DIRECTORATE OF DISTANCE EDUCATION
PONDICHERRY UNIVERSITY

(A Central University)

MCA SYLLABUS

H1010: MATHEMATICAL FOUNDATION OF COMPUTER SCIENCE

UNIT I
Relations, Transitive closure of a relation, Functions, inverse of a function, Eigen values and Eigen vectors, Cayley-Hamilton Theorem (without proof), inverse of a matrix by the use of Cayley-Hamilton Theorem, Principle of mathematical induction.

UNIT II
Mathematical Logic : Connectives, NAND and NOR connectives, Functionally complete set of connectives, equivalence of statement formulae, implication, Principal conjunctive and disjunctive normal forms, inference calculus, derivations, conditional proof, indirect method of proof, Automatic Theorem proving.

UNIT III
Automata: Deterministic and Non-deterministic automation, NDA with epsilon moves, Equivalence of these without proofs, Regular expressions.

UNIT IV
Linear Programming: LPP formulation, Graphical method, Simplex method, Transportation and Assignment problems.

UNIT V
Numerical methods: Finding roots - Bisection, Regula-falsi and Newton-Raphson methods; Solutions of simultaneous linear equations : Gauss elimination, Gauss-Siedel and interation methods.

TEXT BOOKS

1. J.P. Tremblay and R.Manohar, Discrete Mathematical structures with applications to Computer Science, 13th reprint, Tata Mcgraw Hill publishers, 2002.
2. P. Kandasamy, K.Thilagavathy and K.Gunavathy, Engineering Mathematics, Volume-I, Fourth edition, S.Chand & Co, New Delhi, 2001.
3. Hopcroft, Motvani and Ullman, Introduction to automata theory, languages and computation, Pearson Education, 2001.
4. Kanti Swarup, P.K. Gupta and Manmohan, Operations Research, S.Chand&Co, New Delhi.
5. P. Kandasamy, K.Thilagavathy and K.Gunavathy, Numerical Methods, S.Chand&Co, New Delhi, 2000.

H1020: COMPUTER ORGANISATION AND ASSEMBLY LANGUAGE PROGRAMMING

UNIT I
Digital logic fundamentals: Number systems Boolean algebra gates simplification of Boolean expressions combinational logic : adders subtractors Decoders encoders multiplexer / demultiplexers Sequential Logic : Flip-flops - Counters.

UNIT II
Introduction to Intels 8086/88 : Register model Bus interface Unit Execution unit Control Unit: hardwired and microprogrammed control. Memory organization: Basic memory cell RAM, ROM and DRAM associative, cache and virtual memory organizations.

UNIT III
Assembly Language Programming: Instruction formats addressing modes Intel 8086/88 instruction mnemonics timing data transfer arithmetic and machine control instructions - Introduction to Macro assembler.

UNIT IV
Input/Output organization: Input interface Data transfer techniques: synchronous asynchronous Interrupt driven Intel 8086/88 interrupt organization types DMA I/O processors serial communication.

UNIT V
Processor organization: General register organization stack organization. IBM PC architecture: Mother board display adapters add on cards power supply. Architectural overview of Pentium, P-II, P-III and P-4.

TEXT BOOKS

1. M.Morris Mano, Computer Systems Architecture, Pearson Education, 3rd Edition, 2003.
2. Liu Gibson, Microcomputer Systems the 8086/88 family, PHI, 2nd edition, 2001.
3. Govindarajulu, IBM PC and Clones, PHI, 2002.

REFERENCES

1. A.K.Ray, K.M.Bhurchandi, Advanced Microprocessors and Peripherals, TMH, 2000.
2. Peter Abel, IBM PC Assembly language and Programming, PHI,2000,

H1030: DATA STRUCTURES

UNIT I
Introduction to Problem Solving: Problem Analysis, Flowcharts, Pseudo codes and Algorithms, Program design, Structured Programming

Basics of C language: Program structure Data types and Operators, Program Statements - Arrays Functions
.
UNIT II
C Language: Structure - pointers - files

UNIT III
Arrays: Array representation, Array processing single and multi dimension arrays
Stacks: Stack Representations , stack operations
Queues: Definitions, Implementations of Queues, Circular queues, Application of Queues.

UNIT IV
Linked lists: Singly, Doubly, Circular

Sorting and Searching: Searching: Sequential Search, Binary Search.
Sorting: Sequential Sort, Bubble Sort

UNIT V
Trees: nary Trees, Binary Search Trees, Building a Binary Search Tree, Tree Traversal techniques.

Graphs: Definitions, Undirected and Directed Graphs, Traversal, Minimum cost spanning tree, topological sorting.

TEXT BOOKS

1. E.Balaguruswamy, Programming in C , Tata McGraw Hill, 2nd Edition, 2002.
2. Dromey, How to solve it by computer?, Prentice Hall of India, 1999.
3. Ellis Horowitz , Sartaj Sahni and Susan Anderson, Fundamentals of Data
Structures using C, Computer Science Press, 1993.

REFERENCE

1. A.M.Tanenbaum and M.J.Augenstein, Data structures using C, PHI, 2nd Edition, 1996..

H1040: BUSINESS PROCESS

UNIT I

Nature and Types of Business Organizations Introduction to Business Process - Organization Structure Definition Complexity Formalization Outcomes for individuals Size Technology Internal culture Environment National cultures IT Industry Scenario.

UNIT II

Recognizing a Creation Company - The WHOOSH Beginners mind - Creation Company Vs. Compliance Company.

UNIT III

Becoming a Creation company Choosing to change the art of collaboration Models.
Leading a Creation Company Freedom and Focus Creation Leadership.

UNIT IV

Introduction to Business Process Reengineering Business Process Reengineering through IT People view Case Study Empowering through IT.

UNIT V

Introduction to e-Business Rules of e-Business e-business execution framework - Trend spotting Construction steps of e-business design Case studies Constructing the e-business architecture.

TEXT BOOKS

1. Richard H. Hall,Organizations, Structures, Processes, and Outcomes, Pearson Education, 2001.
2. M. S. Jayaraman et. al., Business Process Reengineering, Tata McGraw Hill publications, 2001.
3. Tom McGehee, Whoosh: Business in the Fast Lane, Perseus Publication, 2002.
4. R. Kalakota and M. Robinson, e-Business : Roadmap for Success, Pearson Education, 2000.

H1050: INFORMATION TECHNOLOGY

UNIT I
Introduction: Introduction to IT, Scope for IT, IT Usage, Information System, its functions and applications.

UNIT II
Hardware: Architecture (Mainframe, Mini, PC, Workstations), Real time system, Transaction Processing system, Laptop, Palmtop, Client server, N-Tier. Introduction to Networks: LAN, WAN, MAN, etc. Peripherals: Information about Input devices (Keyboard, Mouse, Joystick, Track ball, etc.) - Details about Storage devices (Floppy disk, Hard disk, Tapes (Cartridge, DAT), Compact Disk), Information about Monitors, Printers (impact, non-impact) - Various types of plotters.

UNIT III
Software: Software Classification (System, Application, and Utilities). Operating System: Introduction, Basic functions of OS, Classification of OS. Programming Languages: Generation of Languages and their uses. Packages: Spread sheets, DTP Tools, Presentation tools. Application areas of Software - Commercial, Scientific, Real time application etc.

UNIT IV
Multimedia and Internet: Introduction to multimedia - Hardware, Software and applications - Introduction to Internet, Service providers, Internet naming and addressing - Information about electronic mail, Remote login, File Transfer, Usenet-BBS, HTML. Intranet, Extranet: Introduction to Intranet and Extranet.

UNIT V
Object Oriented System: Concepts, Benefits of OOS over conventional system. Enterprise Computing: About ERP, Activities under ERP. Mobile Computing - An Introduction to Mobile Computing.

TEXT BOOKS

1. Brain, K. Williams, et. al., Using Information Technology, Third edition, TMH, 2000.
2. Turban, Rainer, Potter, Introduction to Information Technology, second edition, Wiley Publications.
3. Dennis P. Curtin, et.al., Information Technology - The Breaking View, TMH, 2000.

H2010: FUNDAMENTALS OF ALGORITHMS

UNIT I

INTRODUCTION: Algorithm - pseudo code for expressing algorithms analysis - time complexity and space complexity - efficiency of algorithms - O-notation - Omega notation and Theta notation.
DIVIDE AND CONQUER: General method binary search - merge sort - quick sort.

UNIT II

GREEDY METHOD: General method- Knapsack problem - job sequencing with deadlines - minimum-cost spanning trees : Prim's and Kruskal's algorithms - Single source shortest paths : Dijkstra's algorithm.

UNIT III

DYNAMIC PROGRAMMING: General method - Multistage Graphs All pairs shortest paths, Single source shortest paths - optimal binary search trees - O/1 Knapsack problem - Traveling sales person problem.

UNIT IV

BACK TRACKING : General method - n-queen problem - sum of subsets problem - graph colouring - Hamiltonian cycles - Knapsack problem.

UNIT V

BRANCH AND BOUND : Least Cost(LC) search, Bounding - LC branch and bound - FIFO branch and bound - Travelling sales person problem.

TEXT BOOK
1. E. Howrowitz and Sahni, Fundamentals of computer algorithms, Galgotia publications,1998.

REFERENCES
1. Gilles Brassard and Paul Bratley, Fundamentals of Algorithm, Prentice Hall of India Pvt.Ltd., 1997.
2. Mark Allen Weiss, Data Structures and Algorithm Analysis in C,Addition-wesley, Third Indian Reprint, 2000.

H2020: OBJECT ORIENTED PROGRAMMING

UNIT I
Limitations in structured programming Characteristics of Object Oriented Language data types loops pointers arrays structures functions Classes Objects.

UNIT II
Operator overloading Inheritance Polymorphism Templates Exception Handling class Hierarchies - library

organization and containers Strings Stream - Design and programming.

UNIT III
Java vs. C++ - Java on the Internet Exception handling Multithreading and persistence Java keywords and flow control Garbage collection.

UNIT IV
Final declaration Packages and interfaces Java I/O classes Run time type identification User Interface design basics with swing.

UNIT V
Network programming Applets class - architecture - simple applet programs Abstract window tool kit.

Note: Unit I & II deals with C++ and Java
Unit III , IV & V deals with Java.

TEXT BOOKS

1. Bjarne Stroustrup, The C++ Programming Language, (3rd and Special Edition) Addison Wesley, 2000
2. Bruce Eckel, Thinking in Java, (3rd Edition) Prentice Hall PTR, 2002

REFERENCES

1. Robert Lafore, Object Oriented Programming in Turbo C++ , Galgotia publications, 1998
2. E.Balaguruswamy, Programming with Java, Tata McGraw Hill Publications Limited, 2nd Edition ,1999.

H2030: OPERATING SYSTEMS

UNIT I
Introduction Early Operating Systems Buffering & Spooling Multiprogramming Time Sharing Protection Operating System Structures.

Process Management: Process Concept Hierarchy of Process Critical Section Problem Semaphores Process Coordination Problems Inter Process Communication

UNIT II
CPU Scheduling: Scheduling Concepts Scheduling Algorithms Algorithms Algorithm Evaluation Multiple Processor Scheduling

Deadlock: Deadlock Problem: Characterization Prevention Avoidance Detection Recovery Combined Approach to Deadlock Handling.

UNIT III
Memory Management: Introduction Multiple Partition Paging Segmentation Paged Segmentation Virtual Memory Concept Overlays Demand Paging and Performance Page Replacement Algorithms Allocation Algorithms Trashing.

UNIT IV

Secondary Storage Management: Physical Characteristics Disk Scheduling Disk Scheduling Algorithms Sector Queuing File Systems: File Operations Access methods Allocation Methods Directory Systems File Protection Implementation Issues.

UNIT V
Case Studies: Linux and Windows 2000 Operating Systems.

TEXT BOOKS

1. Silberschatz, Peter Baer Galvin & Greg Gagne, Operating System Concepts Seventh Ed., Addison Wesley Publications..

REFERENCES

1. William Stallings, Operating Systems Internals and Design Principles, PHI India, Fourth Edition, 2003.
2. H.M. Deitel, Operating Systems, Addison-Wesley, 2nd Edition.

H3010: DATABASE MANAGEMENT SYSTEMS
UNIT I
Introduction to Database Systems: Overview Data Models Database System Architecture History of Database Systems. Entity-Relationship Model: Basic Concepts Constraints Keys Design Issues Entity Relationship Diagram Weak Entity Sets Extended E-R Features Design of an E-R Database Schema Reduction of E-R Schema to Tables
UNIT II
Relational Model: Structure of Relational Databases Relational Algebra Extended Relational Algebra Operations Modification of Database Views Tuple Relational Calculus Domain Relational Calculus. SQL: Background Basic Structure Set Operations Aggregate Functions Null Values Nested Subqueries Views Complex Queries Modification of the database Joined Relations Data-Definition Language Embedded SQL Dynamic SQL Other SQL Features. Other Relational Languages: Query-by-Example, Quel .
UNIT III
Integrity and Security: Domain Constraints Referential Integrity Assertions Triggers Security and Authorization Authorization in SQL Encryption and Authentication. Relational-Database Design: First Normal Form Second normal form- Boyce-Codd Normal Form Third Normal Form Fourth Normal Form.
UNIT IV
Storage and File Structures: Overview of Physical Storage Media Magnetic Disks RAID Tertiary Storage Storage Access File Organization Organization of Records in Files Data-Dictionary Storage. Indexing and Hashing: Basic Concepts Ordered Indices B+-Tree Index Files B-Tree Index Files Static Hashing Dynamic Hashing Index Definition in SQL Multiple-Key Access
UNIT V
Transactions: Transaction concept Transaction State Implementation of Atomicity and Durability Concurrent Executions Serializability Recoverability Implementation of Isolation Transaction Definition in SQL Testing for Serializability
Concurrency Control: Lock-Based Protocols Timestamp-Based Protocols Validation-Based Protocols Multiple Granularity Deadlock Handling Insert and Delete Operations.
Recovery System: Failure Classification Storage Structure Recovery and Atomicity Log-Based Recovery .

TEXT BOOK
1. Silberschatz, Korth, Sudarshan, Database System Concepts, 4th Edition McGraw-Hill Higher Education, International Edition 2002. Chapters: 1 to 7, 11, 12, 15 to 17.
REFERENCES
1. Fred R McFadden, Jeffery A Hoffer, Mary B. Prescott, Moden Database Management:, Fifth Edition, Addison Wesley, 2000.
2.Elmasri, Navathe, Fundamentals of database Systems, Third Edition, Addison Wesley, 2000.
3.Jefrey D.Ulman, Jenifer Widom, A First Course in Database Systems:, Pearson Education Asia, 2001.
4.Bipin C Desai, An Introduction to Database Systems, Galgotia Publications Pvt Limited, 2001.

H3020: COMPUTER NETWORKS

UNIT I
Introduction To Networks And Communication Media: Uses Network Hardware Network Software Reference Models Example Networks Network Standardization. Basis for data communication - Transmission media Wireless Transmission Telephone Systems Satellite Communication.

UNIT II
The Data Link Layer : Data Link Layer design issues Error Detection and Correction Methods - Elementary Data Link Protocols Sliding Window Protocols Protocol Verification Methods Channel Allocation Multiple Access protocols IEEE 802 Standards.

UNIT III
The Network Layer: Network Layer design issues Routing algorithms Congestion Control algorithms Internetworking Network Layer in Internet.

UNIT IV
The Transport Protocols: Transport Service Transport Protocols Internet Transport Protocols UDP TCP - Performance issues.

UNIT V
The Application Layer: Application Layer design issues Domain Name System - Electronic Mail World Wide Web Multimedia - Other Applications Network Security - Basic Cryptography - DES - RSA.

TEXT BOOK

1. Andrews S. Tanenbaum, Computer Networks, Prentice Hall of India Private Limited, (4th Edition), 2003.

REFERENCE

1. Leon Garcia and Widjaja, "Communication Networks - Fundamental concepts and key architecture", Tata McGraw Hill, 2001.

H3030: MANAGEMENT CONCEPTS AND STRATEGIES

UNIT I
Management: Science Theory and Practice - Management and Society: Social responsibility and Ethics. The nature and purpose of planning - objectives - Strategies Policies and planning premises.

UNIT II
Decision making. The Nature and purpose of organizing - Basic departmentation - Line / staff Authority and decentralization - Effective Organizing and organizational culture.

UNIT III
Human Resource Management and selection - Performance appraisal and career strategy - Manager and organizational development.

UNIT IV
Managing and the Human factor - Motivation - Leadership - communication.

UNIT V
The system and Process of controlling control techniques and information Technology - Productivity and Operations Management - Overall and Preventive Control - Towards a unified, Global management theory.

TEXT BOOKS

1. Herald Knootz and Heinz Weihrich, Essentials of Management, McGraw-Hill Publishing Company, Singapore International Edition, 2000.

2. Ties AF, Stoner and R.Edward Freeman Management Prentice Hall of India Pvt., Ltd., New Delhi 110 011, 2003.

3. Joseph l, Massie, Essentials of Management, Prentice Hall of India Pvt., Ltd.,
New Delhi 110 011, 2002.

H4010: WINDOWS AND VISUAL PROGRAMMING

UNIT I
Introduction to Windows Programming: Different paradigms of programming Comparison Event driven programming Windows programming fundamentals Data types Resources Windows messages Device contexts Dynamic linking libraries.

UNIT II
Visual Basic Programming: Creating and using Controls Menus and Dialogs Programming fundamentals Objects and instances Programming user events Using custom controls and grid control inbuilt and user defined functions - Debugging - Creating graphics for application File system controls - Accessing databases with the data controls VB and the Internet.

UNIT III
Visual C++ Programming: Visual C++ components Developing simple applications Microsoft Foundation classes Controls Message handling Document/view architecture Reading and writing documents SDI and MDI environments splitter windows co-ordination between controls.

UNIT IV
Database Connectivity : Mini database applications - Creating user defined DLL's - Dynamic data transfer functions - Database management with ODBC - Object linking and embedding.

UNIT V
Advanced Topics: Active x controls COM DCOM COM+

TEXT BOOKS

1. Charles Petzold, Windows Programming, Microsoft Press, 1995.
2. David Kruglirski. J, Inside Visual C++, Microsoft press, 1993.
3. Deitel and Deitel, T.R. Nieto, Visual Basic 6 How to Program, Prentice Hall of India, 1999.
4 Garry Cornell, Visual Basic 6 Ground Up, Tata McGraw Hill,1998.

REFERENCES

1. C.H. Pappas, W.H. Murray, III Visual C++: The Complete Reference, Tata McGraw-Hill Publishing Company, 1999.

H4020: PRINCIPLES OF PROGRAMMING LANGUAGES

UNIT I
Language design Issues: Reasons for studying concepts of programming language language evaluation criteria- influences on language design- structure and operation of computer virtual computers and binding times- language paradigms.

UNIT II
Data types: Properties of types and objects-elementary data types- structured data types. Abstraction: Abstract data types-encapsulation by subprograms-type definition- storage management.

UNIT III
Sequence Control : Implicit and explicit sequence control- sequencing with arithmetic and non-arithmetic expressions-sequence control between statements. Subprograms control: subprogram sequence control-attributes of data control shared data in subprograms.

UNIT IV
Inheritance: Inheritance- polymorphism; Language Translation Issues: Programming language syntax- stages in translation- formal translation models.

UNIT V
Advances in language design: variations on subprogram control- language constructors for parallel processing language semantics-software architecture.

TEXT BOOKS

1. Terrance W.Pratt, Marvin V Zelkowitz, Programming Languages, Design and Implementation, PHI, 2002, (4th edition).

REFERENCES

1. Ravi Sethi, Programming Languages Concepts & Constructs, Addison-Wesley, (2nd edition),1996.

2. E.Horowitz, Fundamentals of programming languages, Galgotia Publishers,1984.
3. A.B.Tucker, Robert, Noonan,Programming Languages, McGraw Hill,2002.
4. D.Appleby, J.J.VandeKopple, Programming languages Paradigm and practice, McGraw Hill, International Editions, (2nd edition), 1997.

H4030: SOFTWARE ENGINEERING

UNIT I

THE PRODUCT: The evolving role of software Software.

THE PROCESS : Software Engineering: A Layered Technology The software process Software process models Linear sequential model - Prototyping model RAD model Evolutionary software process models Component based development Formal methods model Fourth generation techniques.

UNIT II

SOFTWARE PROJECT PLANNING: Observation on estimating Software scope resources Software project estimation Decomposition techniques Empirical estimation models Make buy decision.

PROJECT SCHEDULING AND TRACKING: Basic Concepts Relationship between people and effort Scheduling Earned value analysis.

UNIT III

SYSTEM ENGINEERING: Computer based systems The system engineering hierarchy Business process engineering: overview Product engineering: overview Requirement engineering System modeling.

ANALYSIS CONCEPTS AND PRINCIPLES: Requirement Analysis Requirement elicitation for software Analysis principles Software prototyping Specification.

ANALYSIS MODLEING: The elements of the Analysis model Data Modeling Functional modeling and information flow Behavioral modeling The mechanics of structured analysis Data Dictionary.

UNIT IV

DESIGN CONCEPTS AND PRINCIPLES: Software design and software engineering The design process Design principles Design concepts Effective modular design Design heuristics for effective modularity Design Model Design Documentation.

ARCHITECTURAL DESIGN: software Architecture Data design Architectural stykles Mapping requirements into software architecture Transform mapping Transactional mapping Refining architectural design.

USER INTERFACE DESIGN: The Golden rules User interface design Task analysis and modeling Interface design activities Implementation tools Design evaluation.

UNIT V

SOFTWARE TESTING TECHNIQUES: Software testing fundamentals Test case design white box testing basis path testing Control structure testing Black box testing Testing for specialized environments, architectures and applications

SOFTWARE TESTING STRATEGIES: A strategic approach to software engineering Strategic issues unit testing Integration Testing Validation testing System testing The Art of debugging.

TEXT BOOK

1. Roger S. Pressman, Software Engineering. A Practitioners Approach, Fifth Edition, 2001

REFERENCES

1. C. Ghezzi, M. Jazayeri and D. Mandrioli, Fundamentals of Software Engineering ,Printice Hall of India Private Limited 1991.
2. Richard Farley , Software Engineering Concepts, Tata McGraw Hill, 1988

H5010: INTERNET PROGRAMMING AND WEB TECHNOLOGY

UNIT I
Networks , protocols, TCP/IP protocol suites, brief history of Internet, Internet Address, ports, sockets, Name Resolution, firewalls, protocol tunneling , proxy servers and Internet standards. WEB BASICS: history of web, Inside URLs web browsers, web servers, resources of Internet, H/W and S/W requirement of Internet.

UNIT II
HTML: Anatomy of HTML document, text basics, rules, images and multimedia, document layout and webs, formatted lists, cascading style sheets, forms, tables, frames and executable content. DHTML : Adding animation, multiplying the media, adding Interactivity (dragging and dropping) , working with data and dialog boxes, working with text, understanding browser object models, working with VB script and java script, embedding Active-X controls in web document.

UNIT III
Introduction to CGI - Perl : Introduction to CGI, Perl data structures, control structures, pattern matching and regular expressions, I/P and O/P in Perl, report formatting in perl, perl built in functions, custom functions, references and anonymous data structures, object oriented programming in perl, advanced data manipulation, database programming with perl, perl-CGI programming, web programming with perl script.

UNIT IV
SERVELTS: Retrieving information, sending HTML informations, sending multimedia content, session tracking, security, database connectivity, Applet servelet communication, Interservelet communication. ASP : Basics- variables, ASP control structures, object properties, methods and events- request and response objects, Application, session, cookies and error handling objects. Scripting objects, ASP components, Data store Access, using Record sets and building script components for ASP.

UNIT V
XML: Anatomy of an XML Document, markup elements and attributes, creating valid documents, developing advanced DTDs XML objects, checking validity, creating XML links, advanced addressing, viewing XML in browsers , processing , event-driven programming , programming with DOM, metadata, styling XML with css.

TEXT BOOKS
1. Chris Ullman, Beginning ASP 3.0, Wrox Press Ltd, 2001.
2. Chuckmusiano and Bill Kenndy, HTML The Definite Guide, O Reilly publications, 2000.
3. Jason Hunter with William Crawford, Java Servelet programming, O Reilly publications, 2000.
4. Joseph schmuller, Dynamic HTML, BPB publications,2000.
5. Micheal Mcmillan, Perl from the ground up, Tata Mcgraw- Hill Edition, 1999.

H5020: MIDDLEWARE TECHNOLOGY

UNIT I
Client Server File Server, Data Base Server, Group Server, Object Server, Web Server
Middleware General Middleware Service Specific Middleware
Client Client Server Building blocks RPC Messaging Peer-to-Peer

UNIT II
EJB EJB Architecture Overview of EJB Software Architecture View of EJB Conversation Building and Deploying EJBs Roles in EJB

UNIT III
EJB Session Beans EJB Entity Beans EJB Clients EJB Deployment Building an Application with EJB

UNIT IV
CORBA Distributed Systems Purpose Exploring CORBA alternatives Architecture Overview CORBA and Networking Model CORBA Object Model IDL ORB Building an Application with CORBA

UNIT V
COM Data Types Interfaces Proxy and Stub Marshalling Implementing Server/Client Interface Pointers Object Creation, Invocation, Destruction Comparison of COM and CORBA

TEXT BOOKS

1. Robert Orfali, Dan Harkey, Jeri Edwards, 'The Essential Client/Server Survival Guide', Galgotia Publication Pvt. Ltd., 2002.
2. Tom Valesky, 'Enterprise JAVA Beans', Pearson Education, 2002.
3. Jeremy Rosenberger, 'Teach Yourself CORBA in 14 days', Techmedia, 2000.
4. Jason Pritchard, 'COM and CORBA side by side', Addison Wesley, 2000.

REFERENCES

1. Mowbray, 'Inside CORBA', Pearson Education, 2002.

H2060: ACCOUNTING AND FINANCIAL MANAGEMENT

UNIT I
Accounting: Principles, Concepts, Conventions, Double entry system of accounting, Introduction to basic books of accounts, Sole proprietary concern, Control accounts for debtors and creditors, closing of books of accounts and preparation of Trial balance. Final Accounts: Trading and profit and loss account, Balance sheet of sole proprietary concern with normal closing entries. Depreciation: Meaning.

UNIT II
Financial Management: Scope functions jobs of financial managers. Ratio Analysis: Meaning - Advantages Limitations Types of ratio and their applicability.

UNIT III
Fund flow Statement: Meaning of the term fund flow of fund working capital cycle preparation and interpretation of fund flow statement Cash flow statement. Costing Nature Importance Basic principles.

UNIT IV
Budget and budgetary Control: Nature and scope Importance types of budgets methods of finalization of flexible budget. Marginal Costing: Natures, scope and Importance- Break Even - Analysis, Uses and its Limitations.

UNIT V
Standard Costing: Nature and scope Computation and analysis of variances with reference to material cost Labor cost Overhead cost Interpretation of the variances.

TEXT BOOKS

1. Jain and Narang, Financial Accounting, Sultan and Chand Co.
2. R.L. Gupta and V.K. Gupta, Introduction to Financial Accounting, Sultan and Chand Co.

3. S.N. Maheswari, Principles of Management Accounting, Sultan and Chand Co.
4. S.P Jain and Narang, Advanced Cost Accounting, Kalyani publishers, Delhi.
5. S.P. Iyengar, Cost and Management Accounting, Sultan and Chand Co.
6. S.C.Kuchhal, Financial Management, Chaitnaya publishing House, Allahabad.

H2070: OPERATION RESEARCH

UNIT I
Overview of Operations Research Concept of Linear Programming Model Graphical Method Linear Programming Methods Duality

UNIT II
Transportation Problem Assignment Problem Network Techniques

UNIT III
Integer Programming Formulations Cutting-plane Algorithm Branch-and-Bound Technique Zero-One Implicit Enumeration Technique

UNIT IV
Inventory Control Queuing Theory Decision Theory Game Theory

UNIT V
Dynamic Programming Project Management Replacement and Maintenance Analysis

TEXT BOOK

1. R.Panneerselvam, Operations Research, Prentice Hall of India, 2002. Chapters 1 to 13

REFERENCES

1. S.Dharani Venkatakrishnan, Operations Research Principles And Problems, Keerthi Publishing House, 1992
2. Kanti Swarup, Manmohan, P.K.Gupta, Operations Research, Sultan Chand & Sons, 1991.

H2080: SYSTEM SOFTWARE

UNIT I
INTRODUCTION TO SYSTEM SOFTWARE AND MACHINE STRUCTURE : System programs Assembler, Compiler, Interpreter, Operating system. Machine Structure instruction set and addressing modes.

UNIT II
ASSEMBLERS : Basic assembler functions, machinedependent and machine independent assembler features. Assembler design Two-pass assembler with overlay structure, one pass assembler and multi - pass assembler.

UNIT III
LOADERS AND LINKERS : Basic loader functions, machinedependent and machine independent loader features. Loader design Linkage editors, dynamic linking and bootstrap loaders.

UNIT IV
MACROPROCESSORS : Basic Macroprocessor functions machine independent features, Macroprocessor design recursive, one pass macroprocessor two pass macroprocessor-general-purpose and macroprocessing with language translators.

UNIT V
DEBUGGERS : Introduction-debugger architecture-H/W debugger facilities-OS debugger infrastructure-controlling execution-breakpoints and single steping-inspecting data and variables debugging GUI applications.

TEXT BOOKS

1. Leland L. Beck , System Software In introduction to System Programming, Addison Wesley,(Chapter 1,3,4,5,7.2 & 7.3).
2. Jonathan B. Rosenberg, How Debuggers Work : Algorithms, Data Structures, and Architecture, John Wiley & Sons -1 edition (September 27, 1996)

REFERENCE

1. Damdhere, Introduction to System Software, McGraw Hill 1986.

H3060: AUTOMATA THEORY AND COMPUTATIONS

UNIT I
Automata Theory: Finite State Systems Definition of an Automaton - Non- Deterministic Finite Automaton -

Equivalence of DFA and NFA - Finite automata with output (Mealy and Moore Models) - Minimization of Finite Automata Regular Expressions.

UNIT II
Push Down Automata Theory: Context-Free Languages and Derivation Trees Ambiguity in Context-Free Grammars Chomsky Normal Form Greibach Normal Form. Push Down Automata Definition, Acceptance by Push Down Automata Push Down Automata and Context Free Languages.

UNIT III
Turing Theory: Turing Machines Computable Language and Functions Techniques For TM Construction Modification of TM.

UNIT IV
Chomsky Hierarchy: Regular Grammars Unrestricted Grammars Context Sensitive Languages. Linear Bounded Automata Definition Linear Bounded Automata and Context Sensitive Languages.
Undecidability : Properties of recursive and recursively enumerable languages Turing Machine Codes Universal Turing Machine .

UNIT V
Computational Complexity Theory: Space Complexity Time complexity Non-Deterministic Time and Space Complexity Complexity Classes.
Computability: Basic Concepts Primitive Recursive Functions Recursive Functions.
Case Studies: Application of Finite Automata Parsing.

TEXT BOOKS

1.Daniel I.A. Cohen, Introduction to computation theory, John wiley & sons, 2nd editionJohn E.
2.John E.Hopcraft and Jeffery D. Ullman, "Introduction to Automata theory , languages and computations , Narosa, First edition.
3. "K.L.P. Mishra & N. Chandrasekaran " Theory of computer science (Automata, Langauges and computation), PHI.

REFERENCE

1. Thomas A. SudKamp, Languages and Machines.

H3070: COMPUTER GRAPHICS

UNIT I
Introduction, Overview of Graphics Systems, Video Display Devices, Refresh Cathode Ray Tubes, Raster Scan and Random Scan Displays, Raster Scan and Random Scan Display Processor, Color CRT Monitors, DBST, 3D Viewing Devices, Stereoscopic and VR Systems, Input Devices, Hard Copy Devices.

UNIT II
Output primitives, Line drawing algorithms, Circle Drawing algorithms, Circle drawing algorithms, Polynomials and spline curves, Area filling algorithms, character generation, Attributes of Output primitives, Line, Curve, Area fill, Character and bundled attributes, Anti aliasing techniques.

UNIT III

2D Transformations, 2D viewing, Graphical User interfaces and Interactive Input Methods.

UNIT IV
3D Concepts, 3D Object representations, 3D Transformations, 3D Viewing .

UNIT V
Visible Surface Detection Methods.

TEXT BOOK

1. Donald Hearn and M. Pauline Baker, Computer Graphics, 2nd Edition, Prentice Hall of India.

REFERENCES

1. Steven Harringhton, Computer Graphics Programming Approach, McGraw Hill.
2.Roy A. Plastock and Gorden Kelley, Theory and Problems of Computer Graphics, Schaums Outline Series, McGraw Hill.

H3080: ARCHITECTURE OF UNIX

UNIT I
Introduction to Kernel: System concepts Kernel data structures Buffer cache. File representation: Inodes Structure of a regular file Directories Conversion of a path name to an Inode - Super block Inode assignment Aloocation of disk blocks -
System Calls for File system.

UNIT II
Process Structure: Process states and transitions Layout of system memory Context of a process Saving the context Manipulation of process address space Sleep. Threads and Lightweight process: Fundamentals of threads Lightweight process design Multithreading in Solaris Threads in Mach, Digital UNIX.

UNIT III
Process Control: Process creation termination Invoking the process User ID of a process Changing the size of the process The Shell Init process - Signal generation Reliable and Unreliable signals Exceptions. Process Scheduling: Time - Clock interrupt handling Scheduler goals Traditional UNIX scheduling Solaris, SVR4, and MACH schedulers.

UNIT IV
Interprocess Communications: Process tracing System V IPC Messages Ports Message passing Port operations. Synchronization and Multiprocessing: Synchronization in traditional UNIX kernels multiprocessor systems Master and slave processes Semaphores Spin locks Conditional variables Read-write locks.

UNIT V
I/O subsystem: Driver interface Disk drivers Device driver frame work POLL system call Block I/O. Streams: Messages and queues Stream I/O Configuration and setup Multiplexing FIFOs and pipes Network interface.

TEXT BOOKS

1. Maurice J.Bach, Design of UNIX Operating Systems, Prentice Hall of India, 1994.
2. Uresh Vahalia, UNIX Internals-The new frontiers, Pearson education, 2001.
3. Graham Glass and King Ables, UNIX for programmers and Users, Pearson education, 3rd edition, 2003.

H4060: MULTIMEDIA SYSTEMS AND APPLICATIONS

UNIT I
Introduction: Multimedia elements multimedia applications System architecture evolving technologies defining objects data interface standards need for data compression multimedia databases

UNIT II
Multimedia data compression: Types of compression Binary image compression color, gray scale and still video image compression video image compression audio compression fractal compression. Data and file formats: RTF TIFF RIFF, MIDI, JPEG, AVI video file formats, MPEG standards.

UNIT III
Multimedia I/O technologies: Pen input Video and Image display systems Print output technologies image scanners digital voice and audio digital camera Video images and animation full motion video. Multimedia storage and retrieval technologies: magnetic media technology optical media hierarchical storage management cache management for storage systems.

UNIT IV
Multimedia application design: Types of Multimedia systems Virtual reality design components of multimedia systems organizing multimedia databases application work flow design issues. Multimedia authoring systems: Hypermedia application design considerations user interface design information access object display / playback issues.

UNIT V
Distributed Multimedia Systems: Components Distributed Client-Server operation multimedia object servers Multi-Server network topologies Distributed multimedia databases Managing distributed objects.

TEXT BOOKS

1. Prabhat K. Andleigh, Kiran Thakrar, Multimedia Systems Design, PHI 2002.

REFERENCES

1. Tay Vaughan, Multimedia making it works Fifth Edition, TMH, 2001.
2. Jeffery Jefcoat, Multimedia Systems and Application, TMH.
3. Fred Halsall, Multimedia Communication Application Networks, Protocols and Standards, Addison

Wesley, 2001.

H4070: OBJECT ORIENTED ANALYSIS AND DESIGN

UNIT I
Overview of Object-oriented systems development Need for object orientation - Overview of the unified approach -Object Basics -Object-Oriented Systems Development Life Cycle The software development process- building high-quality software- object-oriented systems development- reusability.

UNIT II
Object-Oriented Methodologies Unified Modeling Language Static and dynamic models- why modeling- introduction to the unified modeling language- UML diagrams- UML class diagram- Use-case diagram- UML dynamic modeling- model management- UML extensibility- UML meta-model.

UNIT III
Object-Oriented Analysis Process- identifying Use Cases Use-case driven object-oriented analysis- business process modeling- Use-case model- Object Analysis- Classification classifications theory- approaches for identifying classes-Identifying object relationships - identifying attributes and methods- defining attributes by analyzing use cases and other UML diagrams.

UNIT IV
The Object-Oriented Design Process and Design Axioms the object-oriented design process- object-oriented design axioms- corollaries- design patterns.
Designing Classes - the object-oriented design philosophy- UML object constraint language- designing classes- the process- class visibility- designing classes- refining attributes - designing methods and procedures- Access Layer - designing access layer classes- case study -View Layer- Designing interface objects user interface design as a creative process- designing view layer classes

UNIT V
Case Study - Use-case model- developing effective documentation- Analyzing the ViaNet Bank ATM - Relationship analysis for the ViaNet Bank ATM System- defining attributes for ViaNet Bank objects- object responsibility - defining methods for ViaNet Bank objects - refining attributes for the ViaNet Bank objects - designing methods for the ViaNet Bank objects - Designing the access layer for the ViaNet Bank ATM - designing user interface for the ViaNet Bank ATM.

TEXTBOOK

1. Ali Bahrami, Object Oriented Systems Development, McGraw Hill Publication- International Edition.

H4080: DATA WAREHOUSING AND MINING

UNIT I
Evolution of database technology Introduction to data warehousing and data mining -
Differences between operational databases and data warehouses.

UNIT II
Data warehouse architecture & design, Hardware & Operational design, Tuning and testing.

UNIT III
Data mining: Data pre-processing, data mining primitives, languages & system architectures, concept description: characterization and comparison, Mining association rules, classification and prediction.

UNIT IV
Cluster analysis, Applications and trends in data mining.

UNIT V
Introduction to Microsofts OLE DB for Data mining, DBMiner.

TEXTBOOKS

1. Sam Anahory and Dennis Murray, Data Warehousing in the real world, Addison Wesley 1997.
2. Jiawei Han et, al., Data Mining: Concepts and Techniques, Morgan Kaufmaan series , 2000.

REFERENCES

1. Usama M.Fayyad, Gregory Piatetsky - Shapiro, Padhrai Smyth and Ramasamy Uthurusamy, "Advances in Knowledge Discovery and Data Mining", The M.I.T Press, 1996.
2. Ralph Kimball, "The Data Warehouse Life Cycle Toolkit", John Wiley & Sons Inc., 1998.
3. Sean Kelly, "Data Warehousing in Action", John Wiley & Sons Inc., 1997

H5050: E-COMMERCE

UNIT I
Electronic Commerce Environment and Opportunities: Background The Electronic Commerce Environment Electronic Marketplace Technologies Modes of Electronic Commerce: Overview Electronic Data Interchange Migration to Open EDI Electronic Commerce with WWW / Internet Commerce Net Advocacy Web Commerce going forward

UNIT II
Approaches to safe Electronic Commerce: Overview Secure Transport Protocols Secure Transactions Secure Electronic Payment Protocol(SEPP) Secure Electronic Transaction (SET)- Certificates for Authentication Security on Web Servers and Enterprise Networks Electronic cash and Electronic payment schemes: Internet Monetary payment and security requirements payment and purchase order process - Online Electronic cash

UNIT III
Internet/Intranet Security issues and solutions: The need for Computer Security Specific Intruder Approaches Security strategies Security tools Encryption Enterprise Networking and Access to the Internet Antivirus programs Security Teams.

UNIT IV
MasterCard / Visa secure Electronic Transaction: Introduction Business Requirements Concepts Payment processing E-mail and secure e-mail technologies for electronic commerce:Introduction The Mean of Distribution A model for message handling How does e-mail work? MIME: Multipurpose Internet Mail Extensions S/MIME: Secure Multipurpose Internet Mail Extensions MOSS: Message Object Security Services

UNIT V
Internet and Web site establishment: Introduction Technologies for web servers Internet tools relevant to Commerce Internet Applications for Commerce Internet charges Internet Access and Architecture Searching

the Internet

TEXT BOOKS

1.Daniel Minoli & Emma Minoli, Web Commerce Technology Handbook, TataMcGraw-Hill , 1999.
2. K.Bajaj & D. Nag, E-Commerce, TataMcGraw-Hill, 1999.

H5060: ELEMENTS OF SOFTWARE PROJECT MANAGEMENT

UNIT I
INTRODUCTION: Defining a software development process process identify the software model activities, relationship among activities document information on each activity, tailoring improving the process. Discipline need for implementing discipline attributes of successful leader. Communicating in Harmony Personality traits, management tools.

UNIT II
PROJECT SCHEDULE PLANNING: Top down and bottom up planning initial and final project schedule plans types of activity relationships estimating the duration of an activity critical path identifying milestones activity responsibility matrix project check list.

UNIT III
PROJECT TRACKING: Overview of project progress project outlook occurrence of tracking tracking meetings tracking meeting ground rules recovery plans the role of escalations.

UNIT IV
PRODUCT REQUIREMENT AND SPECIFICATIONS: Product requirement understanding the customers problem to solve product objectives providing direction for the solution product specifications defining the final product development testing unit test function test function test plan anticipating qualities weak link.

UNIT V
MARKETING ISSUES:
Vendor relationships the vendor contract process defining the vendors work performance incentives a trackable plan measure performance routinely quality system proximity to main location acceptance of deliverables is hipped product non preferential treatment selecting , replacing a vendor legal considerations subcontractors post projects review product certification reviews.

TEXT BOOKS

1. Neal Whitten, 'Managing Software Development Projects , Formula for Success', John Wiley and sons , Inc, II edition , 1995.

2.Watts Humphrey, 'Managing the Software Process', Addison Wesley, 1989.

H5070: SOFTWARE TESTING AND QUALITY ASSURANCE

UNIT I

SOFTWARE TESTING PRINCIPLES: Need for testing - Psychology of testing - Testing economics - White box, Black box, Grey box testing SDLC and Testing - Verification & Validation - Weyuker's adequacy axioms.

UNIT II

TESTING STRATEGIES: White box testing techniques - Statement coverage - Branch Coverage - Condition coverage - Decision/Condition coverage - Multiple condition coverage - Dataflow coverage - Mutation testing - Automated code coverage analysis - Black box testing techniques - Boundary value analysis - Robustness testing - Equivalence partitioning - Syntax testing - Finite state testing - Levels of testing - Unit, Integration and System Testing.

UNIT III

TESTING OBJECT ORIENTED SOFTWARE: Challenges - Differences from testing non-OO Software - Class testing strategies - Class Modality - State-based Testing - Message Sequence Specification.

UNIT IV

Introduction to Quality and Quality Control - Evolution of Quality Control - Quality assurance - Quality circles and Quality improvement teams - Benefits of Quality control- Quality and Reliability - Quality costs - Measuring Quality costs - Total Quality Management.

UNIT V

CMM Model and its stages - Introduction to PCMM, CMMI and Six Sigma concepts. ISO 9000, ISO 9000 Part3 for software Quality.

TEXT BOOKS

1. Roger S. Pressman, Software Engineering. A Practitioners Approach, Fifth Edition, 2001
2. William E.Perry, " Effective Methods for Software Testing (2nd Edition) ",
John Wiley & Sons, 2000.
3. Robert V.Binder, " Testing Object-Oriented Systems: Models Patterns and Tools ",
Addison Wesley, 2000.
4.Rajneesh Kapur, Getting ISO 9000 in a software organization, By BPB Publications.
5.Allan C Gillies, Software Quality theory and management, Thompson learning.
6.Stephen H. Kan, Metrics and Models in Software Quality Engineering, Pearson Education.
7.Norman E Fenton and Shan Lawrence Pfleeger, Software Metrics, Thompson learning.
8.Mordechan Ben, Chrissis Mike Konard and Sandy Shrum, CMMI, Pearson Education Ltd.

REFERENCES

1. Glenford J.Myers, "The Art of Software Testing ", John Wiley & Sons, 1997.
2. Boris Beizer, Black-Box Testing: "Techniques for Functional Testing of Software and Systems ",John Wiley & Sons, 1995.
3. P.C.Jorgensen, " Software Testing - A Craftman's Approach ", CRC Press, 1995.

H5080: FUNDAMENTALS OF AGENT TECHNOLOGY

UNIT I

Introduction Intelligent Agents Environments Intelligent agents Agents and Objects Agents and Expert Systems Agents as Intentional Systems Abstract Architectures for Intelligent Agents How to tell an agent what to do Synthesizing Agents

UNIT II

Deductive Reasoning Agents Agents as Theorem Provers Agent-Oriented Programming Concurrent MetateM ,Practical Reasoning Agents Proactical Reasoning Equals Deliberation Plus Means-Ends Reasoning

Means-Ends Reasoning Implementing a Practical Reasoning Agent -Homer The Procedural Reasoning System,
Reactive and Hybrid Agents- Brooks and the Subsumption Architecture The Limitations of Reactive Agents Hybrid Agents

UNIT III
Multiagent Interactions Utilities and Preferences Multiagent Encounters Dominant Strategies and Nash Equilibria Competitive and Zero-Sum Interactions The Prisoners Dilemma Other Symmetric 2 x 2 Interactions Dependence Relations in Multiagent Systems
Reaching Agreements Mechanism Design Auctions Negotiation Argumentation
Communication Speech Acts Agent Communication Languages Ontologies for Agent Communication Coordination Languages

UNIT IV
Cooperative Distributed Problem Solving Task Sharing Combining Task and Result Sharing Handling Inconsistency Coordination Multiagent planning and Synchronization

UNIT V
Methodologies Agent-Oriented Analysis and Design Techniques Pitfalls of Agent Development Mobile Agents
Applications of Agents

TEXT BOOK
1. Michael Wooldridge, An Introduction to Multiagent Systems, John Wiley & Sons Ltd.2002.

REFERENCES
1. Gerhard Weiss, Multi-agent Systems A Modern Approach to Distributed Artificial Intelligence, MIT Press
2. Walter Brenner et al, Intelligent Software agents, Springer Verlag
3. Nicholas R. Jennings, Michael Wooldridge, Agent Technology: Foundations, Applications and markets, Springer Verlag Publishing.

H5090: INTRODUCTION TO SOFTWARE ARCHITECTURE

UNIT I
Introduction Software Architecture Software Design levels An Engineering Discipline for Software The status of Software Architecture Architectural styles Pipes and filters Data Abstraction and Object-oriented organization Event based, implicit invocation Layered systems Repositories Interpreters Process Control Other Familiar Architecture Heterogeneous Architectures.

UNIT II
Case studies - Key word is Context Instrumentation Software Mobile Robotics Cruise Control Three Vignettes in Mixed Style

UNIT III
Shared Information Systems Database Integration Integration in Software Development Environments Integration in the Design of Buildings Architectural structures for shared Information Systems

UNIT IV
Guidance for User-Interface Architectures The quantified Design Space The value of Architectural formalism Formalizing the Architecture of a specific system Formalizing an Architectural Style Formalizing an Architectural Design Space Towards a Theory of Software Architecture Z Notation

UNIT V
Requirements for Architecture Description Languages First class connectors Adding Implicit Invocation to Traditional Programming Languages Tools for Architectural Design UniCon Exploiting Style in Architectural Design Environments Beyond definition/Use: Architectural Interconnection

TEXT BOOKS

1. Mary Shaw, David Garlan, Software Architecture Perspectives on an Emerging Discipline, Prentice Hall of India, Eastern Economy Edition.
2. 2. Boris Beizer, " Software Testing Techniques (2nd Edition) ", Van Nostrand Reinhold, 1990.

- **Categories**
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  - ADMISSIONS
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  - PCP CENTRES
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  - SYLLABUS
  - QUESTION BANK
  - FREQUENTLY ASKED QUESTIONS