Karnataka State Open University

Syllabus

Masters of Sciences Information Technology (M.Sc.IT)

Master of Science – Information Technology

Semester I		
	SUBJECT	CREDITS
	Industrial Management	3
	Analysis and Design of Algorithms	3
	Analysis and Design of Algorithms(Lab)	1
	Advanced Operating System	3
	Visual Programming	3
	Visual Programming (La)	1
Total		14

Semester II		
CODE	SUBJECT	CREDITS
	Software Quality And Testing	3
	Advanced Networks	3
	OOAD and UML	1
	OOAD and UML Lab	3
	Advanced Java	3
	Advanced Java Lab	1
Total		14

Semester III		
	SUBJECT	CREDITS
	Project Management	2
	Client server Computing	2
	Project Synopsis	4
	Elective Paper 1	3
	Elective Paper 2	3
Total		14

Semester IV		
CODE	SUBJECT	CREDITS
	Distributed Database	2
	Component Technologies	2
	Project	4
	Elective Paper 1	3
	Elective Paper 2	3
Total		14

Electives Stream 1: E-Commerce

	E-Commerce	3
	Data Warehousing/ Data Mining	3

Electives Stream 1: E-Commerce

	Cyber Laws	2
	Application Server	2

Electives Stream 2: Systems and Networking

	Internet Programming	3
	Mobile Computing	3

Electives Stream 2: Systems and Networking

	Linux Internals	2
	Embedded Systems	2

Electives Stream 3: Multimedia and Cognition

	Pattern Recognition	3
	Multimedia Computing	3

Electives Stream 3: Multimedia and Cognition

	Computer Cognition	2
	Image Processing	2

Note: In 3rd Semester of MSc (IT), a candidate has to opt for any one of the three elective *streams in addition to the two core courses. The candidate has to continue in the same elective stream in both the 3rd & 4th semesters as well as do his/her project preferably in his/her field of elective specialisation. Change of elective is not permitted once a candidate has opted for a particular stream.*

Detailed Syllabus

Section 1 Industrial Management

UNIT-1 Introduction to Management Definition, Principles of management, functions of management, industrial organisation structure, Departmentation-functions and relationships

UNIT-2 Industrial relations management Definition, scope and importance, trade unions, role of state, collective bargaining, industrial disputes and resolution,

UNIT-3 labour welfare, worker's participation in management

UNIT-4 Motivation and Behaviour Modification Characteristics of motivation, need for motivation, determinants, theories of motivation, behaviour modification-techniques, contributions and criticisms

UNIT-5 Leadership Importance of leadership, functions of a leader, qualities of leader, leadership styles,

UNIT-6 Likert's system, improving leadership

UNIT-7 Human Resource Development Concept, functions of HRD department, Systems, process,

UNIT-8 HRD effectiveness, Strategic management and HRD, HRD/Organisation Alignment Model

UNIT-9 Compensation Need, use, components, industrial compensation, incentives, reward management, wage policy

UNIT-10 Labour and Industrial Laws Industrial Employment (Standing Orders) Act, 1946

Factories Act, 1948 Industrial Disputes Act, 1947.

UNIT-11 Trade Unions Act, 1926 The Workmen's Compensation Act, 1923 .

UNIT-12 The Payment of Wages Act, 1936 The Minimum Wages Act, 1948 Payment of Bonus Act, 1972

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

Section-2   Analysis and Design of Algorithms

UNIT-13 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-14 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-15 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-16 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

UNIT-17 Algorithms Using CAD Technologies, INTERNAL SORTING, Introduction Internal Sorting, Insertion Sort, Insertion Sort, Algorithm, Insertion Sort Analysis Bubble Sort.

UNIT-18 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-19 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-20 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-21 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-22 Method.MATRICES Introduction Matrices Properties Strassen's Matrix Multiplication Conventional Matrix Multiplication Inversion Solving Systems of Linear Equations
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-23 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-24 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

Section 3   Advanced Operating System

UNIT-25 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-26 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-27   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-28   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-29   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-30 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-31 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-32 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 MASS-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-33 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-34 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-35   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.

UNIT-36 CASE STUDIES: WINDOWS 2000 Introduction Design principles System components User Mode Kernel Mode Environmental subsystems MS-DOS Environment BitWindows Environment Win32 Environment POSIX Subsystem OS/2 Subsystem Logon and Security Subsystems File System Networking Protocols Distributed-Processing Mechanisms Redirectors and Servers Domains Name Resolution in TCP/IP Networks Programmer Interface Access to Kernel Objects Interprocess Communication Memory Management

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

Visual Programming

UNIT 37 INTRODUCTION TO VB.NET Introduction ,Welcome to VB.Net ,Evolution of VB.Net ,Features of VB.Net ,Opening and Closing Windows

UNIT 38CONTROL 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 39PROPERTY SETTING Introduction ,Setting Properties of Form and Control ,Properties Categories .

UNIT 40VB.NET VARIABLES Introduction, VB.Net Variables, Naming Variables, Data Types ,The Variant Data Type ,Type onversions 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 41 DECISION MAKING Introduction Conditional Statement If-then Select-Case Looping Do While...End While For Next Nested loops

UNIT 42 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 43ARRAY Introduction Array Menus and Dialog Boxes Dialog Boxes

UNIT 44 VB.NET - PROGRAMMING Introduction Structured Programming File-Level Programming Elements Namespace-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 45FILE HANDLING, Introduction Files Classification Handling Files using Function and Classes Directory Class File Class File Processing

UNIT 46 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 47 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 48 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

Semester II

Section-1   Software Quality And Testing

UNIT 49INTRODUCTION 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?

LESSON2 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 50 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 51FLOWGRAPHS 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

UNIT 52TRANSACTION 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 53DATA 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 54SYNTAX TESTING Introduction Why, What and How? Garbage 8 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 55LOGIC 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 56STATES, STATE GRAPHS AND TRANSITION TESTING Introduction , State Graphs , States , Inputs   and Transitions , Outputs , State Tables , Time versus Sequence , ftware 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 57TESTING 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 58TESTING TACTICS AND DEBUGGING Introduction , Strategic Approach to Testing and Strategic   Issues , Verification and Validation , Organizing for Software Testing , Software Testing Strategy ,

UNIT 59Strategic Issues , Unit Testing , Advantages of Unit Testing , Integration Testing , Top-down Integration ,   Bottom-up Integration , Regression Testing , Smoke Testing , Documentation for Integration Testing , UNIT 60Validation 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

Section Advanced Networks

UNIT 61INTRODUCTION 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 62REFERENCE 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 63THE PHYSICAL LAYER Introduction , Theoretical Basic for Data Communication , Transmission Media , Guided Transmission Media, Twisted Pair (Copper Conductors) , Coaxial Cable , Optical Fiber

UNIT 64THE 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 65THE 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 66Data Link Protocols , High-level Data Link Control (HDLC) , Point-to-Point Protocol (PPP), Multiple Access Protocols , Aloha and Slotted Aloha

UNIT 67THE 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 68INTERNETWORKING Introduction , Internetwork , Internet , Routing in the Internetwork , Virtual Circuits , Fragmentation , Network Layer in the Internet , IP Protocol, IP Addresses ,Internet Control Protocols

UNIT 69TRANSPORT 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 70The Example Transport Entity , The Example as a Finite State Machine , Internet Transmission Protocol , User Datagram Protocol (UDP) , Transmission Control Protocol , Performance Issues

UNIT 71OSI 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 72 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

OOAD and UML

UNIT 73OBJECT 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 , Object and Class Concepts ,Aggregation , Generalization , Multiple Inheritances , Derived Data and Constraints , Dynamic   Modeling , State Diagram , Functional Modeling , Application Fields of Functional Modeling 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 , 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 74 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 ,   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 75 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 , Requirements   Modeling , Use Case Concept , Basic Model Elements , Use Case Diagrams , State Machines , Statechart Diagrams Concepts , Statechart Diagrams , Types of States , Events and Transitions , Modeling Time and   Space Constraints , Process and Threads

UNIT 76 ARCHITECTURAL MODELING IN UML Introduction , Overview of Architectural Modeling , Component   Basics , Types of Components , Component Diagrams , Creating Component Diagrams , Modeling Tables,   Files and Documents , Modeling API Nodes , Common Node Types , Creating Custom Nodes ,API Nodes   Properties, Sets and Sheets , UML Diagram of API Nodes , Modeling System Topology , Introduction ,   Distributed Computer System , Topology ,Mechanisms and Framework , Mechanism and Framework   Concept , Modeling Turnpike: The Proposed Framework , Research Issues and Contributions in Framework   Deployment   Terminologies   and   Diagrams , Deployment: Terminologies , Deployment Diagrams for Hardware Artifacts , Modeling Processors and Devices , Modeling Component Distribution

Reference Books:
1. UML Applied by Martin L. Shoemaker

Advanced Java

UNIT 77 Introduction to JAVA Programming Introduction   , Higher level Languages   , Java: an Introduction , Life   cycle of a Java program ,Java virtual machine , Programming in Java .

UNIT 78Variables ,Arrays ,Classes in Java ,Inheritance in Java ,Constructor ,Methods , The keyword , his.,

UNIT 79 Packages and Interfaces in JAVA Packages , Setting of class path , Interfaces , Modifiers , Access   specifiers , Rules

UNIT 80: Exception Handling Introduction , Exceptions in Java ,Try block , Catch block , Throws clause , Finally block.

UNIT 81 HTML and Applet Programming The World Wide Web- An Overview , HTML , Java Applets , The structure   of Java applet.

UNIT 82 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 83 GUI Concept in JAVA Introduction , The abstract Windowing toolkit , Layout managers , Nested panels , UNIT 84 The Java GUI components , Containers , Creating an User Interface , A sample , Deciding layout , Event   Handling , Event Handling for buttons , Mouse events.

UNIT 85 Multithreading Introduction , Creating and managing threads , Life cycle of a thread , Daemon threads ,   Thread scheduling and ,setting the priorities ,Thread synchronization , Threadgroup , Problems.

UNIT 86 Animation in JAVAIntroduction , Flicker and how to avoid it , Reducing flicker using double-buffering ,

UNIT 87 Animation using Images , Retrieving and using sounds ,Creating applets with double-buffering.

UNIT 88 Input and Output Introduction , Concept of Streams , Java.io interfaces , java.awt.print package. ,

Semester III

Project Management

Unit-1 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,

UNIT 2 project environment & complexity. Organizing human resources, organizing systems & procedures for implementation. Project direction

UNIT 3 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 4 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-5 Project Planning & 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,

UNIT 6 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 7 Modification & Extensions of Network ModelsComplexity 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.

UNIT 8 computer aided project management- essential requirements of PM software, software packages for CPM. Enterprise- wide PM, using spread sheets for financial

Reference Books:
1. Project Management: A Systems Approach to Planning, Scheduling, and Controlling by Harold Kerzner
2. Absolute Beginner's Guide to Project Management by Greg Horine

Client server Computing

UNIT 9 Introduction Network Architecture, Review of data communication, ISDN, Medium access
         sublayer, LAN
UNIT 10 Data link layer
         Data link layer, Elementary data link protocols, Finite State Machines and Petri Nets
UNIT 11 Network layerNetwork layer, Flooding, Congestion control algorithms, Internetworking,
         Example system
Unit 12 Transport layer
         Transport layer, Flow control and buffering, Example system, Domain name system.
UNIT 13 TCP connection establishment and termination, UDP
UNIT 14 Session layer Session layer, Presentation layer, Application layer.
UNIT 15 Case study, File Transfer Protocol(FTP),
UNIT 16 World Wide Web(WWW)

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

Elective Stream 1: E-Commerce

UNIT 17 E-Commerce Introduction,
UNIT 18 Definition of E-Commerce,
UNIT 19 History of E-Commerce
UNIT 20 Types of E-Commerce Conceptual & Architectural framework,
UNIT 21 Types of E-Commerce,
UNIT 22 Consumer-to-Business e-commerce,
UNIT 23 Business-to-business e-commerce
UNIT 24 Networks Virtual Private networks, Extranets
Unit-25 EDI Electronic Data Interchange (EDI) features, components Security Electronic Payment
         Systems, Security Issues

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

SECTION   Data warehousing / Data Mining

UNIT 26 Introduction Data warehousing and OLAP, Overview of mining operations.
UNIT 27 Classifiers Decision tree classifiers,
UNIT 28 Instance-based learners, Bayesian classifiers, Learning hyper planes, Meta learning, Classifier
         evaluation.
UNIT 29 Case study KDD Cup Case study,
UNIT 30 Clustering, Active learning,
UNIT 31 Duplicate elimination, Similarity functions.
UNIT 32 Min hash, Set joins, Sequence mining
UNIT 33 Mining Hidden Markov Models.

UNIT 34 Collaborative Filtering, Association rule mining, Surprising item set mining, Temporal itemset mining
UNIT 35 Selection methods Feature.
UNIT 36 selection methods, Intrusion detection,
UNIT 37 Forecasting
Reference Books:
1. The Data Warehouse Toolkit by Ralph Kimball
2. The Data Warehouse Lifecycle Toolkit by Ralph Kimball, Margy Ross

MSIT 3E21   Internet Programming

UNIT 38 JAVA AWTJava AWT package Containers (Component, Container, Panel, Window, Frame, Canvas), Basic User Interface components (Labels, Buttons, Check Boxes, Radio Buttons, Choice, Text Fields, Text Areas, Scrollbars), Layouts (Flow Layout, Grid Layout, Border Layout, Card Layout
UNIT 39Event Handling And Java I/O Handling Event delegation Approach, Action Listener, Adjustment Listener, Mouse Listener and Mouse Motion Listener, Window Listener, Key Listener, I/O File Handling(Input Stream & Output Streams, File Input Stream & File Output Stream, Data I/P and O/P Streams.
UNIT 40Multithreading And Socket ProgrammingOverview of Multithreading, The Thread control methods, Thread life cycle, Newly created threads, Main thread, Creating a Thread (Implementing Runnable Interface, Extending the Thread Class), Thread Synchronization, Writing Applets with Threads, Introduction, TCP/IP Protocol, UDP Protocol, Ports, Using TCP/IP Sockets, Using UDP Sockets.
UNIT 41Java Database Connectivity (JDBC) JDBC/ODBC bridge, Driver Manager Class, Java.SQL Package (Connection Interface, Statement Interface, Prepared Statement Interface, Result Set Interface, Result Set Meta Data Interface), SQL Exception class.
UNIT 42Remote Method InvocationN-tier Architecture, Distributed object technologies, Locating & loading Remote classes, Locating remote objects & providing references to them, Enabling remote method class.
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)
3. Programming the World Wide Web 2009 (5th Edition) by Robert W. Sebesta (Paperback - Feb 20, 2009)

Mobile Computing

Unit-43 Cellular Networks ,Channel allocation, multiple access, Location management, Handoffs.
Unit-44 Wireless Networking Wireless Transmission Basics, MAC protocols, Routing, Transport
Unit-45 Ad-hoc networking Applications Mobility adaptations, disconnected operations, Data broadcasting, Mobile agents.

Unit-46 Security Security issues.
Unit-47 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

Semester IV

Distributed Database

Unit-1 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-2 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-3 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-4 Control Structure Concurrency Control, Foundation of Distributed Concurrency Control, Distributed Deadlocks, Concurrency Control based on Timestamps, Optimistic Methods for Distributed Concurrency Control

Unit-5 Database Administration Reliability, Basic Concepts, Nonblocking Commitment Protocols, Reliability and concurrency Control, Determining a Consistent View of the Network, Detection and Resolution of Inconsistency, Checkpoints and Cold Restart, Distributed Database Administration,   Catalog   Management   in   Distributed   Databases, Authorization and Protection

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

Component Technologies

Unit-1 Introduction Software component ,objects , fundamental properties of component technology , modules ,interfaces ,callbacks ,directory services , component architecture , components and middleware
Unit-2 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-3 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-4 . Net Based Component Technologies COM ,Distributed COM ,object reuse interfaces and versioning , dispatch interfaces ,connectable objects , OLE containers and servers , Active X controls , .NET component , assemblies , app domains , contexts , reflection , remoting.
Unit-5 Component Frameworks And Development Connectors , contexts , EJB containers , CLR context and channels , Black Box component framework , directory objects , cross , development environment, component , oriented programming , component design and implementation tools , testing tools , assembly tools
Reference Books:
1. Components and Devices by Govind P. Agrawal

Page 14 of

2. Objects Unencapsulated: Java, Eiffel, and C++ (Object and Component Technology Series) by Ian Joyner (Textbook Binding - Jun 16, 1999)

Cyber Law

Unit-1   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-2   E-commerce- Legal issues Digital Signatures and the Indian Law, Electronic Contracts, The UNCITRAL Model law on Electronic Commerce
Unit-3   Intellectual Property Issues Overview of Intellectual Property related, Legislation in India, Copyright law
Unit-4   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-5   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

Semester Application Server

Unit-1   Oracle Application Server 10g Architecture Architectural Overview, Application Server Components, New Features and Components, The Multi Tier Model, Infrastructure (Metadata Repository)
Unit-2   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-3   Application Server 10g Installation Infrastructure Requirements, Planning Multiple Tiers for Performance, Determining Components to Install
Unit-4   Application Server 10g High Availability Planning for High Availability, Multiple Web Caches, Clusters and Farms, Using Islands in OC4J,Infrastructure High Availability, Customer Database High Availability, Disaster Recovery, Rolling Upgrades, Hot (online) Application Deployment, Transparent Application Failover.
Unit-5   Application Server 10g Security Component Security ,Authentication and Authorization, Oracle Identity Management ,Oracle Internet Directory , Deligated Administrative Services, Oracle Single Sign-on.
Reference Books:
1. Web Application Architecture by Leon Shklar and Rich Rosen
2. Oracle Application Server 10g Administration Handbook by John Garmany

Linux Internals

Unit1   Installing Linux As A Server Linux and Linux Distributions ;Major differences between Windows 2000 and Linux; Single Users vs Multiusers vs Network Users; Separation of the GUI and the Kernel; Domains; Active Directory

Unit-2   Installing Linux In A Server Configuartion

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-3 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-4 The Command Line An Introduction to BASH; Job Control; Environment Variables; Pipes; Redirection; Command-Line Shortcuts; Documentation Tools; The man Command; the text info System; File Listings; Owner ships and permissions; Listing Files; File and Directory Types; Change Ownership Change Group; Change Mode ; File Management and Manipulation ; Process Manipulation; Miscellaneous Tools

Unit-5 Booting And Shutting Down LILO ;Configuring LILO; Additional LILO options; Adding a New Kernel to Boot ; Running LILO; The Steps of Booting; Enabling and disabling Services

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

Embedded Systems

Unit-1 Embedded Computing Introduction, Complex Systems and Microprocessor, The Embedded System Design Process, Formalisms for System Design, Design Examples.

Unit-2 The 8051 Architecture Introduction, 8051 Micro controller Hardware, Input/Output Ports and Circuits, External Memory, Counter and Timers, Serial data Input/Output, Interrupts

Unit-3 Basic Assembly Language Programming Concepts The Assembly Language Programming Process, Programming Tools and Techniques, Programming the 8051, Data Transfer and Logical Instructions.

Unit-4 Applications Interfacing with Keyboards, Displays, D/A and A/D Conversions, Multiple Interrupts, Serial Data Communication.

Unit-5 Introduction to Real – Time Operating Systems Tasks and Task States, Tasks and Data, Semaphores, and Shared Data; Message Queues, Mailboxes and Pipes, Timer Functions, Events, Memory Management, Interrupt Routines in an RTOS Environment

Reference Books:
1. Embedded Systems: A Contemporary Design Tool by James K. Peckol
2. Embedded Systems Architecture Tammy Noergaard

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