

JAMAL MOHAMED COLLEGE :: TIRUCHIRAPPALLI – 620 020

CHOICE BASED CREDIT SYSTEM – MCA (AICTE Approved) 2008 – 2009 Onwards

NAME OF THE PROGRAMME _____ MCA _____

SEM	SUBJECT CODE	COURSE	SUBJECT TITLE	HRS/ WEEK	CREDIT	MARK
I	08MCA1401	CORE COURSE 1	PRINCIPLES OF PROGRAMMING	4	3	100
	08MCA1402	CORE COURSE 2	MATHEMATICAL FOUNDATIONS	5	4	100
	08MCA1403	CORE COURSE 3	COMPUTER ORGANISATION AND ARCHITECTURE	5	4	100
	08MCA1404	CORE COURSE 4	DATA STRUCTURES AND ALGORITHMS	4	3	100
	08MCA1405	CORE COURSE 5	ACCOUNTING AND FINANCIAL MANAGEMENT	4	3	100
	08MCA1406P	CORE COURSE 6	DATA STRUCTURES LAB	4	3	100
	08MCA1407P	CORE COURSE 7	MS OFFICE AND TALLY LAB	4	3	100
TOTAL				30	23	700
II	08MCA2408	CORE COURSE 8	OBJECT ORIENTED PROGRAMMING WITH C++	4	3	100
	08MCA2409	CORE COURSE 9	NUMERICAL AND STATISTICAL METHODS	5	4	100
	08MCA2410	CORE COURSE 10	PRINCIPLES OF OPERATING SYSTEMS	5	4	100
	08MCA2411	CORE COURSE 11	DATABASE SYSTEMS	4	3	100
	08MCA2412	CORE COURSE 12	MANAGEMENT INFORMATION SYSTEMS	4	3	100
	08MCA2413P	CORE COURSE 13	OBJECT ORIENTED PROGRAMMING LAB	4	3	100
	08MCA2414P	CORE COURSE 14	UNIX AND SHELL PROGRAMMING LAB	4	3	100
	08MCA28	SUMMER PROJECT – I		-	2	100
TOTAL				30	25	800
III	08MCA3415	CORE COURSE 15	PROGRAMMING IN JAVA	4	3	100
	08MCA3416	CORE COURSE 16	OPTIMIZATION TECHNIQUES	5	4	100
	08MCA3417	CORE COURSE 17	COMPUTER NETWORKS	5	4	100
	08MCA3418	CORE COURSE 18	PRINCIPLES OF COMPUTER GRAPHICS	4	3	100
	08MCA3519	ELECTIVE I	MULTIMEDIA SYSTEMS AND DESIGN	4	3	100
	08MCA3420P	CORE COURSE 19	JAVA PROGRAMMING LAB	4	3	100
	08MCA3421P	CORE COURSE 20	RDBMS LAB	4	3	100
TOTAL				30	23	700
IV	08MCA4422	CORE COURSE 21	VISUAL PROGRAMMING	5	4	100
	08MCA4423	CORE COURSE 22	COMPUTER SIMULATION AND MODELING	5	4	100
	08MCA4424	CORE COURSE 23	MICROPROCESSORS PRINCIPLES AND APPLICATIONS	4	3	100
	08MCA4425	CORE COURSE 24	SOFTWARE ENGINEERING	4	3	100
	08MCA4526	ELECTIVE II	ARTIFICIAL INTELLIGENCE AND EXPERT SYSTEMS	4	3	100
	08MCA4427P	CORE COURSE 25	SOFTWARE DEVELOPMENT LAB – I	4	3	100
	08MCA4428P	CORE COURSE 26	VISUAL PROGRAMMING LAB	4	3	100
	08MCA48	SUMMER PROJECT – II		-	3	100
TOTAL				30	26	800
V	08MCA5429	CORE COURSE 27	WEB TECHNOLOGY	5	4	100
	08MCA5430	CORE COURSE 28	PRINCIPLES OF COMPILER DESIGN	5	4	100
	08MCA5431	CORE COURSE 29	ORGANIZATIONAL DYNAMICS	4	3	100
	08MCA5532	ELECTIVE III	PRINCIPLES OF E-COMMERCE	4	3	100
	08MCA5533	ELECTIVE IV	PARALLEL PROCESSING	4	3	100
	08MCA5434P	CORE COURSE 30	SOFTWARE DEVELOPMENT LAB – II	4	3	100
	08MCA5435P	CORE COURSE 31	WEB TECHNOLOGY LAB	4	3	100
TOTAL				30	23	700
VI	08MCA68	INDUSTRIAL EXPERIENCE AND PROJECT WORK		30	20	500
TOTAL				30	20	500
GRAND TOTAL				180	140	4200

PRINCIPLES OF PROGRAMMING

Objectives:

To develop programming skills using C language, to learn to use the specialties of C language for programming.

Unit I

Identifier – Keywords – Data Types – Access Modifiers – Data Types Conversions – Operators – Conditional Controls – Loop Controls – Input / output Operations.

Unit II

Function prototyping – Function Arguments – Actual vs Formal Parameter – Pointers – Pointer Variables – Pointer Concepts in Functions

Unit III

Arrays – Accessing Array Elements – Pointer and Arrays – Arrays as Functions Arguments – Function Returning Addresses – Dynamic Memory Allocation – Storage Classes.

Unit IV

Structure – Unions – Typedef – Enum – Array of Structures – Pointers to Structures – Macro and Preprocessor.

Unit V

Character I/O, string I/O – Formatting input / output – File I/O – Error handling during I/O – Command line Arguments

Books for Study :

1. B.S. Gottfried – Programming with C – Schaum's Outlines Series – Tata McGraw Hill Edition – 1991.
2. E. Balagurasamy – Programming in ANSI C, - Second Edition Tata McGraw Hill – 1999.

MATHEMATICAL FOUNDATIONS

Objectives :

To impart basic features of Logic , Set Theory and ideas of Lattices and Boolean Algebra and to introduce Graph Theory.

Unit I :

Mathematical Logic :- Introduction – Statements and Notation – Connectives – (AND, OR, NOT) Negation, conjunction, Disjunction, Conditional and Biconditional – Tautologies, Contradiction, related problems - Tautological Implication – Normal Forms – Theory of Inference.

Unit II :

Set Relations And Functions :- Basic concepts of Set Theory – Notations, Inclusion and equal sets, Powerset - operations on sets – Cartesian Product – relations – properties of Relation – Relation Matrix and the graph of a relation – Partition and covering of a set – Equivalence relation – Partial ordering – Functions.

Unit III :

Lattices and Boolean Algebra :- Lattices as partially ordered sets – some properties of lattices – Lattices as algebraic system – some special Lattices – Boolean Algebra – Definition and examples – Boolean Functions.

Unit IV :

Graph Theory :- Introduction – Path and Circuits – Trees and Fundamental Circuits.

Unit V :

Trees, cut sets, Matrix Representation. Cutsets and cut vertices, Matrix representation of Graphs.

Books for Study :

1. Discrete Mathematical Structures with Applications to Computer Science.
Chapters : 1.1,1.2(except 1.2.7,1.2.10,1.2.12 – 1.2.15)
1.3 (except 1.3.5 – 1.3.6) ,1.4(1.4.1,1.4.2,1.4.3 only)
2.1 (except 2.1.5 – 2.1.8)
2.3 (except 2.3.6), 2.4(except 2.4.5,2.4.6)
4.1 (except 4.1.4), 4.2(except 4.2.2) ,4.3.
2. Graph Theory with Applications to Engineering and Computer Sciences –
Narsingh Deo
Chapters : 1.1, 1.2, 1.3,1.5, 2.1,2.2 , 2.4, 2.5, 2.6, 2.7,2.8, 2.9, 3.1, 3.2,3.3,3.5,
3.7 to 3.10, 4.1 to 4.5, 7.1 to 7.4,7.6,7.7, 7.8, 7.9

COMPUTER ORGANISATION AND ARCHITECTURE

Objectives: To understand the principles of digital computer logic circuits and their design. To understand the working of a central processing unit architecture of a computer.

UNIT I

Number Systems – Decimal, Binary, Octal and Hexadecimal systems – Conversion from One System to Another. – Binary Addition, Subtraction, Multiplication and Division – Binary Codes – 8421, 2421, Excess-3, Gray, BCD – Alphanumeric Codes – Error Detection Codes – Parity Generator & Checker.

UNIT II

Basic Logic Gates – Universal Logic – Boolean Laws and Theorems – Boolean Expressions – Sum of Products – Product of Sums – Simplification of Boolean Expressions – Karnaugh Map Method (up to 4 Variables) – Tabulation Method (up to 4 variables) – Implementation of Boolean Expressions using gate networks.

UNIT III

Combinational Circuits – Multiplexers – Demultiplexers – Decoders – Encoders – Arithmetic Building Blocks – Half and Full Adders – Half and Full Subtractors – Parallel adder – 2's Complement Adder-Subtractor – BCD Adder.

UNIT IV

Sequential Circuits – Flip Flops – RS, Clocked RS, D, JK, T and Master-Slave Flip Flops – Edge Triggering Vs Level Clocking – Shift Register – Counters – Asynchronous, MOD-n and Synchronous counters – BCD Counter – Ring Counter – Shift Counter.

UNIT V

Central Processing Unit : Arithmetic Micro operations – Logic Micro operations – Shift Micro operations – Arithmetic Logic Shift Unit – General Register Organization – Stack Organization – Instruction Formats – Addressing Modes – Data Transfer and Manipulation – Program Control – Reduced Instruction Set Computer – CISC characteristics – RISC characteristics.

Text Books:

1. Digital Principles and Applications, Albert Paul Malvino and Donald P. Leach, Tata McGraw Hill, Fourth Edition.
2. Digital Logic and Computer Design, Morris Mano. M, Prentice Hall of India.
3. Computer System Architecture, Morris Mano M, Pearson Education, Third Edition.

Reference Book:

1. Digital Computer Fundamentals, Thomas C. Bartee, Tata McGraw Hill, Sixth Edition.

DATA STRUCTURES AND ALGORITHMS

Objectives: To give a detailed knowledge on Data structures and to give an exposure in the development of algorithms related to data structures.

UNIT I

Elementary data structures: Stack: Definition – Operations (PUSH & POP) – Application (Conversion of Infix Expression to Postfix & Evaluation of Postfix Expression)

Queue: Definition - Operations (Insertion & Deletion)

Linked List: Concepts –Single linked List: Operation (Insertion & Deletion) – Circular Linked List - Definition and Double linked List: Operation (Insertion & Deletion) – Application (Polynomial Addition) –

UNIT II

Trees : Binary trees – Threaded Binary tree – Binary Search Trees – AVL Search Tree – m-way search tree – B Trees – Heap Sort – Huffman’s Algorithm – General Trees.

UNIT III

Graphs : Introduction, Terminology, Representation, Traversing and Application (Topological Sorting)

Sorting: Selection Sort, Bubble Sort , Merge Sorting , Quick Sort (Partition-Exchange Sort) and Radix Sort

Searching: Hash-Table Methods

UNIT IV

Algorithm – Algorithm Specification – Performance Analysis

Divide – And Conquer : The General Method – Binary Search – Finding Maximum and Minimum

The Greedy Method : The General Method –Minimum Cost Spanning Trees – Single Source Shortest Paths (Dijkstra’s Algorithm)

UNIT V

Dynamic Programming : The General Method – Multistage Graphs – All Pairs Shortest Paths – Single Source Shortest Paths

Backtracking : The General Method – The 8 Queens Problem – sum of subsets.

Text Book

1. Jean~Paul Tremblay and Paul G. Sorenson “An Introduction To Data Structures With Applications “ , Tata McGraw-Hill , Second Edition

UNIT I : Chapters 3 (3-4 to 3-7 and 4.2.1 to 4.2.3 and 4-3.1)

UNIT III : Chapters 5 (5-4.1 to 5.4.6 and 5.5.3)
6 (6.1.1 to 6.1.7) , 6.2.4

2. Seymour Lipschutz “ Data Structures” (Schaum’s Outlines)

UNIT II : Chapters 7

3. Ellis Horowitz , Satraj Sahni and Sanguthevar Rajasekaran “Computer Algorithms “ , Galgotia , 1999

UNIT IV : Chapters 1 (1.2 to 1.3), 3 (3.1 to 3.3) and 4(4.5 and 4.8)

UNIT V : Chapters 5 (5.1 to 5.4) and 7 (7.1 to 7.3)

ACCOUNTING & FINANCIAL MANAGEMENT

Objective: To present the whole range of book keeping & accountancy and to give Comprehensive coverage to management accounts.

UNIT –I

Accounting Principles and Concepts – Double entry book keeping- Income and expenditure- Accounting record and system- assets and liabilities.

UNIT- II

Journal – Ledger- Trial Balance- Trading, Manufacturing and profit and Loss account – Balance sheet.

UNIT-III

Analysis and interpretation of financial statements with ratios

UNIT- IV

Cost Accounting - Methods and Techniques of Cost Accounting - classifications of cost - Material Cost - Labour Cost – Overhead - fixed and variable cost- Cost-volume – profit analysis- marginal costing and decision-making.

UNIT- V

Budgeting and budgetary control – types of budgets- Preparation of various functional budgets- Preparations of cash budgets- flexible budgets- Advantages of Budgeting and Budgetary control.

TEXT BOOK (S)

1. N. Vinayakam, P.L. Mani, K.L. Nagarajan, “Principles of Accountancy” EURASIA Publishing House (PVT) Ltd., New Delhi, Revised Edition 2002.
2. S.N. Maheswari “ Principles of Management Accounting “, Sultan Chand, New Delhi (Recent Edition)

REFERENCE (S)

1. S.K. Gupta & R.K. Sharma- Practical Problems in Management Accounting (Recent edition)
2. Khan and Jain “ Financial Management” Tata McGraw Hill (Recent Edition)
3. Shukla, Grewal & Gupta, “ Advanced Accounts “ Sultan Chand

DATA STRUCTURES LAB

1. Sorting

- a) Bubble Sort
- b) Insertion Sort
- c) Selection Sort
- d) Heap Sort
- e) Quick Sort

2. Searching

- a) Linear Search
- b) Binary Search

3. Matrix Manipulations

4. Polynomial Addition & Multiplication

5. Operations on Stack and Conversion of expressions

6. Operations on Queue

7. Operations on Linked List

8. Operations on Doubly Linked List

9. Operations on Binary tree and Traversals

10. Dijkstra's Algorithm to find the Shortest Path

11. File Processing

MS-OFFICE AND TALLY LAB

MS-WORD

- 1 Text Manipulation
Change the font size and type
Aligning and justification on text
Underline the text
Indenting the text
 - i) Prepare a Bio-Data
 - ii) Prepare a letter
- 2 Usage of Numbering, Bullets, Footer and Headers
Usage of Spell check and Find and Replace
 - i) Prepare a document in newspaper format
 - ii) Prepare a document with bullets and footers and headers
- 3 Tables and Manipulations
Creation, Insertion, Deletion (Columns & Rows) and usage of Auto Format.
 - i) Create a mark sheet using table and find out the total marks
 - ii) Create a calendar and Auto format it.
- 4 Picture Insertion and alignment
 - i) Prepare a greeting card
 - ii) Prepare a handout
- 5 Creation of documents using templates Creation of templates
 - i) Prepare a letter using any template
 - ii) Prepare two data using various kinds of templates
- 6 Mail Merge concepts
 - i) Prepare a business letter for more than one company using mail merge
 - ii) Prepare an invitation to be sent to specific addresses in the data source
- 7 Copying text and pictures from Excel
 - i) Draw a chart in Excel and paste it on word
 - ii) Import a picture from Excel and edit the picture

MS-EXCEL

- i) Usage of Formulae and Built – in – Functions
- ii) Describe the types of functions
- iii) File Manipulations
- iv) Data Sorting – Ascending and Descending
- v) Worksheet, Preparation
- vi) Mark list preparation for a student
- vii) Individual Pay Bill Preparation
- viii) Electricity Bill Preparation
- ix) Inventory Report Preparation
- x) Invoice Report Preparation
- xi) Drawing Graphs

- xii) Usage of Auto formatting

MS-POWERPOINT

- i) Creating presentation using Blank presentation.
- ii) Creating presentation using AutoContent Wizard.
- iii) Customizing background of slide master.
- iv) Working with Graphs and Objects.
- v) Slide Transition and animation.
- vi) Usage of Design Templates.

TALLY LAB

1. Preparation of voucher entries.
 - a. Payment voucher
 - b. Receipt voucher
 - c. Sales voucher
 - d. Purchase voucher
 - e. Contra voucher
 - f. Journal voucher
2. Ledger creation.
3. Trail balance Preparation.
4. Preparation of Profit and Loss Account.
5. Preparation of Balance Sheet.
6. Bank Reconciliation Statement.

OBJECT ORIENTED PROGRAMMING WITH C++

Objective: To impart Object Oriented Programming skills using C++

Unit-I

What is Object Oriented Programming? – C++ Console I/O - C++ comments - some differences between C and C++ - Introducing Function Overloading- Constructor and Destructor Functions- Constructors take parameters- Introducing Inheritance – Object Pointers – In-line Functions – Automatic in-lining.

Unit-II

Assigning Objects – Passing Object to Functions – Returning Object from Functions - An Introduction to friend functions- Arrays of objects – Using Pointers to Objects – Using new & delete – More about new & delete – references – Passing references to objects- Returning references- Independent References and restrictions.

Unit-III

Overloading Constructor Functions- Creating and Using a Copy constructor- Using default arguments- Overloading and ambiguity – Finding the address of an overload function- the basics of operator overloading- overloading binary operators- overloading the relational and logical operators- overloading a Unary operator – using friend operator functions- a closer look at the assignment operator- overloading the subscript [] operator.

Unit-IV

Base class access control –using protected members- Constructors, Destructors and inheritance- multiple inheritance- virtual base classes- Some C++ I/O basics- formatted I/O - using width(), precision() and fill() – using I/O manipulators- Creating your own inserters- creating extractors.

Unit-V

Creating your own manipulators- File I/O basics- unformatted, binary I/O- more unformatted I/O functions- random access- checking the I/O status- customized I/O and files- Pointers and derived classes- Introduction to virtual functions- more about virtual functions- applying polymorphism- Templates and Exception handling.

Text Book

“Teach Yourself C++”, Herbert Schildt, IIIrd Edition, Tata McGraw Hill Publishing company Ltd, New Delhi.

Reference(s)

1. Robert Lafore “ Object Oriented Programming in Turbo C++”, Galgotia 2001
2. E. Balagurusamy “ Object Oriented Programming with C++ “, TMH, New Delhi

Semester: II
Code : 08MCA2409

Hrs/Week: 5
Credit : 4

NUMERICAL AND STATISTICAL METHODS

Objectives :

To provide the basic concepts used in Numerical and Statistical methods for solving problems.

UNIT I

Error – types of errors-solution of algebraic and transcendental equations-Bisection – False position – Newton Raphson – Iteration - Simultaneous linear algebraic equations – Gauss elimination – ill conditioned Equations – Gauss-Jordon method– Gauss Seidel methods.

UNIT II

Interpolation – difference table – Newton’s forward and backward differences – Lagrange’s interpolation – numerical Integration –Trapezoidal and Simpson’s rule
Differential equations – Euler method –Runge-Kutta methods – Predictor corrector methods.

UNIT III

Sample space – Events - Probability – Probability Axioms - Addition and Multiplication Law of Probabilities – Conditional Probability – Independent Events – Baye’s Theorem – Random Variables – Distribution Functions – Joint Probability Distributions – Marginal and Conditional Distributions.

UNIT IV

Mathematical Expectations – Moment Generating Functions – Discrete Distributions – Binomial – Poisson – Continuous Distributions – Uniform – Exponential – Normal. Distributions.

UNIT V

Sampling – Types of Sampling – Testing of Hypothesis – Test of Significance of Large Samples – Test based on single mean, difference of means – Student’s t – test – Test based on single mean, difference of means – F-test – Chi-square test – Test of goodness of fit – Independence of attributes.

Books for study :

For Unit I & II:

Introductory methods of Numerical Analysis – S.S. Sastry, 3rd edition

For Unit III, IV & V:

Fundamentals of Mathematical Statistics – S.C Gupta & V.K Kapoor, Sultan Chand & sons.

PRINCIPLES OF OPERATING SYSTEMS

Objectives:

To present fundamental aspects of various managements in an operating system.

Unit I

Operating Systems Objectives and functions – Operating System and User / Computer Interface, Operating System as a Resource Manager: Evaluation of Operating Systems – Serial Processing, Sample Batch Systems, Multi Programmed Batch Systems, Time Sharing Systems.

Unit II

Process Description, Process Control – Processes and Threads, Concurrency – Principles of Concurrency, Mutual Exclusion – Software support, Dekker's Algorithm – Mutual Exclusion- Hardware support, Mutual Messages – Deadlock Prevention, Deadlock Detection, Deadlock Avoidance – An Integrated deadlock Strategy.

Unit III

Memory Management – Memory Management Requirements – Fixed Partitioning, Placement algorithm, Relocation in a Paging System – Sample Segmentation.

Virtual Memory – Paging – Address Translation in a Paging System, Segmentation – Organization, Address Translation in a Segmentation System – Combined Paging and Segmentation – Virtual Memory – Operating System Software – Fetch Policy, Placement Policy and replacement Policy, Page buffering resident set management.

Unit IV

Scheduling – Types of scheduling, scheduling algorithms, scheduling criteria, FIFO, Round Robin, Shortest Process next, Shortest Remaining Time, Highest response ration and Feedback scheduling Performance comparison – Fair – Share Scheduling.

I/O Management and disk scheduling – Organization of the I/O function – the Evaluation of the I/O Function, Logical Structure of the I/O Function, I/O Buffering, Disk I/O - Disk Scheduling Algorithms, Disk Cache.

Unit V

File Management – Files, File Management Systems, File System Architecture, Functions of File Management, File Directories – File sharing – Secondary Storage Management – File allocation.

Books for study :

1. William Stallings, "Operating Systems", Second edition, Maxwell McMillan, International Editions, 1997.
2. Charles Crowley, "Operating Systems – A Design Oriented Approach", IRWIN Publication

Reference :

1. Dental H.M., "An Introduction to Operating Systems", Addison Wesley Publishing Co., 1998
2. Saiberschatz A. Perterson J.L., Galvan P. "Operating System Concepts". Third Edition, Addison Wesley Publishing Co., 1992.

Semester : II
Code : 08MCA2411

Hours/Week : 4
Credit : 3

DATABASE SYSTEMS

Objectives

To impart knowledge about relational database and distributed database.

Unit I

Introduction: Database System Applications-Database Systems versus File Systems-Views of Data-Data Models-Database Languages-Database Users and Administrators. ER Model: Basic Concepts-Constraints-Keys-ER Diagram-Weak Entity Sets.

Unit II

Relational Model: Structure-Relational Algebra-Tuple Relational Calculus- Domain Relational Calculus. Relational Databases: SQL- Basic Structure-Set Operations-Aggregate Functions-Nested Subqueries - Views-Modification of Database-Joined Relations- Data definition language - Query By Example.

Unit III

Relational Database Design: Pitfalls in Relational Database Design. Functional Dependencies: Basic definitions- Trivial and nontrivial dependencies-Closure of a set of dependencies-Nonloss decomposition-First, Second and third Normal Forms-Boyce/Codd normal form-Multivalued dependencies and fourth normal form-Join Dependencies.

Unit IV

Transactions: Concepts – State – Concurrent Executions - Serializability- Testing for Serializability. Concurrency Control: Lock-Based Protocols-Timestamp Based Protocols-Validation Based Protocols. Recovery System: Failure Classification-Storage Structure-Recovery and Atomicity-Log Based Recovery.

Unit V

Database System Architectures: Centralized and C/S Architectures-Server System Architectures-Distributed Systems. Distributed Database: Homogeneous and Heterogeneous Database-Distributed Data Storage-Distributed Transactions-Commit Protocols –Concurrency Control in Distributed Database-Distributed Query Processing-Heterogeneous Distributed System.

Books for study :

Silberschatz, Korth, Suderson, "DATABASE SYSTEM CONCEPTS" 4TH edition
McGraw-Hill International Edition.

Unit II - C.J Date, "An Introduction to DATABASE SYSTEM" Connolly & Begg 7th
Edition Pearson Education Asia.

Reference:

Ramez Elmasri, Shamkant B. Navathe, "Fundamentals of Data Base Systems", Addison
Wesley, Third Edition, 2000

2. "Connolly & Begg , "Database System" Pearson Education

MANAGEMENT INFORMATION SYSTEMS

Objectives: To give an understanding of the importance of Information Systems, how it relates to managerial end-users and the vital role of Information Technology in business.

UNIT – I

Foundation Concepts: Information Systems in Business - Components of Information Systems

Competing with Information Technology: Fundamentals of Strategic Advantage – Using Information Technology for Strategic Advantage.

UNIT – II

Data Resource Management: Managing Data Resources.

Telecommunications and Networks: The Networked Enterprise – Telecommunications Network Alternatives

UNIT – III

Electronic Business Systems: Enterprise Business Systems – Functional Business Systems

UNIT – IV

Enterprise Business Systems: Customer Relationship Management – Enterprise Resource Planning – Supply Chain Management.

Decision Support Systems: Decision Support in Business.

UNIT – V

Developing Business/IT Strategies: Planning Fundamentals – Implementation Challenges.

Developing Business/IT Solutions: Developing Business Systems – Implementing Business Systems.

TEXT BOOKS

James A.O ‘Brien and George M Marakas, “Management Information Systems”, Tata McGraw Hill publishing Company Limited, New Delhi, Seventh Edition 2006.

UNIT I : Chapters 1 and 2.

UNIT II : Chapters 5 (Section I only) and 6.

UNIT III : Chapter 7

UNIT IV : Chapters 8 and 10

UNIT V : Chapters 11 and 12

REFERENCE BOOK

W.S. Jaswadekar, “Management Information Systems”, Tata McGraw Hill Publishing Company Limited , New Delhi, 1998

OBJECT ORIENTED PROGRAMMING LAB

1. Programs using classes and objects
2. Constructors & Destructors
3. Function Overloading
4. Operator Overloading
5. Single & Multi-dimensional arrays
6. Arrays of objects, Passing objects and Arrays as function arguments
7. String manipulation using pointers
8. Inheritance
9. Dynamic Polymorphism – Virtual Functions
10. Formatted I/O and File operations
11. Exception Handling

UNIX AND SHELL PROGRAMMING LAB

- 1). Write a Shell program, which accepts the name of a file from the standard input and performs the following tests on it:
 - (i) File existence
 - (ii) File readable
 - (iii) File writeable
 - (iv) Both readable and writeable

- 2). Write a Shell program using 3 arguments to take the pattern as well as input and output file names. If the pattern is found display "Pattern found", else display "Error message". Also check if right number of arguments is entered.

- 3). Write a Shell program, which accepts the name of the file from the standard input and then performs the following tests on it:
 - (i) Enter the 5 names in a file
 - (ii) Sort the names in existing file
 - (iii) List unsorted and sorted file
 - (iv) Quit

- 4). Write a menu driven Shell program to copy, edit, rename, and delete a file.

- 5). Write a menu driven Shell program to perform the following tasks
 - (i) Enter the sentence in file
 - (ii) Search a given whole word in an existing file
 - (iii) Quit

- 6(a). Write a Shell program to prepare the electricity bill based on the following rules.

For first 100 units	-	Rs. 1.00 / unit
For next 100 units	-	Rs. 2.00 / unit
Above 200 units	-	Rs. 3.00 / unit

- 6(b). Write a Shell program to prepare the electricity bill based on the following conditions. (Illustrates bc utility)

For first 100 units	-	Rs. 0.75 / unit
For next 100 units	-	Rs. 1.50 / unit
Above 200 units	-	Rs. 3.00 / unit

7). Write a Shell script to sum up the following series.

$$\frac{1}{1!} + \frac{2}{2!} + \frac{3}{3!} + \dots$$

8(a). Write a Shell script to display the result “PASS” or “FAIL” using the information given below:

**Student Name, Student Register Number, Mark1, Mark2, Mark3, Mark4.
The minimum pass for each subject is 50.**

8(b). Write a Shell script to display the result of a student in neat format using the information given below:

**Student Name, Student Register Number, Mark1, Mark2, Mark3, Mark4.
The minimum pass for each subject is 50.**

9). Write a menu driven Shell script for converting all the capital letters in a file to small case letters and vice versa.

10). Write a Shell script for a file contains records with each record containing name of city, name of state and name of country. How would you sort this file with country as the primary sort key and state as the secondary sort key.

11). Merge the contents of three given files, sort them and display the sorted output on the screen page by page.

Display the list of last 20 files present in the current directory. Also store this list in a file name `-profile`.

12). Enhance the `cp` command to copy files. Display the necessary error message if error occurs.

13). Write a Shell script to check the user is eligible for vote or not. (One must attain 18 years for voting. Ignore month differences.)

14). Write a Shell script to do the following on the files of the current directory based on file extensions.

- Move all the C language files in to the subdirectory `-C` (under the root directory of the current user)
- Move all the Shell scripts in to the subdirectory `-shell`
- Move all the Text files in to the subdirectory `-text`
- Move all the Java files in to the subdirectory `-java`

15). Write a Shell script to check whether a given string is Palindrome or not. (Palindrome: The given string and its reverse are same).

Semester: II

Code : 08MCA28

Credit : 2

SUMMER PROJECT – I

Students carry out a Mini Project during Summer Vacation at the end of Second Semester.

System Study: 10 days

Project development: 3 weeks

18days x 5 hours per day = 90 hours

Reported preparation: 5 days

PROGRAMMING IN JAVA

Objectives:

To impart sound knowledge in Object Oriented Programming skills in JAVA

Unit I

An overview of Java –Java Buzzwords- Data Types, Variables and Arrays - Operators – Introducing Classes: Class Fundamentals – Declaring Objects – Introducing Methods – Constructors – The **this** keyword – Garbage Collection – Overloading Methods – Call by value, Call by reference – Recursion – Understanding static – final – Nested and Inner classes.

Unit II

Inheritance: Inheritance Basics – Using super – Method overriding – Using Abstract Classes. Packages and Interfaces: Declaring Packages – Access Protection – Importing Packages – Defining, Implementing, Applying Interfaces - Exception Handling: Exception Types – try, catch – throw – throws – finally – Creating User-defined Exception classes.

Unit III

Multithreaded Programming: The Java Thread Model – Creating a Thread – Extending Thread Class - Implementing Runnable Interface — Synchronization - String Handling – Utility Classes and Interfaces: ArrayList, LinkedList, Vector, Stack, HashTable, StringTokenizer, Date and TimeZone.

Unit IV

Files and IO Streams: File – The Byte Streams – The Character Streams – Serialization – Networking – Basics – InetAddress - TCP model – UDP Model – Datagrams.

Unit V

Introducing the Applet: Applet Basics – Applet Architecture – The HTML APPLET tag – Passing parameters to Applets – Graphics, Color and Fonts. Event Handling -Using SWING – Component classes.

Text Book:

Herbert Schildt, “The Complete Reference Java 2”, 3rd Edition, TMH .

Reference:

Herbert Schildt with Joe O’ Neil, “Java – Programmer’s Reference”, TMH.

OPTIMIZATION TECHNIQUES

Objectives

To understand the basic concepts of operations research and the impart the knowledge on various operations research techniques and its applications.

Unit I

Operations Research - Definitions of O.R. - Applications of O.R. - Linear Programming Problem - Mathematical Formulation of the problem - Graphical solution method - Simplex method - Use of Artificial variables - Big-M Method - Two-Phase Method. Duality in LPP - Formulation of Dual Problem - Duality and Simplex Method - Dual Simplex Algorithm.

Unit II

Transportation Problem –General structure of a T.P - Finding initial BFS – NWC rule – Row Minima – Column Minima – Matrix Minima – VAM - Finding Optimal Solution by MODI method - Assignment Problem – Mathematical statement of the problem - Solving Assignment Problem by Hungarian Method.

Unit III

Network Scheduling by PERT / CPM - Basic concept - construction of Networks-Critical path method - Computation of various floats - PERT algorithm - Statistical considerations - Comparison of PERT and CPM - Project Crashing algorithm - Resource leveling and resource allocation.

Unit IV

a. Inventory models - Reasons for maintaining inventories - Costs involved in inventory problems - Deterministic Inventory Models - Purchasing Model without shortages- Purchasing Models with shortages - Manufacturing Models without shortages- Manufacturing Models with shortages - Multi-item Deterministic Problem.

b. Replacement Problem - Various replacement situations - Replacement Models - Replacement of items whose maintenance costs increases with time and money value remains same - Money value varies with time - Replacement of items that fail completely.

Unit V

Queueing Models - Queueing Systems - Characteristics of Queueing System - Transient and Steady states – Various Queueing Models - $(M/M/1):(\infty/FCFS)$ - $(M/M/1):(N/FCFS)$ - $(M/M/c):(\infty/FCFS)$ - $(M/M/c):(N/FCFS)$

Note : Stress to be on solving numerical problems only.

Text Book :

Kanti Swarup, P.K. Gupta and Man Mohan, "Operations Research", Sultan Chand & Sons Publishers, New Delhi, 1992

Reference Books :

1. Hamdy A. Taha, "Operations Research - An Introduction", Macmillan Publishing Co,
2. A. Ravindran, Phillips, Solberg, " Operations Research Principles and Practices ", John Wiley & Sons, New York, 1987.

COMPUTER NETWORKS

Objectives:

To provide a overall knowledge in computer communication networks concepts and its implementation details in the Internet

UNIT – I :

Introduction – Uses of computer networks – Network hardware: LAN-MAN-WAN – Networks Software: Protocol hierarchies – Reference models: OSI-TCP/IP.
The Physical Layer: Guided transmission media- The public switched telephone network: Structure of the telephone system – Switching.

UNIT – II :

The Data Link Layer: Design issues –Error detection and correction – elementary data link protocol – Sliding window protocol – HDLC.
The Medium Access Control Sub Layer: Multiple access protocol: CSMA protocol – collision free protocol – Data link layer switching: Repeaters, Hub, Bridges, Switches, Router, and gateways - Bluetooth.

UNIT – III :

The Network Layer : Design issues – Routing algorithms: Optimality principle – Shortest path – Distance Vector – link state – Hierarchal – Broadcasting – Congestion control algorithms – The network layer in internet: IP protocol – IP address.

UNIT – IV :

The Transport Layer : The transport service: service provided to the upper layer – Transport service primitives – Berkeley sockets - Elements of transport protocols – The internet transport protocol : UDP: Introduction – RPC - TCP: Service model – TCP segment header.
The Application Layer: DNS – E-Mail: Architecture and services – Message formats - WWW : Architectural overview.

UNIT – V :

Network Security: Cryptography: introduction – Substitution and transposition cipher – Symmetric-key algorithm : DES – public-key algorithms : RSA – Digital signature : symmetric and public key signature – Communication security: IPsec – firewalls – VPN. Authentication protocol: Authentication based on shared key – Diffie-hellman key exchange – Email security: PGP – PEM – Web Security: Threats – secure naming – SSL.

Text books:

1. Andrew S. Tanenbaum, “Computer Networks”, **4th edition** by, 2003 PHI.
2. William Stallings, “ Data and Computer Communication”, **5th edition**, PHI.
3. Behrouz A. Forouzan, “ Data Communications and Networking”, **3rd edition** Tata McGraw-hill.

PRINCIPLES OF COMPUTER GRAPHICS

Objectives:

To present concepts on basic graphical techniques, raster graphics, two dimensional and three dimensional graphics.

Unit I

Introduction: The origins of Computer Graphics – New Display Devices – General Purpose Graphics Software – The User Interface – The Display of Solid Objects – Point – Plotting Techniques : Coordinate Systems – Incremental Methods – Line drawing Algorithms – Circle Generators – Line – Drawing Displays : Display Devices and Controllers – Display Devices – The CRT – Inherent – Memory Devices – The Storage Tube Display – The Refresh Line – Drawing Display.

Unit II

Two-Dimensional Transformation: Transformation Principles – Concatenation – Matrix Representations – Clipping and Windowing : A Line Clipping Algorithm – Midpoint Subdivision – Clipping Other Graphic Entities – Polygon Clipping – Viewing Transformations – The Windowing Transformation – A Simple Graphics Package: Ground Rules for Graphics Software Design – functional Domains – Graphic Primitives – Windowing Functions – Example: a Graph-Plotting Program – Implementation of the Functions – The Display-Code Generator – Segmented Display Files : Segments – Functions for Segmenting the Display File – Posting and Unposting a Segment – Segment Naming Schemes – Default Error Conditions – Appending to Segments Display File Compilation : Refresh Concurrent with Reconstruction – Free Storage Allocation – Display-File Structure – Display Files for Storage .

Unit III

Graphical Input Devices : Pointing and Positioning Devices – The Mouse – Tablets – The Light Pen – Three-Dimensional Input Devices – Comparators – Graphical Input Techniques : Introduction – Positioning Techniques – Pointing and Selection – Inking and Painting – On-Line Character Recognition – Event Handling : Interrupts – Polling – Interrupts – The Event Queue – Functions for Handling Events – Light-Pen Interrupts – Input Functions : Dragging and Fixing – Hit Detection – On-Line Character Recognizers.

Unit IV

Raster Graphics Fundamentals : Introduction – Generating a Raster Image : The Frame Buffer Display – Representing a Raster Image – Scan Converting Line Drawings – Displaying Characters – Solid-Area Scan Conversion : Geometric Representations of Areas – Scan – Converting Polygons – Priority – The Y-X Algorithm – Properties of

Scan Conversion Algorithms – Interactive Raster Graphics : Updating the Display – The Painting Model – Raster – Graphics Systems : Representations – Raster Manipulation Functions – Systems Using Raster Representations – Systems Using Geometric Representation.

Unit V

Three-Dimensional Graphics : Three-Dimensional Transformations and Perspective : Transformations – Transformations in Modeling – Transformations in Viewing – The Perspective Transformation – Hidden-Surface Elimination : the Depth – Buffer Algorithms – Scan-Line Coherence Algorithms – Area – Coherence Algorithms – Priority Algorithms – Display Processors : The Simple Refresh Line-Drawing Display – Random Scan – Storage – Tube Display

Book for study:

William M. Newman and Robert F. Sproull, “Principles of Interactive Computer Graphics”, McGraw Hill, International Edition, 1988

Reference :

1. Donald Hearn and M. Pauline Baker, “Computer Graphics”, Prentice Hall of India, Third Edition, 1998
2. Steven Harrington, “Computer Graphics – Programming Approach”, McGraw Hill
3. R.G.S. Asthana and N.K. Sinha, “Computer Graphics for Scientists & Engineers”, New age International Pvt. Ltd.

ELECTIVE I : MULTIMEDIA SYSTEMS AND DESIGN

Objectives:

To provide a sound knowledge in various concepts of Multimedia and its applications.

Unit I

Introduction – Definition – Multimedia Hardware – Multimedia Software – Multimedia Networking – Multimedia Applications – Multimedia Environments – Multimedia Computer Components – Multimedia Standards – Multimedia PC.

Unit II

Multimedia Information Systems : Limitations in workstation Operating Systems .
Middleware System services Architecture: Goals of Multimedia System Services –
Multimedia System Services Architecture Text : Elements of Text – Using Text in
Multimedia Applications – Graphics : Element of Graphics – Images and color –
Graphics file and Application formats – Obtaining Images for Multimedia use – Using
Graphics on multimedia applications.

Unit III

Digital Audio Representation and Processing : Uses of Audio in Computer applications –
Digital Representations of sound – Transmission of Digital Sound – Digital Audio
Signal Processing, Video Technology : Raster Scanning Principles – Sensors for TV
Cameras – Color fundamentals – Color Video – Digital Video and Image Compression:
Evaluating Compression System – Video Compression techniques – JPEG Image
compression standard – MPEG motion Video compression standard.

Unit IV

Multimedia Communications Systems : Applications Network Services – Network
Protocols.
Multimedia Conferencing : Teleconferencing systems – Requirements for Multimedia
Communications – Multimedia Conferencing Architectures.

Unit V

Multimedia and Internet : Internet – Client/Server technology – Communications
protocol – Internet addressing – Internet functions – HTML and Web Authoring.
Multimedia Development Team : Team approach – Assembling multimedia Production
Team – Multimedia Development Process : Multimedia Project – Structured Multimedia
Development – Casting multimedia Project.

Books for Study :

1. For Unit I : Tay Vaughan , “Multimedia making it work “ , 4th Edition Tata McGraw – Hill Edition , 2000
2. For Units II, III, IV : John F. Koegel Buferd, “Multimedia Systems”, Published by Addison Wesley Longman. 3rd Edition year 2000.
3. For Unit V: David Hillman, “Multimedia Technology and Applications “, Galgotia Publications Pvt. Ltd.,Year 1998.

Reference :

Fred T.Hofstetter, “Multimedia Literacy”, McGraw Hill, 1995.

JAVA PROGRAMMING LAB

- 1) Write Java Applications for the following:
 - i) Mark List Preparation (if else)
 - ii) Reverse and Sum of individual digits of a given number (while, do..while and for loops)
 - (ii) Arranging numbers in Ascending and Descending order (One Dimensional Array)
 - (iii) Matrix Manipulation (Two Dimensional Arrays with switch statement)
- 2) Classes and Objects
 - (i) Write a Java application for finding the area and perimeter of a Rectangle (class)
 - (ii) Write a Java application for preparing neat Telephone bill. Use suitable fields and conditions. (class)
 - (iii) Write a Java application for Pay-roll preparation. (Array of Objects)
- 3) Inheritance
 - i) Define a class Stack and implement the PUSH and POP operations and enhance the
 - (ii) Stack class by automatically extending the size when the stack pointer reaches the maximum value.
 - (iii) Write a Program for Library Information System (Parameterized Constructor)
- 4) Interfaces and Packages
 - i) Define an interface Area to find the area of the circle, area of the Rectangle and area of the Triangle
 - ii) Prepare an EB-Bill using the package concept
- 5) Exception Handling
 - a) Write Java Programs to handle the following Exceptions
 - i) DivideByZeroException
 - ii) ArrayIndexOutOfBoundsException
 - iii) NumberFormatException
 - iv) NullPointerException
 - b) Create a user-defined Exception class and use it in Queue Implementation.

6) String Handling

- (i) Write a Program to test the methods in String and StringBuffer classes.
- (ii) Write a Program for arranging the given names in Alphabetical order.

7) Utility Classes

- i) Program using vector
- ii) Program using LinkedList
- iii) Program using Date and TimeZone

8) Files and I/O Streams

- (i) Write Java programs using Streams for
 - a) Displaying contents of the file
 - b) Copying files
 - c) Updating files

9) Multi Threading Programs using

- a) Thread Class b) Runnable Interface c) Methods in the Thread class

10) Networking

Write a server and client programs for sending and receiving text messages using

- a) ServerSocket and Socket classes.
- b) DatagramSocket and DatagramPacket classes

11) Applets and SWINGS

- (i) Write a java applet to display graphical components.
- (ii) Program using PARAM tag
- (iii) Simple application to get and display your bio-data in a neat format. (Use the SWING controls.)

RDBMS LAB

1. SQL - Data Definition Language

Table Creation
Table Altering
Drop table

2. SQL - Data Manipulation Language

Data Insertion,
Tuple variable,
Pattern Matching,
Build-in Function,
Set operations,
Join Operation,
Nested Subqueries,
Views.

3. PL/SQL Procedure

- 3.1 Reverse the string.
- 3.2 Delete any record and count it.
- 3.3 Student Mark sheet preparation.
- 3.4 Pay Roll preparation.
- 3.5 Excess record stored in separate files.
- 3.5 Split a table in to two tables.
- 3.6 Joining two tables in to one table.
- 3.7 Find factorial number using recursive function.
- 3.8 Find Fibonacci series using recursive function.

4. SQL Forms

Student Mark System.
Pay Roll Preparation.
Income tax calculation.
Train reservation System.

VISUAL PROGRAMMING

Objective:

To provide fundamental concept of the Visual Basic language.

Unit I - The Visual Basic Environment

The initial Visual Basic screen – The SDI Environment – Toolbars – The Toolbox – The initial form window – Project Explorer – Menu bar – Starting a new project – The properties window – common form properties – making a form responsive – saving the project.

Unit II – Building the User Interface

Creating controls – The Name property – Anatomy of a Visual Basic Application – The code window – Visual Basic's Editing Tools – Statements in Visual Basic – Variables – Data types – Working with variables – constants – Determinate Loops – Indeterminate Loops – Making Decisions – Select Case – Nested If – The Go To statement.

Unit III – Built-In Functions

String Functions – The Like Function – The Rnd Function – Numeric Function – Date and Time Function – Financial Function – Function Procedures – Sub Procedures – Passing by Reference – Passing by Value – Subprograms – Arrays – Fixed Vs Dynamic Arrays – Static Arrays – Assigning Arrays – The Array Function – Arrays with more than one dimension- Control Arrays.

Unit IV – Windows Common Controls

Common Dialog Boxes – Rich Text Box – Image list control – List View control – Progress Bar Control - Slider control – Status Bar Control – Tab Strip Control – Tool Bar Control - Tree View Control – File System Controls – Menu Editor – MDI Forms – Testing – The Immediate Window.

Unit V – Database Development

Using the Data Control – Methods and Events for the Data Control – Monitoring changes to the Database – The Data Form Wizard – ActiveX Controls – Testing the control – Adding the functionality – The life cycle of a control – Basic syntax of VBScript – Features in VBScript – Form Design and validation with VBScript.

Text Book:

“Visual Basic 6 from the GROUND UP” by Gary Cornell, Tata McGraw Hill Edition.

COMPUTER SIMULATION AND MODELING

Objectives :

To give knowledge in real time modeling process and the simulation of any system using the real time mode.

Unit I

Introduction to simulation: when is simulation the appropriate tool?-Advantages and Disadvantages-Areas of Applications-System and Environment-Components of a system-Discrete and continuous systems-Model of a System-types of models-Discrete Event System Simulation-Steps in a simulation Study-Simulation Examples-Simulation of Queuing systems-simulation of inventory systems.

Unit II

Random Number Generation-Properties of Random Numbers-Generation of Pseudo-Random Numbers-Techniques for Generating Random Numbers-Linear congruential Method-Combined Linear congruential generators-Tests for random numbers-Frequency tests-Runs tests- Tests for Autocorrelation-Gap test-Pocker test.

Unit III

Statistical Models-Basic concept of statistics-Useful statistical models-Discrete Distribution-Poisson Process-Empirical Distribution-Random Variate Generation-Inverse Transform Technique-Exponential Distribution-Uniform Distribution-Weibull Distribution- Discrete Distributions-Direct Transformation for the Normal Distribution-Convolution Method-Erlang Distribution-Acceptance-Rejection Technique-Poisson Distribution-Gamma Distribution.

Unit IV

Design and Evaluation of simulation experments-Length of simulation runs-Variance reduction techniques.

Verification and validation of simulation models-Model building,verification and validation-Verification of Simulation Models-Calibration and validation of models-Face Validity-Validation of model assumption-Input-Output validation.

Unit V:

Simulation Languages - GPSS, SIMSCRIPT, SIMULA, Simulation in MODSIM III.

Books for Study:

1. Discrete-Event System Simulation, Second Edition, Jerry Banks, John S. Carson, II Barry L. Nelson.
Chapters: 1.1-1.10, 2.1,2.2,4.6,6.1-6.7,8.1-8.4,9.1.1-9.1.3,9.2,9.3,9.4,11.1-11.3.
2. System Simulation With Digital Computer, Narsingh Deo.
Chapters: 7.1,7.2,8.6-8.8

MICROPROCESSORS, PRINCIPLES AND APPLICATIONS

Objectives : To understand the architecture and working principles of Microprocessors. To write simple assembly language programs and provide knowledge of various real time Microprocessor Applications.

Unit I

Intel 8085 Architecture – Pin Configuration – Instruction Formats – Addressing Modes – Instruction Set – Data Transfer Instructions – Arithmetic Instructions – Logical Instructions – Branch Instructions- Shift and Rotate Instructions – I/O instructions– Simple Programs.

Unit II

Intel 8086 Architecture – Internal Operation – Pin Configuration – Minimum & Maximum Modes - Machine Language Instructions – Addressing Modes – Instruction Formats – Instruction Execution Timing – The 8088.

Unit III

Instruction Set of 8086 Microprocessor – Assembler Instruction Format – Data Transfer Instructions – Arithmetic Instructions – Branch Instructions – Loop Instructions – Flag Manipulation Instructions – Logical Instructions – Shift and Rotate Instructions – String Instructions – REP Prefix

Unit IV

Assembly Language Programs – Addition, Subtraction, Multiplication and Division – Multibyte Addition and Subtraction – Complements – Shifting – Masking – Sum of a Series – Block Data Transfer – Finding the Smallest and the Biggest Number in an Array – Arranging a Series of Numbers in Descending and Ascending Order – Length of a String – Number of Occurrences of a Character in a String – Comparison of Two Strings

Unit V

Microprocessor Applications – Address Space Partitioning – Memory and I/O Interfacing – I/O Ports – Programmable Peripheral Interface – Delay Subroutines – Seven Segment Displays – Frequency Measurement – Temperature Measurement – Water Level Indicator & Controller – Traffic Lights Control.

Books for study:

1. Fundamentals of Microprocessors and Microcomputers, Badri Ram, Fifth Revised and Enlarged Edition, Dhanpat Rai and Sons, 2003
2. Microcomputer Systems – The 8086/8088 Family – Architecture Programming and Design, Yu Cheng Liu and Glenn A. Gibson, Prentice Hall of India, 1991

Reference :

Microprocessors and Interfacing – Programming and Hardware, Douglas V. Hall, McGraw Hill International Edition, 2002

SOFTWARE ENGINEERING

Objectives : To provide knowledge of the various phases of software engineering process.

UNIT I

Introduction – Definitions – Size Factors – Quality and Productivity Factors – Managerial Issues. Planning a Software Project – Defining the Problem – Developing a Solution Strategy – Planning the Development Process – Planning an Organizational Structure.

UNIT II

Software Cost Estimation – Cost Factors – Cost Estimation Techniques – Staffing-Level Estimation – Estimating Software Maintenance Costs - Software Requirements Definition – Software Requirement Specification – Formal Specification Techniques.

UNIT III

Software Design – Fundamental Design Concepts – Modules and Modularization Criteria – Design Notations – Design Techniques – Detailed Design Considerations – Real Time and Distributed System Design – Test Plans – Design Guidelines.

UNIT IV

Implementation Issues – Structured Coding Techniques – Coding Style – Standards and Guidelines – Documentation Guidelines – Data Abstraction – Exception Handling – Concurrency Mechanisms.

UNIT V

Verification and Validation Techniques – Quality Assurance – Walkthroughs and Inspections – Static Analysis – Symbolic Execution – Unit Testing and Debugging – System Testing – Formal Verification- Software Maintenance – Enhancing maintainability during Development - Managerial Aspects – Configuration Management – Source Code metrics

Text Book :

Richard Fairley, Software Engineering Concepts, Tata McGraw Hill Publishers

ELECTIVE II : ARTIFICIAL INTELLIGENCE AND EXPERT SYSTEMS

Objectives:

To provide the knowledge of problem solving using AI techniques, knowledge representations, expert system development process and tools.

Unit I

The AI problems – AI techniques – problems, problems space & search – Defining the problem as a state Search – Production systems – problem characteristics – heuristic search techniques – Generate & test – Hill climbing – Best first search. Problem reduction – constraint satisfaction – means – ends analysis.

Unit II

Game playing : Mini – max procedure – Adding Alpha – Beta cutoffs – Additional refinements – Searching AND/OR Graphs – Iterative deepening. Using Predicate Logic – Representing simple facts & logic – Representing instance & IS a Relationships – Computable functions & Predicates – Use of the predicate calculus in AI – Resolution – natural deduction.

Unit III

Representing knowledge using Rules – Procedural verses declarative knowledge logic programming – forward versus backward reasoning – Resolving within AND/OR Graphs matching – control knowledge – symbolic Reasoning under uncertainty – non – monotonic reasoning – Implementation Issues – Augmenting a problem solver - Implementation of depth first & breadth first search. Statistical reasoning – Bayee's theorem – Certainty factors & Rule based Systems – Bayesian Networks – Dempston – Shafer theory – Fuzzy logic.

Unit IV

Expert Systems – Architectural Components – Explanation facilities – knowledge acquisition.

Unit V

Expert System Development process – Non – formal representation of knowledge – semantic Networks – Frames – Scripts – Production Systems – Expert Systems tools.

Books for Study:

1. For units – I , II , & III : Elain Rich & Kevin Kaight – Artificial Intelligence - Tata McGraw Hill – Second Edition, 1991 (Chapter 1,2,3,5,6,7,9).
2. For units – IV & V : David W. Roltson – Principles of Artificial Intelligence & Expert Systems Development – McGraw Hill (Chapters 1,4,7,8,9).

Semester: IV
Code : 08MCA4427P

Hrs/Week: 4
Credit : 3

SOFTWARE DEVELOPMENT LAB – I

Students carry out a Mini Project during their practical hours.

VISUAL PROGRAMMING LAB

1. Form Design – Keyboard & Mouse events, Variant Data type, Control arrays, file system controls, shape control.
2. Writing code for keyboard and mouse events
3. Dialog Based applications – tree control, tab control, calculator.
4. Creating MDI applications
5. Simple programs using standard tools box.
6. Simple programs using control structures.
7. Adding Menus in a form.
8. Database applications using data control for inventory report.
9. Database applications using data control for student mark list.
10. OLE Container Control.

Semester: IV
Code : 08MCA48

Credit : 3

SUMMER PROJECT – II

Students carry out a Mini Project during Summer Vacation at the end of fourth Semester.

System study: 10 days

Project development: 3 weeks

18days x 5 hours per day = 90 hours

Report preparation: 5 days

WEB TECHNOLOGY

Objectives:

To provide fundamental concept of Internet, JavaScript, XML, JSP, ASP with a view to developing professional software development skills.

Unit – I

Internet Basics: Basic Concepts – Internet Domains – IP Address – TCP/IP Protocol - The WWW – The Telnet — Introduction to HTML: Web server - Web client / browser - Tags – Text Formatting – Lists – Tables – Linking Documents - Frames.

Unit – II

JavaScript: JavaScript in Web Pages – The Advantages of JavaScript – Writing JavaScript into HTML – Syntax – Operators and Expressions – Constructs and conditional checking – Functions – Placing text in a browser – Dialog Boxes – Form object's methods – Built in objects – user defined objects.

Unit – III

XML: Comparison with HTML – DTD – XML elements – Content creation – Attributes – Entities – XSL – XLINK – XPATH – XPOINTER – Namespaces – Applications – integrating XML with other applications.

Unit – IV

JSP Fundamentals: Basics – Directive basics – Page directive – The taglib directive – The include directive – JSP Standard Actions – Java Beans – Error Handling.

Unit – V

ASP: Introduction to ASP – Objects – Components – Working with HTML forms – Connecting to Microsoft SQL Server & Ms – Access Database – SQL statements with connection object – Working with record sets.

Text Books:

Unit I & II:

“Web Enabled Commercial Application Development Using HTML, DHTML, JavaScript, Perl CGI”, IVAN BAYROSS, BPB Publication.

Unit III:

“XML Bible”, Elliotte Rusty Harold, 2nd Edition, Wrox Publication.

Unit IV:

“Beginning Java Server Pages”, Vivek Chopra, Sing Li, Rupert Jones, Jon Eaves, John T. Bell, Wrox Publications.

Unit V:

“Practical ASP”, Ivan Bayross, BPB Publication.

PRINCIPLES OF COMPILER DESIGN

Objectives:

To understand the various phases of a compiler and to develop skills in designing a compiler.

Unit I:

Compiler - Phases of Compiler – Compiler writing tools – Lexical Analysis – Role of Lexical analyzer – Finite Automata – Regular Expression – From a Regular expression to an NFA , NFA to DFA – Design of Lexical Analyzer.

Unit II

Syntax Analyzer – CFG – Role of the Parser – CFG – Top Down Parsing – Recursive descent parsing, predictive Parsers – Bottom up Parsing – Shift reduce, operator precedence parsers, LR Parsers.

Unit III

Syntax directed definition :- Construction of Syntax trees – Intermediate code generation – Intermediate Languages – Syntax trees, post fix form, Three address code – Boolean expressions – Back Patching.

Unit IV

Symbol table – contents of Symbol table – Data Structures for Symbol table – Runtime storage Administration – Implementation of Stack allocation scheme block structured Languages – Storage allocation in Fortran.

Unit V

Code Optimization and code generation – principles sources of optimization – loop optimization – Dag Representation of Basic blocks.

Code generation – problems in code generation – a simple code generator – Register allocation and Assignment – Peephole optimization.

Text Book:

1. Compilers Principles ,Techniques and Tools
Alfred V.Aho, Ravi Sethi, Jeffrey D.Ullman.
Chapters: 1.1,1.3,1.6,3.1,3.6,3.7,3.9.
4.1,4.2,4.4 – 4.6,5.1,5.2,7.5,8.1,8.4,8.6.
2. Principles of Compiler Design
Alfred V.Aho and Jeffrey D.Ullman.
Chapters: 9.1,9.2,10.1,10.2,10.3,12.1,12.2,12.3,15.2,15.4,15.5,15.7

ORGANIZATIONAL DYNAMICS

Objectives:

To provide the knowledge of understanding human behavior in organization and its importance.

Unit I

The scope and significance of Organizational Behavior - Contributing disciplines - Applications in Business and Management - Reliability and Validity measures.

Unit II

Individual Behavior - Perceptions - Personality - types - determinates - influence on Behavior - Methods of self assessment - Johari Window - Values, Beliefs and attitudes - types of Beliefs, values - implications on work Behavior.

Unit III

Learning : Concept and theory - Motivation theories : Maslow, X and Y and Herzberg, Expectancy theories of Vroom, Porter and Lawler - Motivation in practice - Job enrichment - Job satisfaction - QWL - Leadership - Types and effectiveness - Fielder, Likert and Managerial Grid.

Unit IV

Conflict - Process, Sources - Organizational and Personal goals - Resolution of conflict - Concept of Groups - Informal Groups - Grapevine - Communication - Management's Role - Communication - Types and Processes - Barriers.

Unit V

Designing and an organization structure - method - OD - Organizational change - Change Agents, Programmes and Strategies - resistance - Organizational climate - morals and work environment - Organization culture.

Text Book:

Fred Luthens, " Organizational Behavior ", 7th Edition, McGraw Hill, 1995

Reference Book:

1. John W. Newstorm and Keith Davis, "Organizational Behavior ", Tata McGraw Hill, 9th Edition, 1995
2. Stephen P. Robbins, " Organizational Behavior ", New Delhi.
3. Hugh J. Arnold and Daniel C. Fieldman, " Organization Behavior ", McGraw Hill, 1986

ELECTIVE III : PRINCIPLES OF E-COMMERCE

Objectives:

To acquire the knowledge in Electronic Commerce , Electronic Payment systems , Security systems , Online Advertising and Marketing.

Unit I : Electronic Commerce Framework – Electronic Commerce and Media Convergence – The Anatomy of E-Commerce Applications – Electronic Commerce Consumer Applications – Electronic Commerce Organization Applications. **The Network Infrastructure for Electronic Commerce** : Components of the I-way – Network Access Equipment – Global information Distribution Networks.

Unit II : The Internet as a Network Infrastructure : The Internet Terminology – NSFNET Architecture and components – National Research and Education Network – Internet Governance – An overview of Internet Applications. **The Business of Internet Commercialization** : Telco/Cable/On-Line companies – National Independent ISPs – Regional Level ISPs – Local-level ISPs – Internet Connectivity options.

Unit III : Electronic Commerce and the World Wide Web : Architectural Framework for Electronic Commerce – World Wide Web as the Architecture – Technology behind the Web – Security and the Web. **Consumer-Oriented Electronic Commerce** : Consumer-oriented applications – mercantile process model – mercantile models from the consumers perspective.

Unit IV : Electronic Payment Systems : Types of Electronic Payment Systems – Digital Token based Electronic Payment Systems – Credit Card-Based Electronic Payment Systems – Risk and Electronic Payment Systems – Designing Electronic Payment Systems. **Inter Organizational Commerce and EDI** : Electronic Data Interchange – EDI Applications in Business – EDI: Legal, Security and privacy issues.

Unit V : Advertising and the Marketing on the Internet : The New Age of Information Search and Retrieval – Electronic Commerce Catalogs – Information filtering – Consumer-Data Interface – Emerging Tools. **On Demand Education and Digital Copyrights** : Computer-based Education and Training – Technological Components of Education on Demand. **Software Agents** : Characteristics and Properties of Agents – The technology behind Software Agents – Applets, Browsers, and Software Agents.

Text Book:

Ravi kalakota & Andrew Whinston, “Frontiers of Electronic Commerce”, Addison Wesley, 2000.

ELECTIVE – IV : PARALLEL PROCESSING

Objectives :

To study the Parallel computer Architecture, theories of parallel computing, interconnection networks and applications of cost effective computer systems.

Unit I

Introduction to Parallel Processing – Evolution of Computer Systems – Parallelism in Uniprocessor Systems – Parallel Computer Structures – Architectural Classification Schemes – Parallel Processing Applications.

Unit II

Memory and Input-Output Subsystems – Hierarchical Memory Structure – Virtual Memory System – Memory Allocation and Management – Cache Memories and Management – Input-Output Subsystems.

Unit III

Principles of Pipelining and Vector Processing – Pipelining : An Overlapped Parallelism – Instruction and Arithmetic Pipelines – Principles of Designing Pipelined Processors – Vector Processing Requirements.

Unit IV

Vectorization and Optimization methods – Parallel Languages for Vector Processing – Design of Vectorizing Compiler – Optimization of Vector Functions – SIMD Array Processors – SIMD Interconnection Networks – Associative Array Processing.

Unit V

Multiprocessors Architecture and Programming – Functional Structures – Interconnection Networks - Parallel Memory Organizations – Multiprocessor Operating Systems – Language Features to Exploit Parallelism – Multiprocessor Scheduling Strategies.

Text Book:

Kai Hwang and Faye A. Briggs – Computer Architecture and Parallel Processing – McGraw Hill International Edition – 1985

Chapters : 1, 2, 3, 4.5.1 – 4.5.3, 5.1, 5.2, 5.4, 6.3, 7.1, 7.2.1, 7.2.2, 7.2.3, 7.3.1, 7.3.3, 7.4, 7.5.1, 8.3

Reference Book:

1. Richard Kain – Advanced Computer Architecture – PHI – 1999.
2. V. Rajaraman and C. Siva Ram Murthy – Parallel Computers, Architecture and Programming – PHI – 2000

Semester : V
Code : 08MCA5434P

Hours/week : 4
Credit : 3

SOFTWARE DEVELOPMENT LAB – II

Students carry out a Mini Project during their practical hours.

WEB TECHNOLOGY LAB

1. Write a XML program for job listing in HRML.
2. Write a JavaScript code block, which checks the contents entered in a form's text element. If the text entered is in the lower case, convert to upper case.
3. Write a JavaScript code block, which validates a username and password.
 - a) If either the name or password field is not entered display an error message.
 - b) The fields are entered do not match with default values display an error message.
 - c) If the fields entered match, display the welcome message.
4. Write a JavaScript code to display the current date and time in a browser.
5. Write a JSP Program for user authentication.
6. Write a JSP Program for a simple shopping cart.
7. Write a JSP Program to prepare a bio data and store it in database.
8. Write an ASP Program using Response and Request Object.
9. Write an ASP Program using AdRotator Component.
10. Write an ASP program using database connectivity for student's record.

Semester : VI
Code : 08MCA68P

Hours/week : 30
Credit : 20

INDUSTRIAL EXPERIENCE AND PROJECT WORK

Students carry out a Project in Software Development Companies throughout the Semester.