



Mahatma Gandhi University
MEGHALAYA
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SYLLABUS MANUAL

INFORMATION TECHNOLOGY PROGRAMME

PROGRAMME CODE --- 501
Post Graduate Diploma in Computer Application (PGDCA)

SEMSTER I

CODE	SUBJECT	CREDIT
PGDCA11	Industrial Management	3
PGDCA12	Analysis and Design of Algorithms	3
PGDCA13	Advanced Operating System	3
PGDCA14	Visual Basic Programming	3
PGDCA15-L	Analysis and Design of Algorithms(Lab)	3
PGDCA16-L	Visual Basic Programming (Lab)	3
TOTAL		18

SEMESTER II

CODE	SUBJECT	CREDIT
PGDCA21	Software Quality And Testing	3
PGDCA22	Advanced Networks	3
PGDCA23	OOAD and UML	3
PGDCA24	Advanced Java	3
PGDCA25-L	OOAD and UML Lab	3
PGDCA26-L	Advanced Java Lab	3
TOTAL		18

Detailed Syllabus

SEMESTER I

PGDCA11 --- Industrial Management

UNIT I: Concepts of Management and Organisation

Taylor's Scientific Management, Fayol's Principles of Management, Douglas Mc-Gregor's Theory X and Theory Y, Mayo's Hawthorne Experiments, Hertzberg's Two Factor Theory of Motivation, Maslow's Hierarchy of Human Needs – Systems Approach to Management.

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

Nature, objectives, Importance - Factors influencing layout - Types of layout - Problems of 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 MRPII, Overview of materials management purchasing, storage, disposal and inventory control, Plant maintenance: breakdown and preventive 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 Path probability 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

PGDCA12 --- 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

Choice of Appropriate Data Structures Choice of Appropriate Design Technology Specification Methods for Algorithms Proving Correctness of an Algorithm Analyzing an Algorithm Coding the Algorithm Areas of Study of an Algorithm Performance Analysis Performance Analysis – Space Complexity Performance Analysis – Time Complexity

UNIT IV: Analyzing And Designing Algorithms

Introduction Analyzing Algorithms Criteria of Analyzing Algorithms Correctness Amount of Work Done, The Space Usage Simplicity Optimality Asymptotic Complexity Asymptotic Notation Asymptotic Notations Typical Running Time Functions Performance Analysis Practical Complexities – Function Values Asymptotic Notations – Limits and Properties Designing Algorithms Designing, Algorithms Using CAD Technologies, INTERNAL SORTING, Introduction Internal Sorting, Insertion Sort, Insertion Sort, Algorithm, Insertion Sort Analysis Bubble Sort.

UNIT V: 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

Introduction String Matching Naïve Approach The Naïve String-Matching Algorithm String Matching – Finit

e Automaton KMP Algorithm String Matching – KMP Flowchart String Matching, KMP Scan Example String Matching – KMP Scan Algorithm String Matching – KMP Algorithm Analysis String Matching with Finite Automata

UNIT VIII: Polynomials

Introduction, Polynomial, Overview of Polynomial, Polynomial Functions, Polynomial Equations, Classifications of Polynomial, Polynomials, Representations Evaluation Straightforward Evaluation, Dense Horner's Method Horner's Method, Dense Representation Straight forward Evaluation, Sparse Horner's Method, Sparse Representation Lagrange's Interpolation.

UNIT IX: Matrices

Introduction Matrices Properties Strassen's Matrix Multiplication Conventional Matrix, Multiplication Inversion Solving Systems of Linear Equations.

UNIT X: Dynamic Programming

Introduction Dynamic Programming Characteristics of Dynamic Programming Principle of Optimality Dynamic Programming Approach to Solve Traveling Salesman The Traveling Salesman Problem Knapsack Problem. The 0/1 Knapsack Problem Spanning Tree Problem.

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 Algorithms, What is Genetic Algorithms? Why Genetic Algorithms? Genetic Algorithms Overview Search Space.

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

PGDCA13 --- Advanced Operating System

UNIT I: An Overview Of Operating System

Introduction, What is an operating system? What does an operating system do? Where are operating systems found? History of computer operating systems, Mainframe systems, Desktop systems, Multiprocessor systems, Distributed systems, Clustered systems, Real Time system,SYSTEM'S COMPONENTS Introduction, Systems components, Process Management, Main-Memory Management, File Management, I/O System Management, Secondary-Storage Management, Networking Protection System, Command Interpreter System.

UNIT II: Operating System Services

Introduction, Program Execution, I/O Operations, File System Manipulation, Communications Error Detection. SYSTEM CALLS AND SYSTEM PROGRAMS Introduction, System calls, System Calls for Process Management System Calls for Signaling System Calls for File Management System Calls for Directory Management System Calls for Protection System Calls for Time Management System Calls for Device Management System Programs.

UNIT III: Operating System Structure

Introduction, System Structure Monolithic, Systems Layered Systems, Virtual Machines,Exokernel, Client-server Model, SYSTEM DESIGN & IMPLEMENTATION, Introduction ,System Design & Implementation Design, Goals Mechanisms and Policies Implementation,System Generation

UNIT IV: Process Management

Introduction Process Management Process Concept Thread Processes vs Threads Benefits of Threads Process state Primary process states Additional process states Process Control Block Process State Transitions PROCESS SCHEDULING Introduction Process Scheduling General Goals Policy Enforcement Efficiency Response Time Turnaround Throughput Nonpreemptive Scheduling Preemptive Scheduling First-Come-First-Served Scheduling (FCFS) Shortest-Job-First Scheduling (SJF) Shortest Remaining Time Scheduling (SRT) Priority Scheduling (PS) Round Robin Scheduling (RR) Multi-level feedback queues (MLF).

UNIT V: Operations On Process

Introduction Operations on process Processes Creation Process Termination Cooperating process

Information Sharing Computation Speedup Modularity Convenience Inter process communication Race Condition Critical Section Mutual Exclusion Mutual Exclusion Conditions Proposals for Achieving Mutual Exclusion Semaphore Definition Producer-Consumer Problem Using Semaphores Message Passing CPU SCHEDULING Introduction CPU Scheduling CPU Scheduling Criteria Scheduling algorithms Multiple processor Scheduling Real Time scheduling.

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

Introduction Swapping Contiguous memory allocation Buddy System Paging Segmentation Segmentation with paging VIRTUAL MEMORY Introduction Virtual Memory Demand Paging Process Creation Page Replacement Static Page replacement Algorithms Dynamic Page Replacement Algorithms Allocation of Frames Thrashing.

UNIT VII: I/O SYSTEMS

Introduction I/O Systems I/O Devices Input Device Output Device Device Controllers Device Drivers Memory-Mapped I/O Direct Memory Access DMA Operation Terminals Clocks and Timers.

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

Introduction File Systems Types of File Systems File systems and Operating Systems File concept Access methods Sequential Access Direct Access Other Access Methods Directory structure Single Level Directory Two Level Directory Three Level Directory.

UNIT XI: File System Implementation

Introduction File system structure File system implementation Directory implementation Allocation Methods Contiguous Allocation Linked Allocation Indexed Allocation Free space Management Bit-Vector Linked List Grouping Counting Efficiency & Performance Recovery Physical Damage Physical Damage Recovery Logical Damage Logical Damage Recovery .

UNIT XII: Case Studies

LINUX Introduction Design Principles User interface Kernel modules Linux Kernel Modules Life Cycle of Linux Kernel Module Unloading Modules Process Management Multitasking Types of Processes Input, Output, and Error Redirection Managing Running Processes Killing Stalled Processes Understanding the init Processes Parent Processes Process scheduling Scheduling in Multiprocessor Systems Memory Management Demand Paging Swapping Shared Virtual Memory Physical and Virtual Addressing Modes Access Control Caches Linux Page Tables Page Allocation and Deallocation Memory Mapping Demand Paging The Linux Page Cache Swapping Out and Discarding Pages Reducing the Size of the Page and Buffer Caches Swapping Out System V Shared Memory Pages Swapping Pages In File systems Input & Output The Traditional UNIX Way New POSIX Interfaces Optimising Existing UNIX Interfaces Making Better Use of Existing UNIX Interfaces Inter process Communication Signals Pipes System V IPC Mechanisms Message Queues Semaphores Shared Memory Network structure An Overview of TCP/IP Networking The Linux TCP/IP Networking Layers The BSD Socket Interface The INET Socket Layer The IP Layer The

Address Resolution Protocol (ARP) IP Routing Security.

Reference Books:

1. Advanced Concepts In Operating Systems by Mukesh Singhal and Niranjan Shivaratri
2. Advanced UNIX Programming by Marc J. Rochkind

PGDCA14 --- Visual Basic Programming

UNIT I: Introduction To VB.NET

Introduction ,Welcome to VB.Net ,Evolution of VB.Net ,Features of VB.Net ,Opening and Closing Windows .

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

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

Introduction Resources Menus Accelerators Dialog Icon Bitmaps Versions Message Maps Document/View Architecture The View The Document The Frame The Document/View Approach Overview of the Single Document Interface (SDI) Creating a Single Document Interface Overview of the Multiple Document Interface (MDI) Creating a Multiple Document Interface DATA HANDLING IN VC++ Introduction Connecting to Data Source DAO ODBC, THREAD-BASED MULTITASKING Introduction Thread-based Multitasking ,WIZARD Introduction Visual C++ APPWIZARD Class Wizard.

Reference Books:

1. Programming in Visual Basic 2008 by Julia Case Bradley and Anita
2. Programming in Visual Basic 2010: The Very Beginner's Guide by Jim McKeown

PGDCA15-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 Methods for Algorithms Proving Correctness of an Algorithm Analyzing an Algorithm Coding the Algorithm Areas of Study of an Algorithm Performance Analysis Performance Analysis – Space Complexity Performance Analysis – Time Complexity

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Introduction Analyzing Algorithms Criteria of Analyzing Algorithms Correctness Amount of Work Done, The Space Usage Simplicity Optimality Asymptotic Complexity Asymptotic Notation Asymptotic Notations Typical Running Time Functions Performance Analysis Practical Complexities – Function Values Asymptotic Notations – Limits and Properties Designing Algorithms Designing, Algorithms Using CAD Technologies, INTERNAL SORTING, Introduction Internal Sorting, Insertion Sort, Insertion Sort, Algorithm, Insertion Sort Analysis Bubble Sort.

UNIT V: 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

Introduction String Matching Naïve Approach The Naïve String-Matching Algorithm String Matching – Finite Automaton KMP Algorithm String Matching – KMP Flowchart String Matching, KMP Scan Example String Matching – KMP Scan Algorithm String Matching – KMP Algorithm Analysis String Matching with Finite Automata

UNIT VIII: Polynomials

Introduction, Polynomial, Overview of Polynomial, Polynomial Functions, Polynomial Equations, Classifications of Polynomial, Polynomials, Representations Evaluation Straightforward Evaluation, Dense Horner's Method Horner's Method , Dense Representation Straight forward Evaluation, Sparse Horner's Method , Sparse Representation Lagrange's Interpolation.

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PGDCA16-L---Visual Basic Programming (Lab)

UNIT I: Introduction To VB.NET

Introduction ,Welcome to VB.Net ,Evolution of VB.Net ,Features of VB.Net ,Opening and Closing Windows .

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.

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Document/View Architecture The View The Document The Frame The Document/View Approach Overview of the Single Document Interface (SDI) Creating a Single Document Interface Overview of the Multiple Document Interface (MDI) Creating a Multiple Document Interface DATA HANDLING IN VC++ Introduction Connecting to Data Source DAO ODBC, THREAD-BASED MULTITASKING Introduction Thread-based Multitasking ,WIZARD Introduction Visual C++ APPWIZARD Class Wizard.

Reference Books:

1. Programming in Visual Basic 2008 by Julia Case Bradley and Anita
2. Programming in Visual Basic 2010: The Very Beginner's Guide by Jim McKeown

SEMESTER II

PGDCA21 --- Software Quality And Testing

UNIT I: Introduction To Software Testing

Introduction Purpose of Software Testing Some Dichotomies Testing versus Debugging Function versus Structure The Designer versus the Tester Modularity versus Efficiency Small versus Large The Builder versus the Buyer A Model for Testing The Environment The Program Bugs Tests Testing Levels The Role of Models Playing Pools and Consulting Oracles Playing Pool Oracles s Complete Testing Possible.

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

Introduction Testing Fundamentals Objectives of Testing Benefits of Testing Testing Principles Test Case Design White-box Testing Black-box Testing Boundary Value Analysis Equivalence Class Testing Decision Table-based Testing Cause Effect Graphing Technique

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 Introduction to Software Testing Instrumentation and Application of Path Testing Integration, Coverage and Paths in Called Components New Code Maintenance Re-hosting.

UNITV: Transaction Flow Testing

Introduction Transaction Flows Usage Implementation Complications Transaction-flow Structure Transaction Flow Testing Techniques Inspections, Reviews and Walkthroughs Path Selection Sensitization Instrumentation Test Databases Execution Implementation Comments Transaction-based Systems Hidden Languages.

UNIT VI: Data Flow Testing

Introduction Data Flow Testing Basics Data Flow Graphs Data Flow Model Data Flow Testing Strategies Terminologies Strategies Slicing, Dicing, Data Flow and Debugging Applications, Tools and Effectiveness.

UNIT VII: Syntax Testing

Introduction Why, What and How? Garbage & Software Testing Casual and Malicious Users Operators The Internal World What to Do? Applications and Hidden Languages The Graph we Cover Overview A Grammar for Formats Objectives BNF Notation (BACK59) Implementation and Applications Execution Automation Design Automation Productivity, Training and Effectiveness Ad-Lib Tests Testability Tips The Tip Compiler Overview Typical Software 7.5.4 Separation of Phases Prerequisites.

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

Introduction , State Graphs , States , Inputs and Transitions , Outputs , State Tables , Time versus Sequence , Software Implementation , State Graphs: Good and Bad , State Bugs , Transition Bugs , Output Errors , Encoding Bugs ,State Testing , Impact of Bugs , Principles , Limitations and Extensions , What to Model , Getting the Data.

UNIT X: Testing Specialized Environments, Architecture And Applications

Introduction , Testing GUIs , GUI Test Strategies ,Types of GUI Tests , Improving GUI Testability , Testing of Client-Server Architecture , Client-Server Software , Client-Server Testing Techniques Testing Aspects , Measures of Completeness 10 Software Testing , Testing Documentation and Help Facilities , Software Reviews , Test Deliverables , Samples of Test Deliverables , Testing of Real-Time Systems

UNIT XI: Testing Tactics And Debugging

Introduction , Strategic Approach to Testing and Strategic Issues, Verification and Validation , Organizing for Software Testing , Software Testing Strategy.

UNIT XII: Strategic Issues & UNIT Testing

Advantages of UNIT Testing , Integration Testing , Top-down Integration, Bottom-up Integration , Regression Testing , Smoke Testing , Documentation for Integration Testing, Validation Testing , Configuration Review , Alpha and Beta Testing , System Testing , Recovery Testing , Security Testing , Stress Testing , Performance Testing , Debugging , Debugging Techniques , Debugging Approaches.

Reference Books:

1. Software Testing and Quality Assurance: Theory and Practice by Sagar Naik and Piyu Tripathy
2. Fuzzing for Software Security Testing and Quality Assurance by Ari Takanen, Jared DeMott

PGDCA22 --- 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

Introduction ,Reference Models , Open Systems Interconnection (OSI) Reference Model , TCP/IP

Reference Model , A Comparison of the OSI and TCP/IP Reference Models , Example Networks , Internet , Connection-Oriented Networks.

UNIT III: The Physical Layer

Introduction , Theoretical Basic for Data Communication , Transmission Media , Guided Transmission Media, Twisted Pair (Copper Conductors) , Coaxial Cable , Optical Fiber .

UNIT IV: The Physical Layer-II

Introduction , Wireless Transmission , Radio , Very Low Frequency (VLF) , Microwave Transmission , Satellite Communication , Infrared Transmission , Public Switched Telephone Network , Digital Channel , Trunk Lines , Cable Television (CATV) , Mobile Telephone System , Cellular Radio , GSM Cellular Radio System , Base Transceiver Stations (BTS) and Antennas .

UNIT V: The Data Link Layer

Introduction , Data Link Layer Design Issues , Error Detection and Correction, Elementary Data Link Protocols , Positive Acknowledgement with Retransmission Protocol (PAR) , Sliding Window Protocols , Go Back N , Selective Repeat , Protocol Verification , Finite State Machine Models , Petri Net Models.

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

Introduction , Network Layer Design Issues ,Routing Algorithms , Optimality Principle , Congestion , Control Algorithms , General Principles of Congestion Control , Traffic Management , Congestion Prevention Policies , Traffic Shaping , Leaky Bucket , Token Bucket Algorithm , Quality of Service , Basic QoS Architecture , QoS Concepts , End-to-end QoS Levels , Integrated Services , Traffic Control Functions , Integrated Service Classes ,Reservation Protocol (RSVP) , Differentiated Service , Inbound Admission.

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

Introduction , Transport Service , Services Provided to the Upper Layers , Quality of Service , Transport Service Primitives , Elements of Transport Protocol , A Simple Transport Protocol , The Example Service Primitives .

UNIT X: Internet Transmission Protocol

The Example Transport Entity , The Example as a Finite State Machine , Internet Transmission Protocol , User Datagram Protocol (UDP) , Transmission Control Protocol , Performance Issues

UNIT XI: OSI Upper Layers

Introduction , Session Layer - Design Issues , Session Layer - Synchronization, Presentation Layer, Presentation Layer - The Design Issues , Presentation Layer - Cryptography , Application Layer ,Design Issues .

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

2. Maya Advanced: Building Advanced Shading Networks by Digital Tutors.

PGDCA23 --- OOAD and UML

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 , Metadata Models and Views ,Class Diagrams , Advanced Object Modeling .

UNIT II: Object and Class Concepts

Aggregation, Generalization , Multiple Inheritances , Derived Data and Constraints , Dynamic Modeling, State Diagram , Functional Modeling , Application Fields of Functional Modeling .

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
2. Structured System Anal And Design by Isrd, ISRD Group

PGDCA24 --- 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

The World Wide Web- An Overview, HTML, Java Applets, The structure of Java applet.

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.

PGDCA25-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 , Metadata Models and Views ,Class Diagrams , Advanced Object Modeling .

UNIT II: Object and Class Concepts

Aggregation, Generalization , Multiple Inheritances , Derived Data and Constraints , Dynamic

Modeling, State Diagram , Functional Modeling , Application Fields of Functional Modeling .

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
2. Structured System Anal And Design by Isrd, ISRD Group.