M.C.A. **Prospectus No. 121718**

II & III Year

संत गाडगे बाबा अमरावती विद्यापीठ

SANT GADGE BABA AMRAVATI UNIVERSITY

(FACULTY OF ENGINEERING & TECHNOLOGY)

PROSPECTUS

Prescribed for

MASTER IN COMPUTER APPLICATION

Second Year Examination 2011-2012 &

Third Year Examination 2012-2013

CREDIT GRADE SYSTEM

2011

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SYLLABUS PRESCRIBED FOR THREE YEAR P.G. COURSE IN MASTER IN COMPUTER APPLICATION

CREDIT GRADE SYSTEM

SECOND YEAR

SEMESTER : FIRST

3 MCA 1 OPERATING SYSTEMS

Unit-I : Introduction: Operating System(OS) definition, OS Evolution, OS Components and Services. Process Concept, Process Scheduling, Operations on Processes, Cooperating Processes, Interprocess Communication, Threads Overview, Multithreading Models, Threading Issues, Java Threads.

Unit-II : CPU Scheduling Concepts, Scheduling Criteria and Algorithms. Process Synchronization: The Critical-Section Problem, Synchronization Hardware, Semaphores, Monitors. Deadlocks: Definition & Characterization, Deadlocks Prevention, Avoidance, Detection and Recovery from Deadlock.

Unit-III : Memory Management Background, Swapping, Contiguous Memory Allocation Schemes, Paging, Segmentation.Virtual Memory Management: Background, Demand Paging scheme, Process Creation, Page Replacement Policies, Allocation of Frames, Thrashing.

Unit-IV : File-System Interface; Directory Structure, File-System Mounting, File Sharing & Protection. File-System Structure, File-System Implementation. Directory Implementation, Allocation Methods, Free-Space Management. File Recovery.

Unit-V : I/O Systems :Overview, I/O Hardware, Application I/O Interface, and Kernel I/O Subsystem. Transforming I/O to Hardware Operations. Disk Scheduling, Disk Management, Swap-Space Management, RAID Structure.

Unit-VI : The Linux System; History, Design Principles, Kernel Modules, Process Management, Scheduling, Memory Management, File Systems, Input and Output, Interprocess Communication, Network Structure & Security in Linux.

Text Book:

Avi Silberschatz , P.B.Galvin, G. Gagne : "Operating System Concepts" (Sixth Edition) John Wiley & Sons Publication.

References:

i. A.S Tanenbaum "Modern Operating Systems" Pearson Education.

ii. William Stallings ""Operating Systems" Prentice-Hall.

iii. D M Dhamdhere "Operating Systems" Tata McGraw-Hill.

iv. M Milankovic "Operating Systems" McGraw-Hill.

3 MCA 2 FILE STRUCTURES & DATA PROCESSING

UNIT I. Introduction : File structure design, File processing operations : open, close, read, write, seek. Unix directory structure. Secondary storage devices: disks, tapes, CD-ROM. Buffer management. I/O in Unix.

UNIT II. File Structure Concepts : Field & record organization, Using classes to manipulate buffers, Record access, Record structures. File access & file organization. Abstract data models for file access. Metadata. Extensibility, Portability & standardization.

UNIT III. Data Compression, Reclaiming spaces in files, Introduction to internal sorting and Binary searching. Keysorting. Indexing concepts. Object I/O. Multiple keys indexing., Inverted lists, Selective indexes, Binding.

UNIT IV. Cosequential processing : Object-Oriented model, its application. Internal sorting : a second look. File Merging : Sorting of large files on disks. Sorting files on tapes. Sort-merge packages. Sorting and Cosequential processing in Unix.

UNIT V. Multilevel indexing : Indexing using Binary Search trees. OOP based B-trees. B-tree methods Search, Insert and others. Deletion, merging & redistribution. B*trees. Virtual B-trees. VL records & keys. Indexed sequential file access and Prefix B+trees.

UNIT VI. Hashing : Introduction, a simple hashing algorithm. Hashing functions and record distributions. Collision resolution. Buckets. Making deletions. Pattern of record access. External hashing. Implementation. Deletion. Performance. Alternative approaches.

Textbook :

Michael J.Folk, Bill Zoellick, Greg Riccard : File Structures : An Object-Oriented Approach using C++. (Addison-Wesley) (LPE)

References :

1. M.Loomis : Data Management & File Processing (PHI)
2. O.Hanson : Design of Computer Data Files McGraw-Hill (IE).
3. D. E. Knuth :"The Art of Computer Programming" Volume-3. Addison Wesley Pub.

3 MCA 3 JAVA PROGRAMMING

Unit I: Java Basics: Program Components, Compilation cycle. Introduction to Applet and Application, Data types and Variables, Operators: Arithmetic, relational, Assignment operators. Control statement: Selection statement: if, nested if, switch statement. Repetition statements: while, do-while, for, nested loops.

Unit II: Introducing classes, class fundamentals, declaring objects, methods, class data, & instance data, constructor, this keyword, access control, Inheritance, Polymorphism, Abstract classes and Interface, Packages. Introduction to String and String Buffer classes, Math class. Arrays: Basics, One - & Multi-dimensional, Array of Objects, Passing array to methods.

Unit-III: Exception handling: Exception types, uncaught Exceptions, using try and catch, throw, throws, finally clauses, multiple catch clauses, Built-in Exceptions. Multithreaded programming: Java thread model, creating a thread, creating multiple threads, thread priorities & synchronization.

Unit IV: Java I/O: Stream classes, Byte Stream & Character Streams: Input stream, Output stream, File Input stream, File Output stream, Data Input stream, Data Output stream, PrintWriter, The Applet class and its various methods, Passing parameters to applets. transient & volatile modifiers, using instanceof, using assert.

Unit-V: Event handling: Event handling mechanisms, Delegation Event model, Event, Event sources & EventListeners, Event Classes, Event Listener Interfaces., Using delegation Event model: Handling mouse events, handling Keyboard events, Adapter classes, Inner classes, anonymous inner classes.

Unit-VI: Introduction to AWT, AWT classes, Window fundamentals, working with frame windows, Button, TextField, Label. Working with Graphics, Working with colors, AWT controls, Fundamentals: Adding and removing controls, responding to controls. Layout managers.

TEXT BOOK:

Herbert Schildt: The Complete Reference Java 2 (5/e) (Tata-McGraw Hill)

3MCA7 JAVA Programming Lab.

REFFERENCES

1) Liang "A Text Book of Java Programming" 2/e (PHI).

2) Dietel & Dietel "Java How to Program " Pearson Education.

3) Horstmann & Cornell "Core Java 2 " Vol-1. Sun Microsystems.

4) S. Chavan "Programming in Java" Shroff Pub.

3 MCA 4 COMPUTER NETWORKS

UNIT – I Introduction: Brief history of computer networks & Internet, Layered architecture, Internet protocol stack, Network entities & layers, Application layer: Principles of protocols, HTTP, FTP, SMTP and DNS protocols.

UNIT – II Transport layer: services & principles, multiplexing & demultiplexing applications, UDP, principles of reliable data transfer, TCP details, principles of congestion control, TCP congestion control.

UNIT – III Network layer: network service model, routing principles, hierarchical routing, Internet Protocol (IP) & ICMP details, Routing in the Internet, Router internals, IPV6.

UNIT – IV Link layer: Introduction, services, multiple access protocol, LAN addresses & Address Resolution Protocol, Carrier Sense Multiple Access / CD, Point-to -Point Protocol details.

UNIT – V Network security issues, principles of cryptography, authentication & authentication protocol, version, integrity: digital signatures, message digests, hash function algorithm, key distribution & certification, secure e- mail.

UNIT – VI Network Management: Basic principles, infrastructure for network management, The Internet Network –management framework: SMI, MIB, SNMP details, security and administration, ASN 1, Firewalls: Packet filtering and Application gateway.

TEXT BOOK:

1. James F. Kurose & K W Ross: Computer Networking, Pearson Education (LPE)

REFERENCES:

1. Douglas E. Comer: Computer Network & Internet, Addison Wesley.
2. Andrew S. Tanenbaum : Computer Networks, PHI (5E)
3. Leon Garcia & Widjaja: Communication Networks, TMH
4. William Stallings: Data & Computer Communication, Pearson Education.

3 MCA 5 COMPUTER ORIENTED OPTIMIZATION TECHNIQUES

Unit I: Introduction, Classification of problems, OR mathematical modeling, Dynamic programming, Investment problem, Equipment replacement, stage coach.

Unit II: Linear Programming: Introduction, concept of linear programming model, development of LP model, simplex method, Big M method, Duality theory, dual simplex method, Two phase method.

Unit III: Transportation & Assignment problem: Introduction to transportation problem, mathematical model, types of transportation problem, Optimization techniques for transportation problem , methods to find basic solution, Northwest Corner cell method, Least cost cell method, Vogal Approximation method, optimizing the basic feasible solution using U-V method. Assignment Problem: Introduction, zero-one programming model for Assignment problems, type of assignment problems.

Unit IV: Introduction to sequencing problem, Two machine, N job three machine sequencing problem, Introduction to Integer Programming, cutting plan Algorithm, branch & bound techniques, zero-one Implicit enumeration algorithm.

Unit V: Probability OR Model: Basic probability statistical concepts, Introduction to decision theory-minimax decision procedure, Bayes decision procedure with & without data, Regret function versus loss function

Unit VI: Introduction to Game Theory: minimax, maximum, pure strategies, mixed strategies & expected payoff, solution of 2x4 games, mx2 games, Brown's Algorithm. Introduction to PERT Network, ET, TE, TL ,SE, critical path, probability of completing events on schedule.

TEXT BOOKS :

1. B.E Gillelt , Introduction to Operation Research TMH Edition

2. R.Panneerselvam "Operation Research" PHI.

References :

1. J.K. Sharma " Operation Research" (2/e) Macmillan.

2. S.S. Rao Optimization Theory & Application Wiley

3 Tata Hamdy, " Operations Research- An Introduction" (5/e), PHI.

4. Taha H. A. "Operation Research" Macmillan.

3 MCA 6 F.S.D.P. - Lab

Laboratory : Programing project as given in the textbook should be implemented for each unit, and a project report (journal) should be submitted. Programming project should span over Chapters 1,2,4,6,7,8,9,10 and 12. This lab should be preferably based on Unix/Linux system.

3MCA7 JAVA PROGRAMMING LAB

LIST OF PROGRAMS

The sample list of program is given below. This list can be used as guide line for problem statements but the scope of the laboratory should not be limited to the same. Aim of the list is to inform about minimum expected outcomes.

S. No	Name of Program
1	Write a Java application to print a given format * * * * * * * * * *
2	Design an Applet to Draw a String inside a Pentagon with specified font and color
3	Write an Java application for Loan Calculator
4	Write an Applet that accepts the user name via Text Field object. When user presses the Enter Key the Applet displays a "Welcome <user name>" with <user name> replaced with actual name entered by user.
5	Write an Applet that displays a BMI of a person given his or her weight in Kilogram and height in Meters .
6	Write an Application program in Java using Switch statement to print A-Z, a-z, 0-9 by inputting ASCII value of first character
7	Write an application in Java which reads a string from user as a command line argument and checks the string for vowels, and when the vowel encounters it append the word "egg" before each vowel
8.	Write an application in Java to design "Simple Calculator"
9	Write an application in Java which creates an AddressBook class which manages collection of Person object and allows programmer to add, delete, search a Person object in the Address Book
10	Write an application in Java which reads and writes User defined Byte Array from and to a file using Low Level File I/O.
11	Write an application in Java which creates a File menu on Frame with menuItem "DialogBox". When user clicks on menu Item one Dialog Box will appear on the Frame with one TextField and two Buttons "OK" and "CANCEL".

After entering the data in the TextField and clicking the OK Button Dialog Box closes and data will appear on a Frame Window and when presses CANCEL Button Dialog Box closes and control comes back on Frame Window

12 Write an application in Java which return current x,y coordinates when any mouse button is Pressed and draws freehand drawing when mouse is Dragged.

3MCA 8 C.O.O. T-Lab Based on 3MCA5

3 MCA 9 COMPUTER LAB- III

This laboratory is based on Operating systems. The laboratory may be based either on Windows or Linux.

Minimum Eight (08) of the following laboratory assignments should be completed and submitted in the form of journal. The external examination shall be based on the programming assignment of any of these modules with via-voce.

i. Managing multiple processes/tasks.

ii. Writing Multithreaded Software.

iii. Manipulating Kernel Objects.

iv. Thread Synchronization.

v. Interprocess Communication.

vi. Memory Management.

vii. File Systems & Directories

viii. File Accessing

ix. Network Programming

x. I/O Programming & Device Drivers.

Text-books:

i. Gary Nutt: " Operating System Projects Using Windows-NT" (Pearson Education)

ii. D.P.Bovet & M. Cesati " Understanding the LINUX Kernel" (3/e) O'Reilly, Shroff Publishers.

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SECOND YEAR

SEMESTER : SECOND

4 MCA 1 DATABASE MANAGEMENT SYSTEMS

Unit-I: Database System Applications, Database Systems versus File Systems, View of Data, Data Models, Database Languages, Database Users and Administrators, Transaction Management, Database System Structure, Application architectures, 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 ofan E-R Schema to Tables.

Unit-II: Relational Model: Structure of Relational Databases, The Relational Algebra, Extended Relational-Algebra Operations, Modification of the Database, Views, The Tuple Relational Calculus, The Domain Relational Calculus, SQL: Basic Structure, Set Operations, Aggregate Functions, Null Values, Nested Subqueries, Views.

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, Pitfalls in Relational-Database, Design, Functional Dependencies, Decomposition, BCNF, Third, Fourth and more Normal Forms, Overall Database Design Process.

Unit-IV: Query Processing: Overview, Measures of Query Cost, Selection Operation, Sorting, Join Operation, Other Operations, Evaluation of Expressions, Query Optimization: Overview, Estimating Statistics of Expression Results, Transformation of Relational Expressions, Choice of Evaluation Plans, Materialized Views.

Unit-V: TRANSACTIONMANAGEMENT: Transaction Concept, Transaction State, Implementation of Atomicity and Durability, Concurrent Execution, Serializability, Recoverability, Implementation of Isolation, Transaction Definition in SQL, Testing for Serializability.

Unit-VI: Concurrency Control: Lock-Based Protocols, Timestamp-Based Protocols, Validation-Based Protocols, Multiple Granularities, Multiversion Schemes, Deadlock Handling, Insert and Delete Operations Weak Levels of Consistency, Concurrency in Index Structures. Recovery System, issues & solutions.

TEXT BOOK:

Korth, Sudarshan : Database System Concepts , McGraw Hill, 4th Edition

REFERENCES:

1. Raghu Ramkrishnan :Database System (TMH)
2. C.J.Date : Database System, 7th ed,.(Pearson Education)
3. Connolly & Begg, : Database System, Low Price Ed. (Pearson Education)
4. Navathe & Elmarsi , Fundamentals of Database Systems. 4/e (Pearson Education).

4 MCA 2 CLIENT SERVER COMPUTING

UNIT-I Networking in Java: Basics, Socket Overview, Client/Server concepts, Proxy servers, Internet addressing, Java Networking classes & interfaces, InetAddress, TCP/IP Client sockets, URLConnection, TCP/IP Server sockets. Creating TCP client/server.

UNIT-II Java Database Connectivity, JDBC Concepts, JDBC API, DriverManager, Connection, Statement and ResultSet classes with relevant methods. Prepared & callable statements, Handling queries, inserts, deletes and updates to database. Displaying the query results.

UNIT III Introduction to XML; Writing XML, Well-formed XML documents, creating a DTD, Elements, Attributes & Entities definitions.Validation of documents, XML schema. Defining simple & complex types. Namespaces, schemas and validation. DOM & SAX programming models, Cascading Style Sheets (CSS) & XML.

UNIT IV Servlets in Java; Servlet structure & lifecycle. Servlet API basics, Various classes & interfaces. Servlet requirements, writing. Running and debugging of Servlets, Concepts of Cookies, Servlets & cookies. State and session management with Servlet API. Server side includes and request forwarding. Servlet chaining. Jdbc Servlets.

UNIT V Remote Method Invocation (RMI): Object serialization in Java, Concept of remote object, Architecture of RMI application, Java RMI package, classes & Interfaces, Client/ Server application using RMI, RMI Servlets, RMI-JDBC Servlets.

.UNIT VI Introduction to JSP; Simple JSP concepts, Request-time expressions. Advanced JSPs: Scripts. conditionals, loops, Try/Catch. Concept of Beans, Properties, Bean instances &

serialization; Bean Scopes, Writing Beans, Introspection, Beans & Scriplets..

Books:

1. Dustin R Callaway: Inside Servlets Pearson Education (LPE)
2. XML Related Technologies and Programming in Java by IBM EEE (PHI).
3. Larne Pekowasky: Java Server Pages, Pearson Education (LPE)
4. Dietel & Dietel: WWW: How To Program, Pearson Education (LPE)
5. Dietel, Nieto, Lin, Sadhu : XML: How to Program, Pearson Education.
6. Horstmann & Cornell "Core Java 2" Vol-1 & Vol. II., Sun Microsystems.

4 MCA 3 MULTIMEDIA TECHNOLOGIES

UNIT I. Multimedia Authoring and Data Representations: Introduction. Components of Multimedia. Hypermedia and Multimedia. Overview of Multimedia Software Tools, Multimedia Authoring, VRM. Graphics and Image Data Representations: 1- Bit Images, 8-Bit Gray-Level Images, 24-Bit Color Images, 8-Bit Color Images, Color Lookup Tables, Popular Image File Formats.

UNIT II. Color in Image and Video Color Science, Color Models in Images, Color Models in Video. Fundamental Concepts in Video: Types of Video Signals, Component Video, Composite Video, S-Video, Analog Video, NTSC Video, PAL Video, SECAM Video, Digital Video.

UNIT III. Basics of Digital Audio: Digitization of Sound, Digitization, Nyquist Theorem, Signal-to-Noise Ratio (SNR), Signal-to-Quantization-Noise Ratio (SQNR), MIDI: Musical Instrument Digital Interface. Hardware Aspects of MIDI, Structure of MIDI Messages, General MIDI, MIDI-to-WAV Conversion.

UNIT IV. Multimedia Data Compression: Lossless Compression Algorithms: Basics of Information Theory, Run-Length Coding, Variable-Length Coding , Dictionary-Based Coding, Arithmetic Coding, Lossy Compression Algorithms: Introduction, Distortion Measures, Quantization, Uniform Scalar Quantization, No uniform Scalar Quantization, Image Compression Standard: The JPEG Standard.

UNIT V. Basic Video Compression Techniques: Introduction, Video Compression Based on Motion Compensation, Search for

Motion Vectors, H.261 Encoder and Decoder, MPEG-1, Motion Compression in MPEG-1, MPEG-2, Supporting Interlaced Video, MPEG-2 Scalabilities, Other Major Differences from MPEG-1.

UNIT VI. Basic Audio Compression Techniques: ADPCM in Speech Coding, Vocoders, Phase Insensitivity, Channel Vocoder, Format Vocoder, Linear Predictive Coding. Audio Compression: Psychoacoustics, Equal-Loudness Relations, Frequency Masking, Temporal Masking, MPEG Audio, MPEG Layers, MPEG Audio Strategy, MPEG Audio Compression Algorithm.

Text Book:

Ze-Nian, Li, Mark S. Drew "Fundamentals of Multimedia" (Pearson Education)

References:

1. Rajan Parekh "Principles of Multimedia " (Tata McGraw-Hill)
2. S.J. Gobbs & D.C. Tsichritzis "Multimedia Programming". Addison Wesley 1995
3. P.W. Agnew & A.S. Kellerman "Distributed Multimedia". , Addison Wesley 1996
4. F. Fluckiger," Understanding Networked Multimedia". Prentice-Hall 1995

4 MCA 4 ELECTRONIC COMMERCE

UNIT-I History of e-commerce, Advantages & disadvantages of e-commerce, Indian business context, IT Act 2000, E-business models: based on the relationship of transaction Parties & Transaction Types. Examples of various e-business models in practice.

UNIT-II Enabling technologies of the WWW, Internet client/server applications, Networks & Internet, Software agents, ISPs, E-Marketing: Identifying Web Presence Goals, Browsing Behavior Model, Online marketing, E-advertising, E-branding, Marketing strategies.

UNIT-III E-security: security on the Internet, E-business risk management issues,. E-Payment systems: digital payment requirements, digital-token-based e-payment systems,classification of new payment systems,properties of E-cash, Cheque paymentsystem, risk & e-payment system, Designing of e-payment system, digital signature.

UNIT-IV E-customer relationship management, E-CRM solutions, E-CRM toolkit, Typical business touchpoints, CRM & workflow automation. E-Supply chain management: supply chain, E-logistics, examples of smart chains, ways to reduce inventory, E-SCM advantage & benefits, E-Supply chain components, architecture and trends in E-SCM.

UNIT-V E-Strategy: Information & Strategy, Virtual value chain, seven dimensions of e-commerce strategy, Value chain & E-strategy, Planning the e-commerce project, E-commerce strategy & knowledge management. E-business strategies,data warehousing and data mining.

UNIT-VI Mobile commerce: Growth & success, wireless applications. Technologies for mobile commerce, origin of WAP, WAP programming model, Wireless technologies, Different generations in wireless technologies, security issues to cellular technologies, M-Commerce in India.

Text Book:

P.T .Joseph, S.J. "E-Commerce: An Indian Perspective" (2/e) (PHI)

Reference Books

1. Trepper C. "E-commerce Strategies" Prentice-Hall.
2. Thakkar M. "E-commerce Applications using Oracle8 & Java" Prentice-Hall.
3. Bill Brogden & Chris Minnick "Java Developers' Guide to E- Commerce with XML & JSP" (BPB).
4. D. Minoli & E. Minoli: Web Commerce Technology Hand Book (TMH).

4 MCA 5 ELECTIVE -I

(1) COMPUTER GRAPHICS

Unit I : An overview of Computer Graphics and Graphics System : Video display devices, Raster-Scan systems, Random-Scan systems, Graphics monitors and workstations, input devices, hard copy devices, Graphics software..

Unit II : Output primitives : Point and Lines, Line drawing algorithms, loading the frame buffer, line function, circle and ellipse generating algorithms, curves, parallel curves algorithms, Pixel addressing, filled-area primitives , functions, Cell array, character generation.

Unit III: Attributes of output primitives : Line and curve attributes, color and grayscale levels, area fill attributes. Character attributes, bundled attributes, antialiasing.

Unit IV: 2-D geometric transformations : basic transformations, matrix representations,composite transformations, other transformations, transformations between coordinate systems, affine transformations, transformation functions,Raster methods for transformations. Two-Dimensional viewing : viewing coordinates, Window-to-viewport coordinate transformation, viewing functions, clipping : point, line, polygon, curve, text, exterior.

Unit V : Structures and hierarchical modeling : concepts, editing structures, basic modeling concepts, hierarchical modeling, GUI and interactive input methods : the user dialogue, input of graphical data, functions, initial values for input device parameters, interactive picture - construction techniques, virtual reality environments.

Unit VI: Three dimensional concepts : display methods, graphics, Bezier curves and surfaces, B-spline curves and surfaces, Beta-splines, three dimensional geometric and modeling transformations : translation, rotation, scaling, three dimensional viewing : viewing pipeline, viewing coordinates, projections.

TEXT BOOK :

D. Hearn, M.P.Baker : Computer Graphics, II edition (Pearson Education)

REFERENCES :

1) F.S.Hill : Computer Graphics Using Open GL, II edition (Pearson Education)

2) W.M.Newman & R.F.Sproul : Principles of Interactive Computer Graphics, 2/e, (McGraw Hill)

3) F.S.Hill : Computer Graphics (Macmillan)

4) Harington : Computer Graphics (McGraw Hill)

4 MCA 5 ELECTIVE-I

(2) MODELING & SIMULATION

UNIT – I System Models and System studies: Basic concepts of systems and system modeling static and dynamic/physical and mathematical models-principles used in modeling-corporate models- analysis, design and postulation of system.

UNIT – II Basic Concepts and continuous system : Techniques used-distributed log models and cobweb models continuous system Model- Analytical equations and methods of

obtaining solutions –analog and hybrid computers and simulations CSSLS examples of different continuous system

UNIT – III System dynamics, probability concepts and basic principles of discrete simulation Growth and decay models system dynamics diagrams examples-stochastic Process-probability functions and their evaluation-random number generation–rejection method-comparison of Monte-Carlo method and stochastic simulation-examples.

UNIT – IV Simulation of Queuing System and PERT Network

Simulation of Queuing system: Rudiments of queuing theory, simulation of a single server queue, simulation of a two server queue, simulation of more general queues. Simulation of a PERT Network: Network model of a project, Analysis of an activity network, critical path

UNIT – V Simulation of Inventory Control & Forecasting Design and Evaluation of Simulation Experiments Inventory Control and Forecasting: Elements of inventory theory, more Complex inventory models, simulation example=1,Generation of Poison and Erlanger variates, Simulation example- 2, Forecasting and regression Analysis. Design and Evaluation of simulation Experiments: Length of Simulation runs, variance reduction techniques, Experimental layout, Validation, summary and conclusion.

UNIT – VI Simulation of Languages and Introduction to GPSS

Different special purpose languages used for continuous and discrete systems and comparison –factors affecting the selection of discrete system simulation languages-comparison of GPSS and SIMSCRIPT. A detailed study of GPSS with examples.

TEXT BOOKS:

1. Geoffrey Gordon “System Simulation”, II Edition, PHI Pvt.Ltd., New Delhi- 1987.
2. Narsingh Deo, “System Simulation with Digital Computers” PHI Pvt.Ltd.,New Delhi.

REFERENCES:

1. Shannon R.E.,”System Simulation: The Art of Science” Prentice Hall,Englewood Cliffs,NY,1975.
2. Hugh j. Watson, John H. Blackstone ,Jr., “Computer Simulation” 2nd Edition, John Wiley & Sons.
3. James A. Payne “Introduction to Simulation: Programming Techniques and Methods of Analysis” McGraw Hill.

4 MCA 6 DATABASE MANAGEMENT SYSTEMS LABORATORY

The sample list of programs based on ORACLE or MY SQL is given below. Aim of the list is to inform about minimum expected outcomes.

1. Consider the employee database, where the primary keys are underlined & Write the Queries using following clauses & also retrieve the data from the given database.
   Employee (employee-name,street,city)
   Works (employee-name,company-name,salary)
   Company (company-name,city)
   Manages(employee-name,manager-name)
   I) Order By II) Between III) Group By IV) Having
2. Consider the above database & perform the different Join Operations which are as follows.
   I) Inner Join II) Left Outer Join III) Right Outer Join IV) Full Outer Join
3. Consider the above database & Perform the different Set Operations Which are as follows.
   I) Union II) Intersect III) Except/Minus
4. Consider the above database & perform the all Aggregate Functions.
5. Write an assertion for the bank database to ensure that the assets value for the 'perryridge' branch is equal to the sum of all amounts lent by the 'perryridge' branch.
   Customer(customer-name, customer-street, customer-city)
   Branch(branch-name, branch-city, asstes)
   Loan(loan-number,branch-name,amount)
   Borrower(customer-name,loan-number)
   Depositor(customer-name, account-number)
   Account(account-number,branch-name,balance)
6. Write an SQL trigger to carry out the following action: On delete of an account, for each owner of the account, check if the owner has any remaining accounts, and if she does not, delete her from the depositor relation.
7. Consider the above Bank database & write the SQL queries for the following views:
   i) A view containing the account numbers the customer names for all accounts at the deer park branch. ii) A view containing the names and addresses of all customers who have an account with the bank, but do not have a loan.
8. Mini Project Using Oracle 9i & VB6 / VB.Net.

4 MCA 7 CLIENT SERVER COMPUTING LAB

LIST OF PROGRAMS

The sample list of program is given below. This list can be used as guide line for problem statements but the scope of the laboratory should not be limited to the same. Aim of the list is to inform about minimum expected outcomes.

1 Write programs to study concept of client-Server system, working of Client, working of Server and kinds of Client- Server using Java Sockets.

2. Write programs to study concept of JDBC, connect to database, insert a row into a table through JDBC, query the table(s), and display the result of query through JDBC.

3. a) Introduction to Servlet that describe the Servlet Life cycle with various Http methods, Advantages of Servlet user CGI.
   b) Write a simple Servlet oriented program to print "Hello World" on a client machine. Repeat this with RMI-servlet.

4. Write a program to create cookies that accepts Personal information in a Form from the user and whenever the user clicks "Submit" button cookie will be sent and when the user retrieves cookie from his site the values sent in the cookie should be display on the HTML page

5. (a) Write a program to design and implement customer Registration system which allows you (Customers) to register them with your site. The data is captured by Servlet and stored in the database using JDBC.
   (b) Repeat this exercise with RMI.

6. (a) Write a program using Session that selects the programming language and when Submit button is clicked a page with Session information gets displayed along with the information for selecting another language and other to get recommended books which displays the requested page when clicked.
   (b) Repeat this exercise with RMI.

7. Write programs to create a DTD for Library System, DTD for e-commerce application.

8. Write a program to create a Bean that will create a Rectangle with color property in it and set its various properties like Height, width etc.

9. Write a program to implement the program for Quiz using JSP.

10. Implement one mini Project using Servlets, Cookies, JDBC, JSP.

4 MCA 8 MULTIMEDIA TECHNOLOGIES LABORATORY:

Minimum Eight experiments/programming assignments must be completed based on the respective syllabus covering each of the units.

4 MCA 9 E Commerce Laboratory: The lab shall be based on the following programming-cum-development assignments:

i. A catalog in XML. ii. Presenting the catalog online. iii. Filling a shopping cart.

iv. Billing & Order confirmation. v. Online catalog upkeep.

vi. Using surveys to know the customers. vii. News on the e-commerce sites.

Text-book for 4MCA 9 labs is:

Bill Brogden & Chris Minnick "Java Developers' Guide to E-Commerce with XML & JSP" (BPB).

4 MCA 10 Seminar

The seminar should be based on the recent trends in computing and the applications. Each student should carry out the literature survey through Internet to identify the current trends in computer applications. The survey should culminate into an application that truly reflects the use of computing in that domain. The seminar report should be prepared based on the technical aspects of the application rather than the description of application.

The candidate shall deliver the seminar for minimum fifteen minutes followed by the question answer session. The marks distribution for the seminar shall be as follows:

Seminar Report			**Seminar Presentation**			
Contents	Format	Topic Coverage	English Communi-cation	Presentation Style	Question Answer Session	Atten-dance in all the seminar sessions
05	05	05	05	05	15	10

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THIRD YEAR

SEMESTER : FIRST

5MCA1 ARTIFICIAL INTELLIGENCE

UNIT I. Introduction to Artificial Intelligence: Overview of Artificial Intelligence. Knowledge : General concept, Introduction to LISP : Syntax and numerical functions. Basic list manipulation function in LISP. Functions, predicates and conditional Input, output and local variables, iteration and recursion. Property list and arrays.

UNIT II. Knowledge representation - I: Syntax and symantics for propositional logic. Syntax and symantics for FOPL. Properties of Wffs. Conversion to clausal form. Inference fuels. The resolution principle, Nondeductive inference methods. Representation using rules.

UNIT III. Knowledge representation - II: Truth maintenance system. Default reasoning and closed world assumption. Predicate completion and circumscription, model and temporal logics. Overview of object oriented systems, object classes messages and methods, simulation examples using OOS program.

UNIT IV. Knowledge organization and manipulation: Preliminary concept, Examples of search problems, Uniformed and blind search. Informed search. Searching AND-OR graphs, structure used in matching. Measures for matching: distance matrices, qualitative measures, similarity measures. Partial matching, Indexing and retrieval technique, Integrating knowledge in memory. Memory organization system.

UNIT V. Knowledge Acquisition : General concept in knowledge acquisition, Learning by induction. Analogical and explanation based learning : Analogical learning and reasoning, Explanation and learning.

UNIT VI. Expert system : Expert system architectures : Introduction, Rules based system architecture. Nonproductive system architecture, Dealing with uncertainty. Knowledge acquisition and validation. Knowledge system building tools.

Text Book:

1. Patterson D.W.; **"**Artificial Intelligence and Expert Systems", PHI

Reference Books :

1. P.H.Winston, "Artificial Intelligence," Addison- Wesley Publication Company II Edition, 1984.

2. F.Holtz, "LISP-The language of Artificial Intelligence," TAB Books Inc. Blue Rodge Summit. PA17214, 1985.
3. Peter Jackson, "Introduction to expert systems, "Addison-Wesley Publishing Company, 1986.
4. D.W.Rolston, "Principles of Artificial Intelligence and Expert Systems Development," McGraw Hill International Edition, 1988.
5. E.Rich, K.K.Knight, "Artificial Intelligence," Tata McGraw Hill, New Delhi, 1991.

5MCA2 SOFTWARE PROJECT MANAGEMENT

UNIT I. Evolving role of Software. Software crises & myths. Software Engineering. Software process & process models : Linear sequential, prototyping, RAD, Evolutionary Product & Process. Project management concepts : People, Product, Process, Project. WSHH principle, critical practice.

UNIT II. Measures, Metrics & Indicators. Metrics in process & project domains-software measurment, Metrics for software quality, small organization. Software projects Planning : Scope, resources, estimation, decomposition technique, Tools. Software risks : identification, risk projection,refinement & RMMM plan.

UNIT III. Project Scheduling : Concepts. Peoples Efforts. Task set, Task network. Scheduling. EV analysis, Project Plan. Software quality concepts. SQ Assurance, Software reviews, technical reviews, software reliability, ISO 900 L, SQA Plan. SCM process. Version control. SCM standard.

UNIT IV. System engineering : Hierarchy, Business Process & Product engineering : Overviews. Requirement engineering, System modeling. Requirement analysis. Analysis principles. Software prototyping. Specification. Design Process. Design Principles & Concepts. Effective modular design. Design model & documentation.

UNIT V. Software architecture, Data Design, Architectural styles, Requirement mapping. Transform & Transaction mappings. User-interface design : Golden Rule. UTD, Task analysis & modeling, ID activities, Tools, design evaluation. Component level design : Structure programming, Comparison of design notation.

UNIT VI. Software testing fundamentals ; test case design, Whitebox testing. Basis path, control structure-, Blackbox-Testing, & for specialized environments. Strategic approach to S/W testing. Unit testing, integration testing, validation testing,system testing. Debugging. Technical metrics for software.

Textbook :

Pressman Roger. S. : Software Engineering, A Practitioner's Approach TMH.

References :

1. Somerville : Software Engineering (Addison-Wesley) (5/e)
2. Fairly R. : Software Engineering (McGraw Hill)
3. Davis A. : Principles of Software Development (McGraw Hill)
4. Shooman, M.L. : Software Engineering (McGraw-Hill)

5MCA3 SYSTEM ADMINISTRATION AND SECURITY

UNIT I. Introduction to network secrity, passive and active attacks, authentication, integrity, access control, The model of internetwork security, internet standards : the internet society and RFC publications (Request for comments.)

UNIT II. Cryptography : Encryption principles and various algorithms, standardization process, key distribution, public key cryptography and message authentication, digital signature.

UNIT III. Network security applications : Kerberos, X.509 directory authentication services, e-mail security PGP (Pretty Good Privacy) operational description. MIME (Multipurpose Internet Mail Extensions), S MIME (Security/Multipurpose internet mail extensions) functionality.

UNIT IV. IP Security : Overview, IP security architecture, Authentication header, Web Security : Web security requirements, secure socket layer SSL, Transport layer security TLS, Secure electronic transactions TES.

UNIT V. Network Management Security : Basic concepts of SNMP, Network management architecture and protocol architectures, proxies, services, SNMPv1 authentication service, access policy and proxy service, SNMPv2 architecture, message processing and user security model, view based access control.

UNIT VI. System Security : Intruders, Intrusion technologies, password protection, password selection strategies, Intrusion detection, viruses and related threats : Nature of viruses, types, micro viruses and various antivirus approaches. Firewall : Characteristics, types of fire walls, Firewall configuration, Trusted systems, data access control, the concept of the trusted systems.

Text Book :

Network Security Essentials - William Stallings (Pearson Edu. Asia)

Reference Books :

1. Security for Telecommunication and Network management by Moshe Rozenbit (PHI)
2. Internet Security Protocols - Protecting IP Traffic, by Uyless Black (Pearson Edu. Asia)

5MCA4 MANAGEMENT INFORMATION SYSTEMS

UNIT-I MIS concepts, definition, Role, Impact of MIS, MIS and computers, MIS and academics, MIS support to Management, Role and importance of management. MIS and process of management MIS in orgn structure and strategic management business.

UNIT-II Basics of MIS : Decision making, Decision methods, behavioral concepts, organizational decision making, MIS and decision making concepts, Information; concepts and classification, Methods of data and information collection: value of information, organization and information. Human as an information processor. Development of MIS and choice of IT.

UNIT-III Applications of MIS : Applications in manufacturing sector, applications in service sector, Introduction to service, sector, Creating a destructive services, MIS applications in service industries and role of MIS in source industries. DSS: Concepts and philosophy, deterministic systems and knowledge based expert systems. MIS and role of DSS. MIS in Enterprise Management System.

UNIT-IV Technology in MIS : Data processing, Transaction processing, Application processing, Information System processing, TQM of IS. DBMS: Object Oriented Technologies, client Server Arch. And MIS.

UNIT-V MIS and Networks : Network Topology, LAN, Data Communication, ATM Technology, Business Process Reengineering:Introduction BP, Process Model of organization, Value stream model, Delays in BP, Relevance of IT, MIS and BPR.

UNIT-VI MIS and Datawarehouse : Architecture, Design and Justification of datawarehouse, organization. Management and implementation of data -warehousing, E-Business: Models, WWW, E-payment, security in E-business, MIS and E-business.

Text Book :

W. S. Jawadekar : Management Information System (II Edition), (TMH)

Reference Book :

Kenneth C. Landon & J. P. Landon.**:** Management Information System, 8th Ed. Pearson Education.

5MCA5 ELECTIVE-II

(1) DATA WAREHOUSING AND DATA MINING

UNIT I: Introduction, Data mining, Data mining functions, classification and major issues. Data Preprocessing: Data cleaning, data integration and transformation, data reduction, discretisation & concept hierarchy generation.

UNIT II: Data mining primitives: Data mining primitives, data mining query language. Concept description: concept description, data generalization, Analytical characterization, mining class comparison.

UNIT III : Application and trends in data mining : data mining applications, data mining systems and research prototypes, additional themes on data mining, trends in data mining .

UNIT IV: Data ware house and OLAP Technology for data mining: What is data ware house, multidimensional data model, data ware house architecture, data ware house implementation.

UNIT V: Data Staging: overview, plan effectively, dimension table staging, fact table loads and ware house operations, data quality and cleansing, miscellaneous issues.

UNIT VI: Building end user applications : role of end user application, application specification, end user application development, maintaining and growing data ware house : manage the existing data ware house environment, prepare for growth and evaluation.

Text Books :

1. J. Han and M.Kamber: Data Mining Concepts and Techniques, Elsevier Pub. Indian Reprint, 2004.
2. R. Kimball: The Data Ware House Life Cycle Tool Kit, Wiley Press, John Wiley and Sons ASIA) Pvt. Ltd.

Reference Books :

1. Berson : Data Ware Housing, Data Mining and OLAP, Tata McGraw Hill.
2. Arun K. Pujari : Data Mining Techniques, University Press (Orient Longman)

5MCA5 ELECTIVE-II

(2) BIOINFORMATICS

UNIT I: Introduction to Bioinformatics: Branches, Aim, Scope/ Research Areas, Sequence File Formats, Sequence Conversion Tools, Molecular File Formats, Molecular File Formats Conversion.

UNIT II: Biological databases, Classification Schema of Biological Databases, Biological Database Retrieval Systems, Tools and Databases of NCBI, Database Retrieval Tool, Nucleotide Database, Literature Database, Protein Database, Chemical Database, EMBL Nucleotide Sequence Database, Curation , Sequence Analysis Tools, DNA Data Bank of Japan.

UNIT III : Protein Information Resource (PIR) , resources, Data retrieval, Databases, Protein 3D Structure and Classification Databases : Introduction , Data Deposition Tools, Molecular Modeling Database (MMDB), Retrieval of Structural Data from MMDB, Conserved Domain Database (CCD), E-MSD, 3D- genomics, Gene3D, Protein Structural Classification Databases, CATH, SCOP.

UNIT IV : Sequence Alignments, Concepts, Scoring Matrices, PAM, BLOSUM, Alignment of Pairs of Sequences, Alignment Algorithms, Heuristic Methods, Multiple Sequence Alignment (MSA). Gene Prediction Methods, Overview, Computational methods, methods

UNIT V : Protein Structure and Modeling : Introduction , Levels of Protein Structure, Conformation Parameters of Secondary Structure of a Protein, Secondary structure Types, Secondary Structure Prediction, Software of Secondary Structure Prediction, Limitations, Protein Modeling, Homology or Comparative Modelling, Model refinement, Evaluation of the Model, hands on in Comparative Modeling using Swiss-model, Threading or Fold Recognition.

UNIT VI : Bioinformatics in Computer-aided Drug Design : Drug Discovery Process , Structural Bioinformatics in Drug Discovery, SAR and QSAR Techniques in Drug Design, Graph Theory, Molecular Docking, Recent Upcoming, Modeling Dynamics and Simulations, Monte Carlo methods, Molecular Dynamics, Energy Minimization, Leading MD Simulation Packages.

Text Books:

1. Zhumur Ghosh, Bibekanand Mallick ; Bioinformatics – Principles and Applications – Oxford Higher Education Pub

Reference Books:

1. Hooman H. Rashidi and Lukas K.Buehler: Applications in Biological Science and Medicine , CAC Press 2000
2. David Mount; Bioinformatics. 2000. CSH Publications
3. Stephen Misener, Stephen A. Krawetz; Bioinformatics- Methods and Protocols-Human Press
4. Harshawardhan P.Bal; Bioinformatics – Principles and Applications, TATA MCGRAW-HILL.

5MCA6 Artificial Intelligence Lab.

At least Twelve experiments must be performed which will include at least one experiment on each Unit. Use of LISP/PROLOG is suggested.

5MCA7 SPM Laboratory ; Based on above syllabus, at least one software development project involving all phases of SDLC. The case studies from the textbook and from reference book 3 may be considered as examples.

5MCA 8 System Ad and Security Lab.

PRACTICALS : Minimum 8 experiments based on above syllabus.

5MCA9 Mini Project

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THIRD YEAR

SEMESTER : SECOND

6 MCA 1 PROJECT & DISSERTATION FULL TIME

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