

P.G. Department of Computer Science
S.N.D.T. Women's University, Mumbai.
Syllabus- MCA. (w.e.f. from 2013-14 Batch)

| | |
|---------------------------|---|
| Branch: MCA | Semester-III |
| Subject Code: 3101 | Lecture: 04 Credit: 04 |
| Subject Title | Data Structures and Analysis of Algorithms |

| Modules | Sr. No: | Topics and Details | No. of lectures assigned | Marks Weight age |
|----------|---------|--|--------------------------|------------------|
| UNIT-I | 1 | <p>Introduction: Data types , ADT, data structure: Definition & classification Analysis of algorithms (recursive and non-recursive) with emphasis on best case, average case and worst case</p> | 4 | 10 |
| UNIT-II | 2 | <p>Linear Data structures with applications: Array data structure: storage, mapping, applications (sparse matrix, polynomial representation, strings) List: Introduction, implementation using array & linked list (singly, doubly, circular, multi-list), Applications: Polynomial representation, Sparse matrix Stack: Introduction, implementation using array & linked list, Applications: Function call, Recursion, balancing of parenthesis, Polish Notation: infix to postfix conversion and evaluation of postfix expression Queue: Introduction (queue, circular queue, deque, priority queue), implementation using array & linked list, Applications: Job Scheduling</p> | 12 | 25 |
| UNIT-III | 3 | <p>Non Linear data structures: Tree: Introduction and representation, Forest, Tree traversal, Binary Tree (representation using array and links): Binary tree traversal (recursive & non-recursive implementation), Expression tree Graph: Introduction, representations, Traversal(BFS, DFS), Applications: Shortest path (Single source-all destinations), Minimal spanning tree (Prim's algorithm, Kruskal's algorithm)</p> | 12 | 25 |
| UNIT-IV | 4 | <p>Searching and Sorting: Linear Search, Binary Search, Transpose sequential search, Binary search tree, Heap tree (application in priority queue and sorting), AVL tree, Splay tree, M-way search tree, B tree (insertion), B+ tree (Definition and introduction), B* tree (Definition and introduction), Tries, Application of B tree and B+ tree in File Structures Hash Tables: Introduction, hash functions and hash keys, Collisions, Resolving collisions, Rehashing Sorting with algorithm analysis (best case, worst case, average): Bubble, Selection, Insertion, Shell, Merge, Quick, Heap, Radix</p> | 14 | 30 |

| | | | | |
|--|---|--|---|----|
| | 5 | NP-Completeness and the P & NP Classes Introduction , Polynomial Time & Verification, NP-Completeness and Reducibility, The Vertex Cover Problem, The Traveling Salesman Problem, The Set Covering Problem | 8 | 10 |
|--|---|--|---|----|

Books:

1. Mark Allen Weiss, "Data Structures and Algorithm Analysis in C", Pearson Education, 2nd edition (2003)
2. G. A.V. PAI, "Data structures and algorithms, concepts, Techniques and Applications", TMH , 1st Edition (2008)

Additional Reference Book:

1. Horowitz, Sahni, Anderson-Freed, "Fundamentals of Data Structures in C", University Press (2nd edition-2007)
2. Jean-Paul Tremblay, Paul G. Sorenson, "An Introduction to Data Structures with Applications", Tata McGraw-Hill, 2nd Edition, (2007)
3. Cormen, Leiserson, Rivest, Stein, "Introduction to Algorithm", PHI (2003), 2nd Edition
4. Gilberg & Forouzan, "Data Structures: A Pseudo-code Approach with C", Thomson Learning.
5. Parag Dave & Himanshu Dave, "Design and Analysis of Algorithms", Pearson Education (2008)
6. Tanenbaum, "Data Structures Using C & C++", PHI.
7. Michel Goodrich, Roberto Tamassia, "Algorithm design-foundation, analysis & internet examples", Wiley
8. A V Aho, J E Hopcroft, J D Ullman, "Data Structures & Algorithms", Addison-Wesley Publishing (1983).
9. Michael Berman, "Data Structures Via C++: Objects by Evolution", Oxford Univ. Press (2004)
10. D E Knuth, "Sorting & Searching - The Art of Computer Programming", Vol. 3, Addison- Wesley Publishing (1973).

| | |
|---------------------------|---|
| Branch: MCA | Semester-III |
| Subject Code: 3102 | Lecture: 04 Credit: 04 |
| Subject Title | ADVANCED JAVA |

| Modules | Sr. No. | Topic and Details | No. of lectures assigned | Marks Weight age |
|----------------|----------------|--------------------------|---------------------------------|-------------------------|
|----------------|----------------|--------------------------|---------------------------------|-------------------------|

| | | | | |
|----------|---|---|----|----|
| UNIT-I | 1 | Introduction to Applet and Swing – Creating Applet in Java, Identifying various stages of an Applet life Cycle, various Graphic method in java, the AWT control components, the Swing component class Hierarchy, using top level swing containers , using intermediate level swing containers, using the atomic component, using the Layout Manager, Flow Layout Manager, Border Layout Manager and Grid Layout Manager. | 6 | 12 |
| | 2 | Introduction to Event Handling – Identifying the source of Event, Event Listeners and Event Handlers, the Delegation Event Model, Event classes, Event Listener Interface, Action Listener interface, MouseListener Interface Adapter classes- the Mouse Adapter class, the MouseMotion Listener Interface. | 10 | 20 |
| UNIT-II | 3 | Introduction to JDBC – What is JDBC. Database connectivity , JDBC Architecture, JDBC drivers, Using JDBC API – Loading a Driver, connecting and executing JDBC statement, Handling SQL Exceptions. Accessing Result Sets, method of Result Set interface, Methods of PreparedStatement interface , retrieving row, inserting row, Managing Database Transactions, creating and calling stored procedures in JDBC, using Metadata in JDBC. | 12 | 24 |
| UNIT-III | 4 | Introduction to JavaBean – javabeen concept, software components and javabeans , elements of javabeans, javabeen component specification, services of javabeen components, types of javabeen. Beans development kit, user defined javabeans, creating javabeen Applet using BDK, types of javabeen properties creating custom Events, Event class, EventListener, Event Handler. | 12 | 24 |
| UNIT-IV | 5 | RMI – Overview of distributed Application , Remote Method Invocation, components of RMI application , RMI architecture, RMI Packages, Distributed Garbage collection, creating Distributed application using RMI, creating remote interface, implementing remote interface, creating RMI server, creating RMI client, Running the RMI application, Transmitting files using RMI , client side checks. | 10 | 20 |

References:

1. Java™ 2 : The Complete Reference, Third Edition, by Patrick Naughton and Herbert Schildt, Tata McGraw Hill Edition 1999.
2. Java Enterprise in a Nutshell : A Desktop Quick Reference (Nutshell Handbook) or any other book with similar contents.
3. mastering Java2 J2SE1.4 by John Zukouski PBP Publication
4. Java™ How to Program sixth Edition By H.M Deitel, P.J. Deitel
5. Core Servlets & JavaServer Pages By Marty Hall, Larry Brown

| | |
|---------------------------|-----------------------------------|
| Branch: MCA | Semester-III |
| Subject Code: 3103 | Lecture: 04 Credit: 04 |
| Subject Title | COMPUTER GRAPHICS |

| Modules | Sr. No. | Topic and Details | No. of lectures assigned | Marks Weight age |
|----------------|----------------|---|---------------------------------|-------------------------|
| UNIT-I | 1 | A Brief background about applications of Computer Graphics, Overview of Graphics Systems, Video display devices, Refresh cathode ray tubes, Raster and random scan displays, colour CRT monitors, Flat panel displays, LCDs. Design and architecture of raster scan and random scan display systems. A brief introduction to input devices and hardcopy devices. Output primitives, DDA and Bresenham's 2D line drawing algorithms, Parallel line algorithms. | 8 | 16 |
| UNIT-II | 2 | Midpoint circle generating algorithm, Ellipse generating algorithm, Other curves, Filled area primitives, Scan line polygon fill algorithm, Inside outside test, Boundary fill algorithm, Flood fill algorithm, Character generation, Attributes of output primitive, line and curve attributes, Character attributes. | 10 | 20 |
| UNIT-III | 3 | Anti-aliasing, Two dimensional geometric transformations, Composite transformations, General Composite Transformations and Computational Efficiency, Other transformations, Affine transformation, Two dimensional viewing, Window to viewport coordinate transformation. | 8 | 16 |
| | 4 | Clipping operations, Cohen Sutherland line clipping, Liang Barsky line clipping, Nicholl-Lee-Nicholl line clipping, polygon clipping, Sutherland Hodgeman and Weiler Atherton Polygon clipping, Text and curve clipping. Three dimensional concepts, Display methods, polygon surfaces, quadric surfaces and superquadrics. | 12 | 24 |
| UNIT-IV | 5 | Three dimensional Geometric and Modelling Transformations, General three dimensional rotation, Three dimensional viewing pipeline, Projections, Parallel and perspective projection, View volume and general Projective transformation. Visible Surface Detection Methods, Back Face detection, Depth Buffer Method, A buffer method, Depth sorting method. | 12 | 24 |

Text Book:-

1. Donald Hearn and M. Pauline Baker, Second Edition, Prentice Hall of India, 1997.
2. J.D. Foley, A van Dam, S.K. Feiner, J.F. Hughes, Addison Wesley Publ. Company, 1997.
3. Jim Blinn, Jim Blinn's Corner: A trip Down the Graphics Pipeline, Morgan Kaufman, 2000.

| | |
|---------------------------|--|
| Branch: MCA | Semester-III |
| Subject Code: 3104 | Lecture: 04 Credit: 04 |
| Subject Title | COMPUTER ORIENTED QUANTITATIVE TECHNIQUES |

| Modules | Sr. No: | Topics and Details | No. of lectures assigned | Marks Weight age |
|----------------|----------------|---|---------------------------------|-------------------------|
| UNIT-I | 1 | Statistical Methods: Frequency distribution, measures of central tendency, measures of dispersion, linear correlation and regression, forecasting, Elementary probability theory, Bayes theorem, Some standard discrete and continuous distributions, Testing of statistical hypotheses and tests of significance, sampling distributions, non-parametric methods, Analysis of variance and covariance, Use of some relevant statistical packages | 15 | 30 |
| UNIT-II | 2 | Optimization models : Introduction to optimisation models, Assignment problem, transportation problems, Linear programming, Simplex method, sensitivity analysis, Use of relevant packages' Network analysis, PERT/CPM, resource and scheduling, network compression and cost consideration, use of relevant packages | 15 | 30 |
| UNIT-III | 3 | Inventory model The classical economic order quantity, Sensitivity analysis, Non-zero lead-time | 8 | 16 |
| UNIT-IV | 4 | Queuing model General characteristics, Performance measure, Markovian queuing model, Non-Markovian queuing model | 12 | 24 |

References:

1. "PERT and CPM Principles and Application": Srinath
2. "Operations Research": Kantiswaroop, Gupta
3. "Operations Research Methods and Problems": Sasieni, Yaspan Friedman
4. "Mathematical Methods in Operations Research": Wagner
5. "Operations Research": Sharma
6. "Operations Research": Taha
7. "Probability and statistical Inference": R.V.Hogg & E.A.Tanis, Macmillan, 1983
8. "Introductory Mathematical Statistics": E.Kreyszig Wiley, 1970

| | |
|---------------------------|--|
| Branch: MCA | Semester-III |
| Subject Code: 3105 | Lecture: 04 Credit: 04 |
| Subject Title | ACCOUNTING AND FINANCIAL MANAGEMENT |

| Modules | Sr. No: | Topics and Details | No. of lectures assigned | Marks Weight age |
|----------|---------|---|--------------------------|------------------|
| UNIT-I | 1 | Principles of accounting, Nature and scope of accounting and financial management, Double-Entry system of accounting ,Introduction to basic books of accounts of sole proprietary concern, Closing of books of accounts | 4 | 8 |
| | 2 | Preparation of trial balance, Final Accounts, Trading, profit and loss accounts, Balance Sheets of sole proprietary concern with normal closing entries, Introduction to manufacturing accounts, Final accounts of partnership firms and Limited companies, Control accounts for debtors and creditors, Ratio Analysis, Meaning, advantages, Limitations, Types of ratios and their usefulness, Fund flow statement, Meaning of the term fund: Flow of fund | 12 | 24 |
| UNIT-II | 3 | Working capital cycle, Preparation and interpretation of statement, Costing, Nature, importance and basic principles, Budget and budgetary control, Nature, scope and Importance, Method of finalisation of master budget Functional budget | 12 | 24 |
| UNIT-III | 4 | , Marginal costing, Nature, scope and Importance, Construction of break-even chart, Limitations and uses of break-even chart, Practical applications of marginal costing, Standard Costing, Nature and scope of standard cost | 12 | 24 |
| UNIT-IV | 5 | Variance, Variance analysis with reference to material, labour, Overhead costs, Interpretation of the variance | 10 | 20 |

References:

1. "Accounting & Book-Keeping": Kishnadwala
2. "Book-Keeping & Accountancy": Choudhari, Chopade.

| | |
|---------------------------|---|
| Branch: MCA | Semester-III |
| Subject Code: 3201 | Practical: 02 Credit: 02 |
| Subject Title | DATA STRUCTURES AND ALGORITHMS LAB |

| Modules | Sr. No: | Topics and Details | No. of lectures assigned | Marks Weight age |
|----------|---------|---|--------------------------|------------------|
| UNIT-I | 1 | Implementation of linear data structure Array | 3 | 06 |
| UNIT-II | 2 | Implementation of linear data structure List, Linked List | 4 | 20 |
| UNIT-III | 3 | Implementation of stack, queue, enqueue, dequeue | 6 | |
| UNIT-IV | 4 | Tree: BST, AVL, HEAP | 6 | 24 |
| | 5 | Graph: DFS, BFS | 6 | |

| | |
|---------------------------|-------------------------------------|
| Branch: MCA | Semester-III |
| Subject Code: 3202 | Practical: 02 Credit: 02 |
| Subject Title | ADVANCED JAVA LAB |

| Modules | Sr. No: | Topics and Details | No.of Lectures/ Practicals assigned | Marks Weight age |
|----------------|----------------|---------------------------|--|-------------------------|
| UNIT-I | 1 | Class | 2 | 04 |
| | 2 | Function Overloading | 4 | 18 |
| | 3 | Operator Overloading | 5 | |
| UNIT-II | 4 | Polymorphism | 5 | 16 |
| | 5 | Java Beans | 3 | |
| UNIT-III | 6 | JDBC | 2 | 12 |
| | 7 | RMI | 2 | |
| UNIT-IV | 8 | Animation | 2 | |

| | |
|---------------------------|-----------------------------------|
| Branch: MCA | Semester-IV |
| Subject Code: 4101 | Lecture: 04 Credit: 04 |
| Subject Title | SOFTWARE ENGINEERING |

| Modules | Sr. No. | Topic and Details | No of Lectures Assigned | Marks Weight age |
|----------------|----------------|--|--------------------------------|-------------------------|
| UNIT-I | 1 | Software Processes: Processes projects and products, Component software processes, characteristics of a software process, software Development Process, project management process, software configuration management process, software configuration management process, process management process. | 8 | 16 |
| | 2 | Software requirement Analysis and Specification: Software requirement, need for SRS, requirement process, problem analysis, analysis issues. Informal approach, structured analysis, object oriented modeling, other modeling approaches, prototyping, requirement specification, characteristics of an SRS, component of an SRS, specification languages, structure of requirement document validation requirement reviews, other method metrics, | 8 | 16 |

| | | | | |
|----------|---|--|---|----|
| | | size measures, quality metrics. | | |
| UNIT-II | 3 | Planning Software Project:- Cost estimation, uncertainties in cost estimation, building cost estimation models, on size estimation, COCOMO model, project scheduling, average duration estimation, project scheduling and milestones, staffing and personnel planning, rayleigh curve, personnel plan, team structure, software configuration management plans, quality assurance plans, verification and validation, project monitoring plans, risk management. | 8 | 16 |
| | 4 | Function Oriented Design:- Design principles, coupling, cohesion, design notation and specification, structured design methodology, verification, network metrics, stability metrics, information flow metrics Software Testing. | 4 | 08 |
| UNIT-III | 5 | Testing Methods : Software testing fundamentals, test case design, white box testing, control structure testing, black-box testing, testing for specialized environments. Software Testing Strategies: A Strategic Approach to software testing, strategic issues, unit testing, validation testing, system testing, the art of debugging. | 8 | 16 |
| UNIT-IV | 6 | Re-Engineering : Software re-engineering, software maintenance, a software reengineering process model, reverse engineering, reverse engineering user interfaces, restructuring, code restructuring, data restructuring, forward engineering the economics of reengineering. | 8 | 16 |
| | 7 | Client/Server software Engineering: The structure of client/server systems, software engineering for c/s systems, analysis modeling issues, design for C/S systems, testing issues. Computer-Aided software Engineering: What is case, building blocks for case, a taxonomy of case tools, integrated case environments, the integration architecture, the case repository | 6 | 12 |

Reference Books:

1. Presman Roger, Software, Engineering: A Practitioner's Approach Tata McGraw Hill, New Delhi.
2. Jalote Pankaj, An Integrated Approach to Software Engineering Narosa, New Delhi
3. R.E. Fairly. Software Engineering Concepts. McGraw Hill, Inc 1985.
4. Poyce, Software Project Management, Addison-Wesly.
5. Sommerville , Software Engineering, Addison-Wesly.

| | |
|---------------------------|---|
| Branch: MCA | Semester-IV |
| Subject Code: 4102 | Lecture: 04 Credit: 04 |
| Subject Title | OBJECT ORIENTED METHODOLOGY AND DESIGN |

| Modules | Sr. | Topic and Details | No of Lectures | Marks Weight |
|---------|-----|-------------------|----------------|--------------|
|---------|-----|-------------------|----------------|--------------|

| | No. | | Assigned | age |
|----------|-----|--|----------|-----|
| UNIT-I | 1 | Introduction: Object Oriented development and themes, evidence for usefulness, modeling as a Design Technique. | 4 | 8 |
| | 2 | Object Modeling: Objects, classes, links and associations, generalization and inheritance, grouping constructs, aggregation, abstract classes, generalization as extension and restriction, multiple inheritance, metadata, candidate keys and inheritance. | 6 | 12 |
| | 3 | The Notation: Elements of Notations, Class Diagram, State Transition Diagram, Object Diagram, Interaction Diagram, Module Diagram, Process Diagram | 6 | 12 |
| UNIT-II | 4 | Dynamic and Functional Modeling: Events, states, operations, concurrency, nested state diagrams, advanced dynamic modeling concepts, relation of object and dynamic models, DFD, relation of functional to object and dynamic models | 8 | 16 |
| | 5 | Design Methodology: Preview of OMT technology, Impact of an object oriented approach, Analysis, System design with examples, Combining models, Designing models, Designing algorithms, Optimization of design, control. Associations, Physical packaging, Comparing methodologies using structure analysis and design, Jackson's structured development Information modeling notation and object oriented works | 8 | 16 |
| UNIT-III | 6 | Implementation of OMT: Use of programming language and database system, Object oriented style, feature Of object-oriented languages, Applications of OMT like object diagram compiler, Computer animation, and Electrical distribution design system etc. | 4 | 8 |
| | 7 | Behavioral Modeling using UML: Interactions, Use cases, Use case diagram, Interaction Diagrams and Activity diagrams, Events and signals, State Machines, Processes and Threads, Time and space, State chart diagrams | 4 | 8 |
| UNIT-IV | 8 | Object Oriented Analysis and design Methodology with examples Shlaer/ Mellor, Coad/ Yourdaon and Nocolas's, Rambaugh – OMT, Martin/Odell Methodologies | 4 | 8 |
| | 9 | Object Oriented Programming languages—A review and Survey Similarities and differences: Simula, Small talk, C++, Eiffel etc | 6 | 12 |

Reference Books:

1. Object Oriented Modeling and Design: Rambaugh, Premerlani, Eddy, Lorenson (PHI)
2. The Unified Modeling Language User Guide, Grady Booch, Jeams Rambaugh, Ivar Jacotson (Addison Wesley)
3. Object Oriented Analysis and Design – Grady Booch
4. Object Oriented Analysis and Design – Andrew High (TMG)
5. Practical Object Oriented Design with UML – Mark Priestley.
6. Object oriented Analysis & design – Kahate (TMH)

| | |
|---------------------------|---|
| Branch: MCA | Semester-IV |
| Subject Code: 4103 | Lecture: 04 Credit: 04 |
| Subject Title | MANAGERIAL ECONOMICS |

| Modules | Sr. No. | Topic and Details | No of Lectures Assigned | Marks Weight age |
|----------------|----------------|---|--------------------------------|-------------------------|
| UNIT-I | 1 | Economic analysis , Microeconomics and macroeconomics , Analysis of consumer behavior : | 6 | 12 |
| | 2 | Law of demand and supply, Utility analysis/indifference curves, Revealed preference theory, Elasticity of demand, Consumer surplus. 1.Break even point 2.Demand Forecasting | 8 | 16 |
| UNIT-II | 3 | The Firm: Theory of production : Production function, ISO product curves, Cost analysis, Optimum firm | 8 | 16 |
| | 4 | Theory of product pricing: Revenue concepts, Equilibrium of the firm & industry under perfect Competition, monopoly, monopolistic competition, Oligopoly & duopoly | 10 | 20 |
| UNIT-III | 5 | Theory of Factory pricing : Marginal productivity theory of distribution and Modern theory : Theories of rent, wages, interest & profit, Risk and uncertainly | 10 | 20 |
| UNIT-IV | 6 | The economy : National income Concepts : . Savings – investments, Applications of Harrod - Domar Model, International trade and balance of payments. | 4 | 8 |
| | 7 | The financial system, Money:Definition and uses, Demand and supply of money, Commercial banking systems | 4 | 8 |

References:

1. R.L.Varshney , KL Maheshwari “ Managerial Economics Sultan Chand & Sons
2. D.N.DWIVEDI “Managerial Economics Vikas Publication.
3. I.C.DHINGRA “Essential of Managerial Economics Sultan Chand & Sons Publications
4. RUDDAR DATT K.P.M.SUNDRAM “Indian Economy” 54th edition S.Chand & Company Ltd.

| | |
|---------------------------|---|
| Branch: MCA | Semester-IV |
| Subject Code: 4104 | Lecture: 04 Credit: 04 |
| Subject Title | NETWORK PROGRAMMING |

| Modules | Sr. No: | Topics and Details | No: of lectures assigned | Marks Weight age |
|----------------|----------------|--|---------------------------------|-------------------------|
| UNIT-I | 1 | Network Hardware Network Introduction, Network Interface Adapter-Function, | 4 | 18 |

| | | | | |
|----------|---|--|---|----|
| | | Features, Selection of NIC. Cabling a Network – Cable properties, Standards, Types, cable installation. Network Interconnection devices :Repeaters, Hubs, Bridges, Routers, Switches, Server Technologies : Multiple processor server, Server storage technologies. Designing a Network. | | |
| | 2 | Network Operating System : a) Windows 2000 and Windows NT Overview, Windows Networking Architecture, File System, Windows Networking Services. Windows NT Domains. b) Novell Netware : Netware role in Enterprise, Netware Versions, Netware installation, Netware Storage Subsystem. c) Linux d) Network Clients : Windows Network Clients, Netware Clients, Unix Clients. | 5 | |
| UNIT-II | 3 | Directory Services: a) Active directory services Active directory architecture, Deploying active directory, Designing activedirectory, Managing ,Active directory. b) Novel directory services : NDS architecture, NDS tree design, Building the tree NDS security. | 6 | 12 |
| | 4 | Installation of NOS a) Installation of windows 2000 / windows NT b) Installation of Novell Netware c) Installation of Linux | 8 | 16 |
| UNIT-III | 5 | Managing users and groups Managing users and groups on windows, Linux and NetWare. Configuration of Network and communication services a) DHCP b) DNS c) WINES File system a) NTFS and distributed file system on win 2000 b) NFS c) Sharing and securing files and folders | 8 | 16 |
| | 6 | Network Services a) Web serve b) Ftp Server c) E-mail Server d) Telnet Server | 4 | 8 |
| | 7 | Network Management and troubleshooting tools a) Operating System utilities b) TCP/IP utilities, c) Network analyzer d) Traffic analysis e) Protocol analysis f) Network Management Using SNMP. | 5 | 10 |

| | | | | |
|---------|---|---|----|----|
| UNIT-IV | 8 | Network programming UNIX Networking architecture, Sockets API in UNIX Preliminary system calls for TCP/UDP sockets, I/O models in UNIX, Socket Options, Advance I/O system calls. Broadcasting and Multicasting, Raw Sockets and Data-link access, Remote Procedure Calls, Basic architecture for RPC, RPC runtime library – high level and low level calls. XDR (eXtended Data Representation) format and XDR filters. | 10 | 20 |
|---------|---|---|----|----|

Reference Books:

1. The complete Reference Networking by Craig Zacker TMH Publication.
2. Distributed Systems and Networks by William Buchanan TMH Publication.
3. Windows 2000 Server Bible by Jeffrey R.S shapiro and Jim Boyee IDG Books India.
4. Unix Administration Handbook Evi Nemeth, Garth Snyder Pearson Education
5. The complete reference Linux by Richard L. Peterson Tata Mcgraw Hill Publication
6. Introduction to Computer Networks - Andrew S. Tanenbaum
7. UNIX Network Programming, Volume I and II - W. Richard Stevens
8. Power Programming with RPC - John Bloomer
9. RPC handbook, Java Programming Language - Ken Arnold, James Gosling
10. JDK 1.2 Documentation
11. Network Security Essentials – William Stallings

| | |
|---------------------------|--|
| Branch: MCA | Semester-IV |
| Subject Code: 4105 | Lecture: 04 Credit: 04 |
| Subject Title | ELECTIVE-I ADVANCED DATABASE MANAGEMENT SYSTEMS |

| Modules | Sr. No. | Topic and Details | No of Lectures Assigned | Marks Weight age |
|---------|---------|---|-------------------------|------------------|
| UNIT-I | 1 | Parallel and Distributed Databases: Architectures for parallel database, Parallel query Evaluation, Parallelizing individual operation, Parallel Query Optimization, Distributed DBMS Architecture, Storing data in distributed DBMS, Distributed Catalog Management, Distributed query processing, Updating distributed data, Distributed Concurrence control, Distributed recovery | 8 | 16 |
| UNIT-II | 2 | Web databases : Web search engines, web search architecture, Inverted indexes the IR way, Inverted indexes for web search engines, web crawling, web search statistics. | 5 | 10 |
| | 3 | Decision Support : Introduction Data Warehousing OLAP, Implementation Techniques for OLAP, Views and decision support. | 5 | 10 |

| | | | | |
|----------|---|--|---|----|
| UNIT-III | 4 | Data Mining: Introduction, Counting Co-occurrences, Mining for rules, Tree structured rules. Clustering, Similarity search over sequences, Additional data mining tasks. | 8 | 16 |
| | 5 | Object Database Systems: User defined abstract data types, Structured types, Objects, Objects Identity and Reference types, Inheritance, database design for an ORDBMS, Comparing RDBMS with OODBMS and ORDBMS. | 8 | 16 |
| | 6 | Spatial Data Management: Types of Spatial Data and Queries Application involving Spatial data. Introduction to spatial Indexes, Indexing based on space filling Curves, Grid files, R trees, High command Indexing. | 8 | 16 |
| UNIT-IV | 7 | Deductive Databases: Recursive Queries, Theoretical foundation, Recursive Queries with Negation, Efficient evaluation of Recursive Queries, Additional Transaction Processing. Advance transaction processing Integrated access to Multiply data sources, Mobile database, multiplying database, Geographic Information systems. Temporal and Sequence database, Information Visualization. | 8 | 16 |

Reference Books:

1. Database Management Systems By Raghu Ram Krishnan. Iind edition
2. Database System Design Implementation & Management By Rob & Control (Thomson Learning)
3. An Introduction to database system” By Date, Addison Wesley Pub.
4. “Principles of Repagination database” By Desai Galgotia Publications.
5. Decision support and data warehouse systems By Mallach (TMH)

| | |
|---------------------------|--|
| Branch: MCA | Semester-IV |
| Subject Code: 4105 | Lecture: 04 Credit: 04 |
| Subject Title | ELECTIVE-I ENTERPRISE RESOURCE PLANNING |

| Modules | Sr. No. | Topic and Details | No of Lectures Assigned | Marks Weight age |
|----------------|----------------|---|--------------------------------|-------------------------|
| UNIT-I | 1 | Introduction to ERP : Introduction , ERP General Model, Evolution of ERP, Reasons for growth of ERP, Reasons for failure, why ERP Packages are used now ? Enterprise Overview - Integrated Management Information, Business Modeling, Integrated Data Model ERP Technologies: - BPR, MIS, DSS, EIS, Supply Chain Management, ERP Generations | 10 | 20 |
| UNIT-II | 2 | ERP Implementation Lifecycle : Pre-evaluation screening, package evaluation, project planning phase, Gap Analysis, Reengineering, Configuration, Team | 15 | 30 |

| | | | | |
|----------|---|---|----|----|
| | | training, Testing, Going live, End-user Training, Post Implementations, Role of Vendors, consultants and user's, Cost of ERP Implementation. | | |
| UNIT-III | 3 | ERP Modules: Business Modules, Finance, Plant maintenance, Quality Management, Materials Management, Manufacturing, Human resources, Sales and Distribution, ERP Market: Introduction, SAP AG, BAAN, PeopleSoft Oracle and JD Edwards. | 15 | 30 |
| UNIT-IV | 4 | ERP-Present and Future Directions: Limitation of ERP, Implementation requirements, ERP & E-Commerce, ERP & Internet, Future Directions, Case Studies in different Sector : Software industry, Telecom, Textile, Electronic manufacturing | 10 | 20 |

Reference Books

1. ERP Demystified by Alexis Leon : TMH Publication (10th edition)
2. ERP by VinodKumar Garg and NK Venkitakrishan : PHI Publication
3. ERP Implementation cycle by Stephen Harwood
4. ERP by Joseph A Brady, Thomson
5. ERP by Sunil Sharma & Parag Diwan, Excel book

| | |
|---------------------------|---|
| Branch: MCA | Semester-IV |
| Subject Code: 4105 | Lecture: 04 Credit: 04 |
| Subject Title | ELECTIVE-I ARTIFICIAL INTELLIGENCE |

| Modules | Sr. No. | Topic and Details | No of Lectures Assigned | Marks Weight age |
|----------------|----------------|--|--------------------------------|-------------------------|
| UNIT-I | 1 | Introduction: AI Techniques – Importance of AI, Representation of Knowledge, Knowledge Base Systems, State Space Search – Production, Systems – Problem Characteristics of 8-Queens, Traveling Salesman, Missionary & Cannibals, Crypt, Arithmetic, Monkey Banana Problem, Tower of Hanoi and Block World. | 8 | 16 |
| UNIT-II | 2 | Heuristics Search Techniques: Generate & test – Hill Climbing, Depth First Search, Breadth First Search, Best First Search, Problem reduction – Constraint satisfaction – Means-Ends Analysis., Game playing – Minmax & Alpha-Beta Cutoffs. | 10 | 20 |

| | | | | |
|----------|---|---|----|----|
| | 3 | Predicate & Logic: Representing simple facts in Logic - Computable functions in predicates, resolution – unification – forward vs. backward reasoning. , Probabilistic reasoning – Bayes’s Theorem – Certainty Factors– Demphster–Shafer Theory – Fuzzy , Sets, Reasoning with Fuzzy Logic, Natural Language Computation with Fuzzy Logic. | 10 | 20 |
| UNIT-III | 4 | Structured Knowledge Representation: Associative Networks, Semantic Nets, Frames Structures, Conceptual , Dependencies & Scripts, Learning – Concept of Learning – Learning Automata, Genetic Algorithm, Learning by induction. Natural Language Processing: Overview of Linguistics, Grammars and Languages, basic Parsing techniques, semantic analysis, and representation structures. Natural Language generation and Natural Language Systems., | 12 | 24 |
| UNIT-IV | 5 | Expert Systems: Architecture – Need and Justification of Expert Systems – Knowledge acquisition and validation. Perception and Action , Real time search, perception, action, vision, robot architecture , Learning in Neural Networks – Applications – Hopfield Networks, Backpropagation , Case Study XCON, PROSPECTOR | 10 | 20 |

Reference Books

1. Introduction to AI and Expert Systems - Patterson.
2. Artificial Intelligence - Rich E and Knight K
3. Principles of Artificial Intelligence - Nilsson.
4. Artificial Intelligence – An Engineering Approach - Schalkoff R J
5. Introduction to Expert System - Peter Jackson
6. Artificial Intelligence - Janakiraman

| | |
|---------------------------|--|
| Branch: MCA | Semester-IV |
| Subject Code: 4105 | Lecture: 04 Credit: 04 |
| Subject Title | ELECTIVE-I INFORMATION SECURITY |

| Modules | Sr. No. | Topic and Details | No of Lectures Assigned | Marks Weight age |
|----------------|----------------|--------------------------|--------------------------------|-------------------------|
|----------------|----------------|--------------------------|--------------------------------|-------------------------|

| | | | | |
|----------|---|--|----|----|
| UNIT-I | 1 | Symmetric Ciphers : Overview – Services, Mechanism and Attacks, The OSI Security. Architecture, A model for network security Classical Encryption techniques – Symmetric Cipher model, Substitution. Techniques, Transposition techniques, Rotor Machines, Steganography. Block Cipher and Data Encryption Standard – Simplified DES, Block. Cipher principles, The Data Encryption Standard, The strength of DES, Differential and Linear Cryptanalysis, Block Cipher design principles, Block Cipher mode of Operation. | 10 | 20 |
| UNIT-II | 2 | Asymmetric Ciphers : Public Key Cryptography and RSA – Principles of Public Key Cryptosystems, The RSA Algorithm Key management ; Other public key cryptosystems – Key Management, Diffe- Hellman Key Exchange, Elliptical Curve Arithmetic, Elliptical curve Cryptography Message Authentication and HASH Functions – Authentication requirements, Authentication Functions, Message Authentication Codes, Hash Functions, security of Hash Functions and MACS Digital Signatures and Authentication Protocols – Digital Signatures, Authentication Protocols, Digital Signature Standard. | 15 | 30 |
| UNIT-III | 3 | Network Security practice : Authentication Applications – Kerberos, X.500 Authentication Service Electronic Mail Security – Pretty Good Privacy, S/MIME IP Security – IP Security Overview, IP Security Architecture, Authentication Header, Encapsulating security payload, Combining Security Associations, Key Management WEB Security – Web Security Considerations, Secure Socket Layer and Transport Layer Security, Secure Electronic Transaction. | 15 | 30 |
| UNIT-IV | 4 | System Security : Intruders – Intruders, Intruder detection, Password Management, Malicious Software – Viruses and Related Threats, Virus Countermeasures, Firewall design principles, Trusted system. | 10 | 20 |

Reference Books :

- 1) Williams Stallings – Cryptography and Network security principles and practices. Pearson Education (LPE)
- 2) Menezes, A.J., P.C.Van Oorschot, and S.A. Vanstone, “Handbook of Applied Cryptography”
- 3) Schneir, Bruce, “Applied Cryptography : Protocols and Algorithms”

| | |
|---------------------------|--|
| Branch: MCA | Semester-IV |
| Subject Code: 4105 | Lecture: 04 Credit: 04 |
| Subject Title | ELECTIVE-I MOBILE COMPUTING |

| Modules | Sr. No. | Topic and Details | No of Lectures Assigned | Marks Weight age |
|----------|---------|---|-------------------------|------------------|
| UNIT-I | 1 | Cellular networks, wireless LANs, application adaptation administrative | 2 | 4 |
| | 2 | Cellular Overview: Cellular concept, location management, handoffs | 4 | 8 |
| | 3 | Wireless LANs overview: Mac issues, mobile IP, adhoc networks, TCP issues. Applications Overview: Wireless applications, disconnected operations, data bcasting, mobile agents | 8 | 16 |
| UNIT-II | 4 | GSM: Air-interface, channel structure, timing, architecture WAP: Architecture, protocol stack, application environment, application demo TCP: Asymmetric links, wireless errors, handoffs, i-tcp, snoop, link rxmit, m-top | 12 | 24 |
| UNIT-III | 5 | Adhoc Networks: Mac, routing, transport Routing: Virtual backbone, Kelpi, MobileIP | 6 | 12 |
| | 6 | Sensor Networks: SPIN, distributed computation Data Broadcasting: Push-pull, consistency | 6 | 12 |
| UNIT-IV | 7 | Mobile agents: Design, applications frameworks: Aglets etc. Ajanta Location Management: HLR-VLR, hierarchical | 6 | 12 |
| | 8 | File systems: Bayou Access Technologies: Blue Tooth, GPRS, 802.11, CDMA Q0s in Wireless | 6 | 12 |

Reference Books:

1. Mobile Communications by J. Schiller, Addition Wesley Publication
1. Page no:115
2. GSM System Engineering by A.Mehrotra, Addition Wesley Publication
3. Understanding WAP by M. Heijden, M. Taylor, Artech House Publication
4. Mobile IP by Charles Perkins, Addition Wesley Publication
5. Adhoc Networks by Charles Perkins, Addition Wesley Publication

| | |
|---------------------------|---|
| Branch: MCA | Semester-IV |
| Subject Code: 4201 | Practical: 02 Credit: 02 |
| Subject Title | SOFTWARE ENGINEERING LAB |

| Modules | Sr. No: | Topics and Details | No.of Lectures/ Practicals assigned | Marks Weight age |
|---------|---------|--------------------|-------------------------------------|------------------|
|---------|---------|--------------------|-------------------------------------|------------------|

| | | | | |
|----------|---|---------------------|----|----|
| UNIT-I | 1 | Project Description | 1 | 02 |
| | 2 | Project Statement | 1 | 02 |
| UNIT-II | 3 | Analysis | 2 | |
| | 4 | Designing | 2 | |
| UNIT-III | 5 | Implementation | 15 | |
| | 6 | Testing | 2 | 8 |
| UNIT-IV | 7 | Demonstration | 2 | |

| | |
|---------------------------|-------------------------------------|
| Branch: MCA | Semester-IV |
| Subject Code: 4201 | Practical: 02 Credit: 02 |
| Subject Title | OOMD LAB |

| Modules | Sr. No: | Topics and Details | No.of Lectures/ Practicals assigned | Marks Weight age |
|----------------|----------------|---------------------------|--|-------------------------|
| UNIT-I | 1 | Project Description | 1 | 02 |
| | 2 | Project Statement | 1 | 02 |
| UNIT-II | 3 | Object Modeling | 2 | |
| | 4 | Dynamic Modeling | 2 | |
| UNIT-III | 5 | Functional Modeling | 2 | |
| | 6 | Implementation | 15 | 34 |
| UNIT-IV | 7 | Demonstration | 2 | |