classifier evaluation.

UNIT III: Data Preprocessing, Language, Architectures, Concept Description
Why Preprocessing, Cleaning, Integration, Transformation, Reduction, Discretization, Concept Hierarchy Generation, Data Mining Primitives, Query Language, Graphical User Interfaces, Architectures, Concept Description, Data Generalization, Characterizations, Class Comparisons, Descriptive Statistical Measures.

UNIT IV: Association Rules
Association Rule Mining, Single-Dimensional Boolean Association Rules from Transactional Databases, Multi-Level Association Rules from Transaction Databases.

UNIT V: Classification And Clustering
Classification and Prediction, Issues, Decision Tree Induction, Bayesian Classification, Association Rule Based, Other Classification Methods, Prediction, Classifier Accuracy, Cluster Analysis, Types of data, Categorisation of methods, Partitioning methods, Outlier Analysis.

UNIT VI: Mining
Hidden Markov Models, Collaborative Filtering, Association rule mining, Surprising item set mining, Temporal itemset mining.

UNIT VII: Recent Trends
Multidimensional Analysis and Descriptive Mining of Complex Data Objects, Spatial Databases, Multimedia Databases, Time Series and Sequence Data, Text Databases, World Wide Web, Applications and Trends in Data Mining.

UNIT VIII: Mining Complex data objects
Spatial databases, Multimedia databases, Time series and Sequence data; mining Text Databases and mining World Wide Web.

UNIT IX: Data Mining Primitives, Languages, and System Architectures:
Data mining primitives, Query language, Designing GUI based on a data mining query language, Architectures of data mining systems.

UNIT X: Application and Trends in Data Mining
Applications, Systems products and research prototypes, Additional themes in data mining, Trends in data mining.

UNIT XI: Data Design And Data Representation:
Principles of dimensional modeling, Dimensional modeling advanced topics, data extraction, transformation and loading, data quality.

UNIT XII: Selection methods
Feature selection methods, Intrusion detection, Forecasting.

Reference Books:
1. The Data Warehouse Toolkit by Ralph Kimball
2. The Data Warehouse Lifecycle Toolkit by Ralph Kimball, Margy Ross

Elective Stream 1: E-Commerce 11
MSIT4E11 --- Cyber Law

UNIT I: Fundamentals of Cyber Law
Jurisprudence of Cyber Law, Overview of Computer and Web Technology, Electronic Governance — the Indian perspective, Overview of General Laws and Procedures in India

UNIT II: E-commerce- Legal issues

UNIT III: Types of Cyber crimes

UNIT IV: Cryptography
Concept of Digital Signatures and Cryptography.

UNIT V: Regulation of cyber crimes
Issues relating to investigation, issues relating to jurisdiction, issues relating to evidence, relevant provisions under Information Technology Act 2000, Indian penal code, pornography Act and evidence Act etc.

UNIT VI: Intellectual Property Issues
Overview of Intellectual Property related, Legislation in India, Copyright law

UNIT VII: Introduction to computer and cyber crimes
Cyber crimes and related concepts, distinction between cyber crimes and conventional crimes, Cyber criminals and their objectives. Kinds of cyber crimes cyberstalking; cyber pornography, forgery and fraud, crime related to IPRs, cyber terrorism; computer vandalism etc.

UNIT VIII: Cyber forensics
computer forensics and the law, forensic evidence, computer forensic tools

UNIT IX: Cyber crime and Digital Evidence – the Indian Perspective
Penalties & Offences under the Information Technology Act, 2000, Offences under the Indian Penal Code, 1860, Issues relating to investigation and adjudication of cyber crimes in India, Digital evidence.

UNIT X: Concept of property in Cyberspace
Intellectual Property Right issues in Cyberspace, Copyright and related issues, Issues relating to Trademarks and Domain names. Liability for Hyperlinking and Metatags. Domain Name Dispute Resolution Policy.

UNIT XI: Copyright issues in cyberspace
linking, framing, protection of content on web site, international treaties, trademark issues in cyberspace: domain name dispute, cyber squatting, uniform dispute resolution policy, computer software and related IPR issues

UNIT XII: Cyberspace – The Indian Perspective
Cyberspace, Trademark law & Cyberspace, Law relating to Semiconductor Layout & Design

Reference Books:
1. Cyber Law: A Legal Arsenal for Online Business by Brett J. Trout
2. Cyber Law: Maximizing Safety and Minimizing Risk in Classrooms by Aimée M. Bissonette

MSIT4E12 --- Application Server

UNIT I: Oracle Application Server 10g Architecture
Architectural Overview, Application Server Components, New Features and Components, The Multi Tier Model, Infrastructure (Metadata Repository)

UNIT II: Application Server 10g Containers for Java
Java 2 Enterprise Edition Architecture, Enterprise Java Beans and Containers, JAR, WAR, and EAR Files, Database Connectivity, Java Naming and Directory Interface, Java Virtual Machines Deploying Applications, Managing the Oracle Container, Container Listeners

UNIT III: Application Server 10g Installation
Infrastructure Requirements, Planning Multiple Tiers for Performance, Determining Components to Install.

UNIT IV: Oracle Enterprise Manager Application Control
Using OEM Application Control, Starting and Stopping Components, Monitoring using OEM Application Control.

UNIT V: Oracle Application Server 10g Infrastructure
Metadata Repository, Oracle Internet Directory, Oracle Single Sign-on, Configuration, Changing Passwords, Modifying Component Configuration, Introduction to LDAP, Oracle Directory Manager, Delegated Administration Services, OID Self Service Console

UNIT VI: Oracle HTTP Server (OHS)
Managing OHS, OHS Modules, OHS Configuration and Server Logs, Using Container Directives, Implementing Multiple Languages, Log Files, Virtual Hosts, Using Dynamic Content, OHS Performance, Tuning, Monitoring OHS with OEM Application Control

UNIT VII: Oracle Web Cache Administration

UNIT VIII: Application Server 10g High Availability

UNIT IX: Application Server 10g Backup and Recovery
Planning for Recovery, External Failures, Internal Failures, What to Backup, Backing up the Application Server, Recovering the Application Server, Protecting the Metadata Repository, Undo Logs, Archive Logs and Control Files, Cold (Closed) Backup, Hot (Open) Backup, Recovering the Metadata Repository, Complete and Incomplete Recovery, Backup and Recovery Tool

UNIT X: Application Server 10g Security

UNIT XI: Database Connections
Data Persistence, Java Database Connectivity, Dynamic SQL and SQLJ, Data Sources, Container Managed Persistence, Using TopLink.

UNIT XII: Application Server 10g Performance Tuning
Proactive Tuning, Monitoring Performance, Standard Environment, Component Monitoring, Transaction Response Monitoring, Using Dmstool, Monitoring with Aggrespy.

Reference Books:
1. Web Application Architecture by Leon Shklar and Rich Rosen
2. Oracle Application Server 10g Administration Handbook by John Garmany

Elective Stream 2: Systems and Networking 1
MSIT3E21 --- Internet Programming

UNIT I: Introduction
What are Active Server Pages? (Understanding the Client Server Model, How ASP differs from Client-Side Scripting Technologies).

UNIT II: ASP with server
Running ASP Pages (Setting Up Personal Web Server, Setting Up Internet, Information Server, Using ASP without IIS or PWS), Creating You First ASP Pages. Understanding ASP Scripts (What Does Response.

UNIT III: Basic ASP coding
The <%=Shortcut, What’s with the <%@ LANGUAGE=VBSCRIPT%>=, Writing ASP Code Without Using <%...%>, Comments, Line Continuation Character); What You ASP Script Returned to the Browser; The ASP Process.

UNIT IV: Control Structures
What is a Control Structures. Types of Controls (Conditional Logic, Looping Logic, Branching Logic). Control Structure Typecasting Variables (What is Typecasting and Why Should I Typecast?.

UNIT V: Function
How to Typecast Your Variables; Formatting Functions, Math Functions; Date Functions (Working with Date Values, Breaking Down Date Values), String Functions; Other Functions.

UNIT VI: Working With Objects Using The Response Object
What is the Response Object. Dissecting the Response Object (Sending HTML to the Browser, Buffering ASP Pages, Sending the User to Another Page, Cookies, Caching Your ASP Pages).

UNIT VII: Forms And Tools
UNIT VIII: Collecting the Form Information and Working with the Request Object
Retrieving the Results of a Form (Using the Request Object); Using the Querystring to Send Information. Accessing the HTTP Headers (Useful HTTP Headers, Reading the HTTP Headers with Request.

UNIT IX: Cookies
Accessing the Environment Variables (Useful Environment Variables, Reading the Environment Variables Using Request. ServerVariables); Using Cookies (What are Cookies?, How to Read Cookies Using the Request Object, How to Write Cookies Using the Response Object, Advantages and Disadvantages of Using Cookies.

UNIT X: Cookies with session and application
The Session Object (Using Session Variables, Pitfalls of Session Variables, Session Variables Without Cookies). The Application Object (Using Application Variables, Pitfalls of Application Variables); Initializing Application and Session Variables (Creating a Global. asa File).

UNIT XI: Using Databases
What Are Relational Databases ? (Common Relational Databases), Why Use Databases ?; Working with Databases Using ASP, Reading from a Database Using ASP :: Databases and ASP (Communicating with a Database Using ActiveX Data Objects (ADO)); Connecting to a Database (The Connection Object, Using a System DSN, Using a DSN-less Connection, Opening the Connection, Closing the Connection, Properties of the Connection); Reading Data from a Database (The Recordset Object, Using adovbs.inc, Reading and Displaying the Contents of a Database Table). Inserting, Updating, and Deleting Database Records :: Inserting Records (Lock Types, Add New and Update); Updating Records; Deleting Records. Using SQL Statements to Query Data :: What is SQL ? (Executing SQL Statements Using ASP and ADO); The SELECT SQL Statement (Using the WHERE Clause, Iterating Through Record sets Generated by SQL Statements); Allowing Users to Query Data.

UNIT XII: XML
The History Of XML; The Origins Of XML; Comparison Of XML And Html Components Of XML; Anatomy Of An XML Document : A Sample XML Document, ; XML Declaration; The Root Element ; An Empty Element; Attributes, Markup Delimiters; Element Mark Up; Attribute Mark Up; Naming Rules; Character References; Predefined Entities; Entity References; Cdata Sections; Processing Instructions.

Reference Books:
1. Internet & World Wide Web Program
2. Internet Programming with Python by Aaron Watters, Guido Van Rossum, James C. Ahlstrom, and Guido Van Rossum (Paperback - Sep 30, 1996)

MSIT3E22 --- Mobile Computing

UNIT I: Wireless Communication Fundamentals
UNIT II: Telecommunication Networks
Telecommunication systems, GSM, GPRS, DECT, UMTS, IMT-2000, Satellite Networks - Basics, Parameters and Configurations, Capacity Allocation, FAMA and DAMA, Broadcast Systems, DAB - DVB.

UNIT III: Characteristics of radio propagation.
Fading, Multipath propagation

UNIT IV: Introduction to digital transmission
Definition of bit-rate and signalling rate. Introduction to synchronous transmission. The need for pulse shaping, synchronisation and line-coding. Calculation of bit-error probabilities when the channel is affected by the addition of Gaussian noise

UNIT V: Narrowband digital modulation
The need for modulation. Binary and multi-level (M-ary) amplitude-shift keying (ASK), frequency-shift keying (FSK) and phase-shift keying (PSK).

UNIT VI: WIRELESS LAN
Wireless LAN, IEEE 802.11 - Architecture, services, MAC, Physical layer, IEEE 802.11a - 802.11b standards, HIPERLAN, Blue Tooth.

UNIT VII: Protocols supporting mobility
Mobile network layer protocols such as mobile-IP, Dynamic Host Configuration Protocol (DHCP). Mobile transport layer protocols such as mobile-TCP, indirect-TCP. Wireless Application Protocol (WAP).

UNIT VIII: Mobile Network Layer

UNIT IX: Cellular Networks
Channel allocation, multiple access, Location management, Handoffs.

UNIT X: Wireless Networking
Wireless Transmission Basics, MAC protocols, Routing, Transport

UNIT XI: Ad-hoc networking Applications
Mobility adaptations, disconnected operations, Data broadcasting, Mobile agents.

UNIT XII: Efficient computing
Energy efficient computing, Impact of mobility on algorithms.

Reference Books:
1. Mobile Computing Principles by Reza B'Far
2. Fundamentals of Mobile and Pervasive Computing by Frank Adelstein

Elective Stream 2: Systems and Networking 11
MSCIT4E21 Linux Internals

UNIT I: The Operating System
Main Characteristics, Linux Distributions, COMPILING THE KERNEL, Where Is Everything?, Compiling, Additional Configuration facilities

UNIT II: Installing Linux As A Server
Linux and Linux Distributions; Major differences between Windows 2000 and Linux; Single Users vs Multisusers vs Network Users; Separation of the GUI and the Kernel; Domains; Active Directory

UNIT III: Introduction To The Kernel
Important Data Structures, Main Algorithms, Implementing System Calls

UNIT IV: Memory Management
The Architecture Dependent memory model, The Virtual Address space for a Process, Block Device Caching, Paging under Linux
UNIT V: Inter-Process Communication
Synchronization in the Kernel, Communication via Files, Pipes, Debugging Using ptrace, System V IPC, IPC with Sockets.

UNIT VI: Device Drivers Under Linux
Character and Block Devices, Polling and Interrupts, The Hardware, Implementing a Driver, An Example of DMA Operation

UNIT VII: Installing Linux In A Server Configuration
Before Installation; Hardware; Server Design ; Dual-Booting Issues; Methods of Installation; Installing Red Hat Linux; Creating a Boot Disk; Starting the Installation; Welcome of Red Hat Linux GNOME AND KDE : The History of X Windows; The Downside; Enter KDE and GNOME; About KDE; Licensing issues; Starting X Windows and KDE; KDE Basics; The KDE Control Center; About GNOME; Starting X Windows and GNOME; GNOME Basics; The GNOME Configuration Tool.

UNIT VIII: Installing Software
The Red Hat Package Manager; Installing a New Package; Querying a Package; Uninstalling a Package; gnorpm; Compiling Software; Getting and Unpacking the Package; Looking for Documentation ;Configuring the Package; Compiling Your Package; Installing the Package

UNIT IX: Network Implementation

UNIT X: Multi-Processing
The Intel Multi-processor Specification, Problems with Multi-processor Systems, Changes to the Kernel, Compiling Linux SMP

UNIT XI: The Command Line
An Introduction to BASH; Job Control; Environment Variables; Pipes; Redirection; Command-Line Shortcuts; Documentation Tools; The man Command; the textinfo System; File Listings; Ownerships and permissions; Listing Files; File and Directory Types; Change Ownership Change Group; Change Mode; File Management and Manipulation; Process Manipulation; Miscellaneous Tools

UNIT XII: Modules And Debugging
What are Modules?, Implementation in the Kernel, What can be Implemented as a Module?, Parameter Passing, The kernel Daemon, An Example Module, Debugging

Reference Books:
1. Understanding the Linux Kernel, Third Edition by Daniel P. Bovet and Marco Cesati Ph.D.
2. Linux Kernel Programming by Michael Beck, Harald Bohme

MSIT4E22 --- Embedded Systems

UNIT I: Introduction To Embedded Systems
Definition and Classification , Overview of Processors and hardware units in an embedded system , Software embedded into the system , Exemplary Embedded Systems , Embedded Systems on a Chip (SoC) and the use of VLSI designed circuits

UNIT II: Devices And Buses For Devices Network
I/O Devices, Device I/O Types and Examples, Synchronous, Iso-synchronous and Asynchronous Communications from Serial Devices, Examples of Internal Serial, Communication Devices - UART and HDLC, Parallel Port Devices.

UNIT III: Features

UNIT IV: Programming Concepts And Embedded Programming In C, C++
Programming in assembly language (ALP) vs. High Level Language, C Program Elements, Macros
UNIT V: Concepts of Embedded Programming in C++

UNIT VI: REAL Time Operating Systems
Definitions of process, tasks and threads, Clear cut distinction between functions, ISRs and tasks by their characteristics, Operating System Services- Goals, Structures- Kernel - Process Management, Memory Management, Device Management, File System Organisation and Implementation, I/O Subsystems, Interrupt Routines Handling in RTOS, REAL TIME

UNIT VII: Operating System
RTOS Task scheduling models - Handling of task scheduling and latency and deadlines as performance metrics, Co-operative Round Robin Scheduling, Cyclic Scheduling with Time Slicing (Rate Monotonic, Co-operative Scheduling), Preemptive Scheduling Model strategy by a Scheduler, Critical Section Service by a Preemptive Scheduler,

UNIT VIII: Fixed (Static) real time scheduling of tasks
INTER PROCESS COMMUNICATION AND SYNCHRONISATION, Shared data problem, Use of Semaphore(s), Priority Inversion Problem and Deadlock Situations, Inter Process Communications using Signals, Semaphore Flag or mutex as Resource key, Message Queues, Mailboxes, Pipes, Virtual (Logical) Sockets, Remote Procedure Calls (RPCs).

UNIT IX: Embedded Computing

UNIT X: The 8051 Architecture
Introduction, 8051 Micro controller Hardware, Input/Output Ports and Circuits, External Memory, Counter and Timers, Serial data Input/Output, Interrupts

UNIT XI: Basic Assembly Language Programming Concepts
The Assembly Language Programming Process, Programming Tools and Techniques, Programming the 8051, Data Transfer and Logical Instructions.

UNIT XII: Applications
Interfacing with Keyboards, Displays, D/A and A/D Conversions, Multiple Interrupts, Serial Data Communication.

Reference Books:
2. Embedded Systems Architecture Tammy Noergaard

Elective Stream 3: Multimedia and Cognition 1
MSIT3E31 --- Pattern Recognition
UNIT I: Introduction to Pattern Recognition
Statistical Pattern Recognition, Feature Selection, Syntactic Pattern Recognition, Segmentation Techniques.

UNIT II: Basics of Decision Theory
Classifiers, Discriminant Functions, Decision surfaces, Normal density and recognition, Discrete Features.

UNIT III: Parameter Estimated Methods
Maximum likelihood Estimation, Expectation maximization methods, Bayesian Estimation.
UNIT IV: Dimension Reduction Methods
Fisher Discriminant Analysis, Principal Component Analysis, Non-Parametric Techniques

UNIT V: Linear Discrimination Functions
Support Vectors, Classifiers, Discrimination Functions, Perceptron

UNIT VI: Non-Metric Methods
Introduction, Non-numeric data, Nominal Data, Decision trees.

UNIT VII: Non-Parametric Methods

UNIT VIII: Unsupervised Learning and Clustering

UNIT IX: Continued Un-Supervised Learning and Clustering
Introduction, Mixture Densities and identifiability, maximum likelihood estimates, application to normal mixtures, Data description and clustering- criteria functions.

UNIT X: Features
Preprocessing, Feature Selection and Primitive Extraction, Adaptive Classification, Fuzzy Grammar.

UNIT XI: Approaches
Fuzzy Mathematical Approach to Pattern Recognition, Classificatory Analysis

UNIT XII: Analysis Scene
Analysis, Analytical Description of region Boundaries, Shape Description by Region Analysis.

Reference Book
1. Pattern recognition by Sergios Theodoridis
2. Pattern recognition by William Gibson

MSCIT3E32 Multimedia Computing

UNIT I: Introduction to Multimedia-media and Data streams-properties of a multimedia system
Data streams characteristics-information units- Multimedia Hardware platforms-Memory and storage devices-Input and output devices-Multimedia software tools.

UNIT II: Multimedia Building blocks
Audio: Basic sound concepts- Music-speech-audio file formats- Images and graphics: Basic concepts- computer image processing- Video and Animation: Basic concepts- Animation techniques.

UNIT III: Data compression
Storage space and coding requirements- source, entropy and Hybrid coding- Basic compression techniques- JPEG- H.261- MPEG- DVI

UNIT IV: Multimedia Database systems
Characteristics of Multimedia Database Management system- data analysis- Data structure operations on data- Integration in a database Model.

UNIT V: Multimedia Systems

UNIT VI: Multimedia Documents
Hypertext and Hypermedia- document architecture SGMLDocument architecture ODA, MHEG.

UNIT VII: Image and Video Compression – JPEG and MPEG
Introduction, Color Space Conversion and Down sampling, Discrete Cosine Transform, quantization,
Zig-Zag Reordering, Zero Run Length Coding.

UNIT VIII: Video Compression – Summary of MPEGs and MPEG-4, Streaming Videos

UNIT IX: Multimedia applications
Introduction, Media preparation- Media composition, Media Integration- Media communication, Media consumption, Media entertainment- trends.

UNIT X: Hardware Devices for Multimedia Computing
Input Devices, Output Devices, Video Cameras, Digital Cameras, Scanners, Microphones, Midi Hardware, Optical Disks, Buses, Monitors.

UNIT XI: Multimedia Authoring
Multimedia Authoring, Multimedia Conferencing, Types of authoring tools, Card- and page-based tools, Icon-based authoring tools, Time-based authoring tools, Object- Oriented tools, Mark-up tools, The right tool for the job, Programming, Basics, Effective programming techniques, Programming Approaches

UNIT XII: Multimedia Data Mining
Introduction, Process of Application of Multimedia Mining, Feature extraction, Feature extraction from text, Feature extraction from images, Feature extraction from Audio, Feature extraction from Video, Models for multimedia mining, Classification models, Clustering Models, Association rules, Digitisation And Data Mining, Multimedia Data Mining Architecture, Various Applications of Multimedia Data Mining, Similarity Search in Multimedia Data, Queries in Content-Based Retrieval Systems, Approaches Based on Image Signature, Wavelet Analysis, Multidimensional Analysis of Multimedia Data.

Reference Book

Elective Stream 3: Multimedia and Cognition 11
MSIT4E31 --- Computer Cognition
UNIT I: Overview
Image/Appearance-based, Relational/Graphical, Probabilistic, Ontological, Geometric/Object, Logical/Rule-based/Syntactic, Procedural/Embodied

UNIT II: Issues
Indexing, Certainty, Scale, Multiple Representations, Storage

UNIT III: Knowledge Representation Technologies
Receptive Fields/Gaussian Derivatives, Graph Representations, Bayesian Network Models, Hidden Markov Models, Eigenspace / Principal Component Representations, Active/Deformable/Parametric Shape Models, Frames/Rules/Demons

UNIT IV: Applications/CaSe Studies
Activity/Behavior/Processes/Dynamics, Classification/Category, Context/Scene/Situations, Function, Objects/Parts, Ontologies, Parameters, Task Cont
UNIT V: Recognition, Categorization and Estimation
Category, Parameters, Position, State, Bayesian Classification, Model Based Indexing, Invocation, Decision Trees, Sequential Classifiers, k-Nearest Neighbor, Neural, Network/Perceptron Methods

UNIT VI: Activity/Behavior/Processes/Dynamics
Classification/Category, Context/Scene/Situations, Function, Objects/Parts, Parameters

UNIT VII: Reasoning about Structures and Events
Objects & spatial structures and their organization, Appearance/Visibility, Events & temporal structures and their organization, Tasks/Goals

UNIT VIII: Reasoning Technologies
Bayesian Inference, Change and Moving Object Detection, Temporal Event Analysis, Perceptual Organization, Grouping / Figure-Ground Separation, Performance Analysis for Vision, Correspondence Matching

UNIT IX: Planning for sensing and other processes
Occlusion Understanding and Recovery, Decision Making, Probabilistic, Rule Based, Soft Control

UNIT X: Model Learning
Types of Learning, Supervised, Case-based, Process identification: ARMA, ANOVA, HMM, Unsupervised, Validation, Learning Control, Robustness

UNIT XI: Visual Process Control
Quality/Accuracy, Goal Specification, Multiple/Single Sensor, Distribution of Control, Speed of Response, Sensing, Attention/Focus of processing, Processing Resources, Reasoning Directions

UNIT XII: Static Image & Image Sequence Understanding
Aerial Image Understanding, Scene Understanding, Behavior Analysis, Movement Analysis, Walker Identification, Gesture Analysis, Abnormal behavior detection, Expression Understanding

Reference Book

MSIT4E32 --- Image Processing

UNIT I: Introduction and organization
Physics of vision, resolution, impulse response, Viewing digital images, bits and bytes, raster scan format, quantization.

UNIT II: Linear systems
matrix transformations, scaling, translation and rotations, Contrast and grey levels, histograms, Gaussian and other non-linear stretches, Scaling, translation and rotation, sums and differences

UNIT III: Filters
Convolution, simple filters, edge detection, Histograms and stretches, convolutional filters, The frequency domain, power spectral density, the FFT, Digital filtering, image enhancement, noise

UNIT IV: Color representation
RGB, HSI, 24 bit and 8 bit color tables, Storing multiple images in 8 bits, color table swaps, Color basics

UNIT V: Interpolation methods
accuracy vs. efficiency, forward and backward methods, Image interpolation, Topography and shaded relief displays, Perspective viewing and anaglyphs

UNIT VI: Geometric and spatial transforms
restoring distortion, Fitting smooth functions to sparse data, least-squares, Rubber sheeting of images

UNIT VII: Image morphing
Introduction to morphing, False color images, principle components analysis, Creating multiple
image sequences for the project

**UNIT VIII: Digital Image Fundamentals**
Human visual system, Sampling and Fourier analysis, Intensity Transformations and Spatial Filtering, Histogram Processing, Spatial Filtering

**UNIT IX: Filtering in the Frequency Domain**
Preliminary Concepts, Extension to functions of two variables, Image Smoothing, Image sharpening.

**UNIT X: Image Restoration and Reconstruction**
Noise Models, Noise Reduction, Inverse Filtering, MMSE (Wiener) Filtering, Color Image Processing

**UNIT XI: Image Compression**
Fundamentals, Basic Compression Methods, Morphological Image Processing, Erosion, dilation, opening, closing, Basic Morphological Algorithms: hole filling, connected components, thinning, skeletons.

**UNIT XII: Image Segmentation**
Point, line, edge detection, Thresholding, Region-based segmentation

**Reference Book**
1. Image processing: principles and applications by Tinku Acharya, Ajoy K. Ray
2. The image processing handbook by John C. Russ