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JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA
I YEAR I SEMESTER M.C.A

MCA I YEAR I SEMESTER STRUCTURE

Code Theory	Subject	T	P
	ENGLISH LANGUAGE COMMUNICATION SKILLS	2	-
	C PROGRAMMING AND DATA STRUCTURES	4	-
	DIGITAL LOGIC AND COMPUTER SYSTEMS ORGANIZATION	4	
	DISCRETE STRUCTURES AND GRAPH THEORY	4	
	PROBABILITY AND STATISTICAL APPLICATIONS	4	
	ACCOUNTING AND FINANCIAL MANAGEMENT	4	
Code Practical's	**ENGLISH LANGUAGE COMMUNICATION SKILLS LAB**	-	2
	C PROGRAMMING AND DATA STRUCTURES LAB	-	4
	DIGITAL LOGIC AND COMPUTER SYSTEMS ORGANIZATION LAB	-	4

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ENGLISH LANGUAGE COMMUNICATION SKILLS

UNIT I:
Features of Indian English - Correction of sentences - Structures - Tenses - ambiguity - idiomatic distortions.

UNIT II:
Informal conversation Vs Formal expression Verbal and non-verbal communication, barriers to effective communication – kinesics

UNIT III:
Types of Communication - - Oral, aural, Writing and reading - Word-Power - Vocabulary- Jargon - rate of speech, pitch, tone - Clarity of voice

UNIT IV:
Technical presentations - types of presentation –video conferencing-- participation in meetings - chairing sessions.

UNIT V:
Formal and informal interviews – ambiance and polemics - interviewing in different settings and for different purposes e.g., eliciting and giving information, recruiting, performance appraisal.

UNIT VI:
Written communication - differences between spoken and written communication - features of effective writing such "as clarity, brevity, appropriate tone clarity, balance etc.- GRE. TOEFL models

UNIT VII:
Letter-writing - business letters – pro forma culture - format - style – effectiveness, promptness - Analysis of sample letters collected from industry - email, fax.

UNIT VIII:
Technical Report writing - Business and Technical Reports – Types of reports - progress reports, routine reports - Annual reports - format - Analysis of sample reports from industry - Synopsis and thesis writing

REFERENCE BOOKS:

1. Essentials of Business Communication, Rajendra Pal, J S KorlahaHi , Sultan Chand & Sons,
2. Basic Communication Skills for Technology, Andrea J. Rutherford, Pearson Education Asia,
3. Advanced Communication Skills, V. Prasad, Atma Ram Publications.
4. Business Communication, Theory & Application .Raymond . Lesikav, John D. Pettit Jr. All India Traveller Bookseller
5. Business Communication, RK Madhukar, Vikas Publishing House Pvt Ltd
6. English. for Technical Communication – vols I & 2.,K R Lakshminarayana. SCITECH Publications
7. Edmond H Weiss: Writing Remedies: Practical Exercises for Technical Writing, Universities Press
8. Cliffs Test Prep for GRE and TOEFL, Computer Based Test, IDG Books.
9. GRE and TOEFL, Kaplan and Baron's
10. English in Mind, Herbert Puchta and Jeff Stranks, Cambridge

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C PROGRAMMING AND DATA STRUCTURES

UNIT I

Introduction to Computers, Some novice HW and SW concepts, Algorithm / pseudo code, flowchart, program development steps, Introduction to various IDE's and their use in C program development, structure of C program, A Simple C program, identifiers, basic data types and sizes, Constants, variables, arithmetic, relational and logical operators, increment and decrement operators, conditional operator, bit-wise operators, assignment operators, expressions, type conversions, conditional expressions, precedence and order of evaluation. Control structures such as if, goto , labels, and switch statements.

UNIT II

Loops- while, do-while and for statements, break, continue, programming examples.
Arrays - concepts, declaration, definition, accessing elements, storing elements, Strings and string manipulations, 1-D arrays other than strings, 2-D character arrays – 2-D arrays other than character arrays – Multidimensional arrays – Practical examples to expose Engineering problems.

UNIT III

Functions, basics, parameter passing, storage classes- extern, auto, register, static, scope rules, block structure, user defined functions, standard library functions, recursive functions, header files, C pre-processor, example c programs. Passing 1-D arrays, 2-D arrays , and functions.

UNIT IV

Pointers- concepts, initialization of pointer variables, pointers and function arguments, passing by address –dangling memory, dangling memory, address arithmetic, Character pointers and functions, pointers to pointers, pointers and multidimensional arrays, dynamic memory managements functions, command line arguments, C program examples.

UNIT V

Derived types- structures- declaration, definition and initialization of structures, accessing structures, nested structures, arrays of structures, structures and functions, pointers to structures, self referential structures, unions, typedef, bit-fields, Input and output – concept of a file, text files and binary files, Formatted I/o, file I/o operations, C program examples.

UNIT VI

Introduction to Data Structures – Time Complexity – Space Complexity – Pattern matching – naive method – Robin Karp Algorithm - Searching – Linear and binary search methods, sorting – Bubble sort, selection sort, Insertion sort, Quick sort, merge sort.

UNIT VII

Introduction to data structures, single linked lists, doubly linked lists, circular list, representing stacks and queues in C using arrays and linked lists, infix to post fix conversion, postfix expression evaluation. Adding two large integers using linked lists.

UNIT VIII

Trees- Binary tress, terminology, representation, traversals, Graphs - terminology, representation, graph traversals (dfs & bfs) – Warshalls – Dijkstra – Kruskal – Prims Algorithms. Only Algorithms

TEXT BOOKS:

1. C and Data Structures: A Snap Shot Oriented Treatise Using Live Engineering Examples, N.B. Venkateswarlu & E.V. Prasad, S Chand & Co, 2009.
2. Computer science, A structured programming approach using C, B.A. Forouzan and R.F. Gilberg, Third edition, Thomson.

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REFERENCES:

1. Fundamentals of Data Structures in C , Horowitz, Sahni, Anderson-Freed, 2nd ed, Universities Press,2008.
2. Classic Data Structures, Samanta,2nd ed, PHI, 2009.
3. The C Programming Language, B.W. Kernighan, Dennis M.Ritchie, PHI/ Pearson.
4. C Programming with problem solving, J.A. Jones & K. Harrow, Dreamtech Press
5 DataStructures Using C , A.S.Tanenbaum, Y. Langsam, and M.J. Augenstein, PHI/ Pearson.
6. Programming in C , Stephen G. Kochan, III Edition, Pearson .
7. Data Structures and Program Design in C, R.Kruse,, Tondo, Leung, Shashi M, 2nd Edition, Pearson.
8. Data Structures and Algorithms, Aho, Hopcroft, Ullman, Pearson ,2006
9. C and Data Structures, Ashok N.Kamthane, Pearson.
10. C Programming and Data Structures, E Balaguruswamy, TMH, 2008.

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DIGITAL LOGIC AND COMPUTER SYSTEMS ORGANIZATION

UNIT I

Digital Components and Data Representation: Learning Goals, Introduction, Numbering Systems, Decimal to Binary Conversion, Binary Coded Decimal Numbers, Weighted Codes, Self-Complementing Codesm, Cyclic Codes, Error Detecting Codes, Error Correcting Codes, Hamming Code for Error Correction, Alphanumeric Codes, ASCII Code, Indian Script Code for Information Interchange (ISCII), Representation of Multimedia Data, Representation of Pictures, Representation of Video, Representation of Audio

Boolean Algebra and Logic Gates: Learning Goals, Introduction, Postulates of Boolean Algebra, Basic Theorems of Boolean Algebra, Duality Principle, Theorems, Precedence of operators, Venn Diagram , Boolean Functions and Truth Tables, Canonical Forms for Boolean Functions, Binary Operators and Logic Gates, Simplifying Boolean Expressions, Veitch-Karnaugh Map Method, Four Variable Karnaugh Map, Incompletely Specified Function, Quine-McCluskey Procedure

UNIT II

Digital logic circuits: Combinatorial Switching Circuits,: Introduction, Combinatorial Circuit Design Procedure, Integrated NAND-NOR Gates, CMOS Transistor Gates, NAND-NOR Gates with CMOS Transistors, Open Drain and Tri-state Gates, Wired AND Gate, Driving a Bus from Many Sources, Tri-state Gates, Realization of Boolean Expressions Using NAND/NOR Gates, Combinatorial Circuits Commonly Used in Digital Systems, Design of Combinatorial Circuits with Multiplexers, Programmable Logic Devices, Realization with FPLAs, Realization with PALs

Sequential Switching Circuits: Types, Flip-Flops, Counters, Modelling Sequential Circuits – FSM. Synthesis of synchronous, Binary counters.

UNIT III

Arithmetic and Logic Unit: Learning Goals, Introduction, Binary Addition, Binary Subtraction, Complement Representation of Numbers, Addition/Subtraction of Numbers in 1's Complement Notation, addition/Subtraction of Numbers in Two's Complement Notation, Binary Multiplication, Multiplication of signed Numbers, Binary division, Integer Representation, Floating Point Representation of Numbers, Binary Floating Point Numbers, IEEE Standard Floating Point Representation, Floating Point addition/Subtraction, Floating Point Multiplication, Floating Point Division, Floating Point Arithmetic Operations, Logic Circuits for Addition/Subtraction, Half- and Full-Adder Using Gates, A Four-bit Adder, MSI arithmetic Logic Unit, A Combinatorial Circuit for Multiplication

UNIT IV

Central Processing Unit: Learning Goals, Introduction, Operation Code Encoding and Decoding, Instruction Set and Instruction Formats, Instruction set, Instruction Format, Addressing Modes, Base Addressing, Segment Addressing, PC Relative Addressing, Indirect addressing, How to Encode Various Addressing Modes, Register Sets, Clocks and Timing, CPU Buses, Dataflow, Data Paths and Microprogramming, Control Flow, Summary of CPU Organization.

UNIT V

Micro programmed Control: Control Memory, Address Sequencing, Conditional Branching, Mapping of Instruction, Subroutines, Micro program Example, Computer Configuration, Microinstruction Format, Symbolic Microinstructions, The Fetch Routine, Symbolic Micro program, Binary Micro program , Design of Control Unit, Micro program Sequencer

UNIT VI

Memory Organization: Learning Goals, Introduction, Memory Parameters, Semiconductor Memory Cell, Dynamic Memory Cell, Static Memory Cell, Static Memory Cell, Writing data In Memory Cell, Reading the Contents of Cell, IC Chips for Organization of RAMs , 2D Organization of Semiconductor Memory, 2.5D Organization of Memory Systems, Dynamic Random Access Memory, Error Detection and Correction in Memories, Read Only Memory, Dual-Ported RAM, Enhancing Speed and Capacity of Memories, Program Behaviour and Locality Principle, A Two-Level Hierarchy of Memories, Cache in Memory Organization, Design and Performance of Cache Memory System, Virtual Memory-Another Level in Hierarchy, address Translation, Page Replacement, Page Fetching, Page size, fast address Translation , Page Tables.

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UNIT VII

Input-Output Organization: Learning Goals, Introduction, device Interfacing, Overview of I/O Methods, Program Controlled Data Transfer, Interrupt Structures, Single level Interrupt Processing, Handling Multiple Interrupts, Interrupt Controlled data Transfer, Software Polling, Bus Arbitration, Daisy Chaining, Vectored Interrupts, Multiple Interrupt Lines, VLSI Chip Interrupt Controller, Programmable Peripheral Interface Unit, DMA Based Data Transfer, Input/output (I/O) Processors, Bus Structure, Structure of a Bus Types of Bus, Bus Transaction Type , Timings of Bus Transactions, Bus Arbitration, some Standard Buses, Serial Data Communication, Asynchronous Serial data communication, Asynchronous Communication Interface Adapter (ACIA), Digital Modems, Local area Networks, Ethernet Local area Network-Bus Topology, Ethernet Using star Topology, Wireless LAN, Client-Server Computing Using LAN.

UNIT VIII

Pipeline and Vector Processing: Parallel Processing, Pipelining-General Considerations, Arithmetic Pipeline, Instruction Pipeline, Ex: Four-Segment Instruction Pipeline, Data Dependency, Handling of Branch Instructions, RISC Pipeline, Ex: Three-Segment Instruction Pipeline, Delayed load, Delayed Branch, Vector Processing, Vector Operations, Matrix Multiplication Memory Interleaving Supercomputers, Array Processors, Attached Array Processor, SIMD Array Processor

TEXT BOOKS:

1. Digital Logic and Computer Organization, Rajaraman, Radhakrishnan, PHI, 2006
2. Computer System Architecture, 3rd ed ., M. Morris Mano, PHI, 1994

REFERENCE BOOKS:

1. Computer Organization, 5th ed., Hamacher, Vranesic and Zaky, TMH ,2002
2. Computer System Organization & Architecture, John D. Carpinelli, Pearson, 2008
3. Computer System Organization, Naresh Jotwani, TMH, 2009
4. Computer Organization & Architecture: Designing for Performance, 7th ed., William Stallings, PHI, 2006

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DISCRETE STRUCTURES AND GRAPH THEORY

UNIT I

Mathematical Logic: Statements and notations, Connectives, Well formed formulas, Truth Tables, tautology, equivalence implication, Normal forms, Theory of inference for the statement calculus

UNIT II

Rules of inference, Consistency of premises and indirect method of proof, Automatic Theorem Proving
Predicate calculus: Predicates, statement functions, variables and quantifiers, predicate formulas, free & bound variables, universe of discourse, inference theory of predicate calculus

UNIT III

Set theory & Relations:Introduction, Relations and ordering, Properties of binary Relations, Equivalence, Compatibility Relations, Partial ordering, Hasse diagram.
Functions: composition of functions, Inverse Function, Recursive Functions, Lattice and its Properties, Pigeon hole Principles and its application.

UNIT IV

Algebraic structures: Algebraic systems, Examples and general properties, Semi groups and monoids, groups, sub groups, Definitions, Examples, homomorphism, Isomorphism and related problems.

UNIT V

Elementary Combinatorics: Basis of counting, Enumeration of Combinations & Permutations, Enumerating of Combinations & Permutations with repetitions and constrained repetitions, Binomial Coefficients, Binomial Multinomial theorems, principles of Inclusion – Exclusion.

UNIT VI

Recurrence Relations: Generating Function of Sequences, Calculating Coefficient of generating functions, Recurrence relations, Solving recurrence relation by substitution and Generating functions, The method of Characteristic roots, Solution of Inhomogeneous Recurrence Relation.

UNIT VII

Graph Theory: Representation of Graph, Spanning Trees, BFS, DFS, Kruskals Algorithm, Binary trees, Planar Graphs

UNIT VIII

Graph Theory and Applications, Basic Concepts, Isomorphism and Sub graphs, Multi graphs and Euler circuits, Hamiltonian graphs, Chromatic Numbers

TEXT BOOKS:

1. Discrete Mathematical Structures with Applications to computer science J.P Tremblery, R.Manohar, TMH
2. Discrete Mathematical for computer Scientists & Mathematicians " J.L. Molt, A.Kandel ,T.P.Baker, PHI

REFERENCE TEXTBOOKS:

1. Elements of Discrete Mathematics, C L Liu, D P Mohanpatra,TMH
2. Discrete Mathematics, Schaum's Outlines,Lipschutz,Lipson TMH.
3. Discrete Mathematical Structures, Kolman, Busby, Ross, 6th ed., PHI, 2009
4. Discrete Mathematics, Johnsonbaugh, 6th ed., Pearson, 2005
5. Discrete Mathematics, Malik, Sen, 6th ed., Cengage Learning, 2004
6. Discrete Mathematics for computer science, Bogart, Stein and Drysdale, Springer, 2005
7. Discrete Mathematics and Combinatorics, Sengadir, Pearson, 2009
8. Discrete and Combinatorial Mathematics, Grimaldi, Ramana, 5th ed., Pearson. 2006
9. Mathematical Foundations of Computer Science, Rajendra Prasad, Rama Rao et al., USP, 2009
10. Discrete Mathematics, J K Sharma, 2nd ed., Macmillan, 2005

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11. Discrete Mathematics with Combinatorics and Graph Theory, Santha, Cengage Learning, 2009
12. Applied Discrete Structures For Computer Science, Alan Doerr, Levassure, GP, 2005
13. Discrete Mathematics with Applications, Koshy, Elsevier,2006.
14. Discrete Mathematics and its Applications, Rosen, 5th ed, T M Graw-Hill ed, 2006.
15. Discrete Mathematics for Computer Science, Gary Haggard, John Schlipf, Sue Whitesides, Cengage.,2006.
16. Discrete Mathematical, Kevin Ferland, Cengage,2008.
17. Discrete Mathematical Structures, Jayant Ganguly, Sanguine, 2007.

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PROBABILITY AND STATISTICAL APPLICATIONS

UNIT I

Probability Theory: Sample spaces Events & Probability; Discrete Probability; Union , intersection and compliments of events; Conditional probability ;Baye's theorem.

UNIT II

Random variables and distribution: Random variables Discrete Probability Distributions,. Continuous probability distribution, Binomial, Poisson, uniform, Exponential, Normal.

UNIT III

Expectations and higher order moments – Moment Generating Function, Characteristic functions – Laws on large numbers – Weak Laws and strong laws of large numbers. Central limit theorem and other limit theorems.

UNIT IV

Sampling distribution: Populations and samples - Sampling distributions of mean (σ known and unknown) proportions, sums and differences. Statistics based on Normal, Student's t and F distributions.

UNIT V

Tests of significance –Z-test, t-test, F-test, χ^2 test. Factor Analysis ANOVA, Application to medicine, psychology, agriculture etc

UNIT VI

Linear correlation coefficient Linear regression ; Non Linear regression Least square fit ; polynomial and Curve fittings

UNIT VII:

Time series and Forecasting : Moving averages , Smoothening of curves Forecasting models and methods , Statistical Quality Control Methods-bar charts p-charts etc.

UNIT VIII

Queuing theory – Markov Chains – Introduction to Queuing systems – Elements of a queuing model – Exponential distribution – Pure birth and death models. Generalized Poisson Queueing model – Specialized Poisson Queues.

TEXT BOOKS:

1. Probability, Statistics and Random Processes Dr.K.Murugesan & P.Gurusamy by Anuradha Agencies, Deepti Publications.
2. Probability, Statistics and Random Processes , T.Veerarajan, TMH, India

REFERENCE BOOKS:

1. Probability and Statistics for Engineers: Miller and Freund, PHI.
2. Probability, Statistics and Queuing Theory Applications, 2nd ed, Trivedi, John Wiley and Sons.

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ACCOUNTING AND FINANCIAL MANAGEMENT

UNIT I:
Accounting: Generally Accepted Accounting Principles(GAAP) & Accounting standards, Characteristics and limitations of single entry system, double entry system of accounting, introduction of basic books of accounts ledgers..

UNIT II:
Preparation of trial balance - Final accounts - company final accounts. Users of Accounting Information, Role of Accountant in modern Organization

UNIT III:
Financial Management - meaning and scope, role, objectives of time value of money - over vitalization - under capitalization - profit maximization - wealth maximization - EPS maximization.

UNIT IV:
Ratio Analysis - advantages - limitations - Fund flow analysis - meaning, importance, preparation and interpretation of Funds flow and cash flow statements-statement of changes in working capital.

UNIT V:
Costing - nature and importance and basic principles. Elements of cost ,Absorption costing vs. marginal costing - Financial accounting vs. cost accounting vs. management accounting.

UNIT VI:
Marginal costing and Break-even Analysis: nature, scope and importance - practical applications of marginal costing, limitations and importance of cost - volume, profit analysis, Short run decisions.

UNIT VII:
Standard costing and budgeting: nature, scope and computation and analysis - materials variance, labor variance and sales variance -cash budget, sales budget - flexible Budgets, master budgets.

UNIT VIII:
Introduction to computerized accounting system: coding logic and codes, master files, transaction files, introduction documents used for data collection, processing of different files and Outputs obtained.

REFERENCES:
1. Accounting for Management, T. Vijay Kumar, TMH.
2. Financial Accounting,S.N. Maheswari and S.K. Maheswari, Vikas
3. Financial Accounting, A. Mukherjee and M. Haneef, TMH
4. Basic Financial Accounting for Management, Ambaresh Gupta, Pearson
5. Accounts and Finance for Non Accounts, Chatterjee. D.K, Himalaya
6. Financial Analysis and Accounting, P. Premchand Babu and M.Madan Mohan, Himalaya.
7. Essential of Financial Accounting, Ashish. K and Ballacharya, PHI.
8. Guide to Financial Management, John Tannent, Viva.

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ENGLISH LANGUAGE COMMUNICATION SKILLS LAB

Objectives: The language lab focuses computer-aided multi-media instruction and language acquisition to achieve the following targets:

1. To expose the students to a veriety of self-instructional, learner-friendly modes of language learning.
2. To help the students cultivate the habit of reading passages from the computer monitor, thus providing them with the required facility to face computer-based competitive exams such GRE, TOEFL, GMAT etc.
3. To enable them to learn better pronunciation through stress on word accent, intonation, and rhythm.
4. To train them to use language effectively to face interviews, group discussions, public speaking.
5. To initiate them into greater use of the computer in resume preparation, report writing, format- making etc.

However, depending upon the available of infrastructure and budget, the above targets can also be achieved by procuring the minimum required equipment suggested for the establishment of Conventional Lab the details of which are given below. The lab should cater to the needs of the students to build up their confidence to help them develop leadership qualities through through their communicative competence.

ENGLISH LANGUAGE LABORATORY PRACTICE

1. Introduction to Phonetics. 2. Introduction to Vowels and Consonants and associated Phonetic symbols.
3. Introduction to Accent, Intonation and Rhythm. 4. Situational Dialogues/Role Play. 5. Debate
6. Public Speaking. 7. Group Discussions 8. Facing Interviews 9. Resume preparation 10. e- correspondence

MODULE	TOPICS/SUB-TOPICS	LAB SESSIONS
1.	INTRODUCTION TOPHONETICS -Vowels, -Consonants, -Diphthongs	2
2.	INTRODUCTION TO STRESS & INTONATION -Articulation, -Respiration, -Phonation	1
3	SITUATIONAL/DIALOGUE/ ROLE PLAY	1
4	PUBLIC SPEAKING	1
5	DEBATE	1
6	GROUP DISCUSSIONS	2
7	FACING INTERVIEWS	2
8	RESUME PREPARATION	1
9	e-CORRESPONDENCE	1
10	GRE,TOEFL,GMAT MODELS	2

Suggested Software for Lab classes:

- **Cambridge Advanced Learners' Dictionary with exercises**
- **The Rosetta Stone English Library**
- **Clarity Pronunciation Power**
- **Mastering English in Vocabulary, Grammar, Spellings, Composition**
- **Dorling Kindersley series of Grammar, Punctuation, Composition etc.**
- **Oxford Advanced Learner's Compass, 7th Edition**
- **Language in Use, Foundation Books Pvt Ltd**
- **Learning to Speak English - 4 CDs**
- **Microsoft Encarta**
- **Murphy's English Grammar, Cambridge**
- **Time series of IQ Test, Brain-teasers, Aptitude Test etc.**
- **English in Mind, Herbert Puchta and Jeff Stranks with Meredith Levy, Cambridge**

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COMPUTER PROGRAMMING DATA STRUCTURES LAB

Objectives:

- To learn/strengthen a programming language like C, To learn problem solving techniques
- To Introduce the student to simple linear and non linear data structures such as lists, stacks, queues, etc.,

Recommended Systems/Software Requirements:

- Intel based desktop PC, ANSI C Compiler with Supporting Editors, IDE's such as Turbo C, Bloodshed C

Exercise l.

a) Write a C program to find the sum of individual digits of a positive integer.

b) A Fibonacci Sequence is defined as follows: the first and second terms in the sequence are 0 and 1. Subsequent terms are found by adding the preceding two terms in the sequence. Write a C program to generate the first n terms of the sequence.

c) Write a C program to generate all the prime numbers between 1 and n, where n is a value supplied by the user.

d) Write a program which checks a given integer is Fibonacci number or not.

Exercise 2.

a) Write a C program to calculate the following Sum:

$Sum=1-x^2/2! +x^4/4!-x^6/6!+x^8/8!-x^{10}/10!$

b) Write a C program to find the roots of a quadratic equation.

c) Write a C program to implement Newton Raphson method for a quadratic equation

d) Write a C program to implement Newton Raphson method for a general purpose algebriac equation

Exercise 3

a) Write C programs that use both recursive and non-recursive functions

i) To find the factorial of a given integer. ii) To find the GCD (greatest common divisor) of two given integers.

iii) To solve Towers of Hanoi problem. iv) Write program to calculate probability of head/tail by generating random numbers using random() function.

Exercise 4

a) The total distance travelled by vehicle in 't' seconds is given by distance = $ut+1/2at^2$ where 'u' and 'a' are the initial velocity (m/sec.) and acceleration (m/sec^2). Write C program to find the distance travelled at regular intervals of time given the values of 'u' and 'a'. The program should provide the flexibility to the user to select his own time intervals and repeat the calculations for different values of 'u' and 'a'.

b) Write a C program, which takes two integer operands and one operator form the user, performs the operation and then prints the result. (Consider the operators +,-,*, /, % and use Switch Statement)

Exercise 5

a) Write a C program to find both the larges and smallest number in a list of integers.

b) Write a C program that uses functions to perform the following:

i) Addition of Two Matrices ii) Multiplication of Two Matrices

iii) Checking symmetricity of a square matrix. iv) Calculating transpose of a matrix in-place manner.

Exercise 6

a) Write a C program that uses functions to perform the following operations:

i) To insert a sub-string in to given main string from a given position.

ii) To delete n Characters from a given position in a given string.

b) Write a C program to determine if the given string is a palindrome or not

Exercise 7

a) Write a C program that displays the position/ index in the string S where the string T begins, or –1 if S doesn't contain T.

b) Write a C program to count the lines, words and characters in a given text.

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Exercise 8
a) Write a C program to generate Pascal's triangle. **b)** Write a C program to construct a pyramid of numbers.

Exercise 9
Write a C program to read in two numbers, x and n, and then compute the sum of this geometric progression:
$1+x+x^2+x^3+\ldots\ldots\ldots\ldots+x^n$
For example: if n is 3 and x is 5, then the program computes 1+5+25+125. Print x, n, the sum
Perform error checking. For example, the formula does not make sense for negative exponents – if n is less than 0. Have your program print an error message if n<0, then go back and read in the next pair of numbers of without computing the sum. Are any values of x also illegal ? If so, test for them too.

Exercise 10
a) 2's complement of a number is obtained by scanning it from right to left and complementing all the bits after the first appearance of a 1. Thus 2's complement of 11100 is 00100. Write a C program to find the 2's complement of a binary number.
b) Write a C program to convert a Roman numeral to its decimal equivalent.

Exercise 11
Write a C program that uses functions to perform the following operations using Structure:
i) Reading a complex number ii) Writing a complex number
iii) Addition of two complex numbers iv) Multiplication of two complex numbers

Exercise 12
a) Write a C program which copies one file to another. **b)** Write a C program to reverse the first n characters in a file.
(Note: The file name and n are specified on the command line.)

Exercise 13
a) Write a C program that uses functions to perform the following operations on singly linked list.:
i) Creation ii) Insertion iii) Deletion iv) Traversal
b) Adding two large integers which are represented in linked list fashion.

Exercise 14
Write a C program that uses functions to perform the following operations on doubly linked list.:
i) Creation ii) Insertion iii) Deletion iv) Traversal in both ways

Exercise 15
a.) Write C programs that implement stack (its operations) using
i) Arrays ii) Pointers iii) linked list.

Exercise 16
a. Write C programs that implement Queue (its operations) using
i) Arrays ii) Pointers iii) linked lists.

Exercise 17
Write a C program that uses Stack operations to perform the following:
i) Converting infix expression into postfix expression ii) Evaluating the postfix expression

Exercise 18
a. Write a C program that uses functions to perform the following:
i) Creating a Binary Tree of integers ii) Traversing the above binary tree in preorder, inorder and postorder.
b. Program to check balance property of a tree. c. Program to check for its strictness.

Exercise 19
Write C programs that use both recursive and non recursive functions to perform the following searching operations for a Key value in a given list of integers : i) Linear search ii) Binary search

Exercise 20
Write C programs that implement the following sorting methods to sort a given list of integers in ascending order:
i) Bubble sort ii) Quick sort

Exercise 21
a. Write C programs that implement the following sorting methods to sort a given list of integers in ascending order:
i) Insertion sort ii) Bubble sort
b. Recursive implementation of sorting algorithms.

Exercise 22
Write C programs to implement the Lagrange interpolation and Newton- Gregory forward interpolation.

Exercise 23
a. Program to calculate mean and standard deviation of a population.
b. Write C programs to implement the linear regression and polynomial regression algorithms.

Exercise 24
a. Write C programs to implement Trapezoidal and Simpson methods. and b) Program for Calculating pi value.

Reference Books:
1. Digital Fundamentals, Floyd, Jain, 8th ed , Pearson
2. Digital Logic and Computer Organization, Rajaraman, Radhakrishnan, PHI, 2006

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JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA
I YEAR I SEMESTER M.C.A

DIGITAL LOGIC AND COMPUTER SYSTEMS ORGANIZATION (DLCSO) LAB

Exercise 1
Boolean Algebra: Theorems and logical guides, verification of truth tables

Exercise 2
Realization of Boolean expressions ; Using (i) AND – OR-NOT Gates (ii) NAND Gates (iii) NOR Gates

Exercise 3
Latches Flip – Flops : RS, JK,T,D, Master –Slave FF, Edge – Triggered Flip – Flops

Exercise 4
Counters: Binary Counter, Synchronous/Asynchronous Binary Counter, Ripple Counter, Decade Counter, Up/Down Counter

Exercise 5
Modulo Counter: Modulo - 5, Modulo – 10

Exercise 6
Adders / Sub tractors: Half Adder, Full Adder, 1 ‘s and 2’s complement addition

Exercise 7
Multiplexers/ Data Selector : 2- input and 8- input, Demultiplexers , Logic Function Generator

Exercise 8
Decoders and Encoders

Exercise 9
BCD adders and Comparators

Exercise 10
Registers: Basic Shift Register (SR), SI/SO SR, SI/PO SR, PI/SO SR, PI/PO SR

Exercise 11
Johnson Counter, Sequence Generator, Parity Generators/ Checkers

Exercise 12
Code Converters : Decimal –to-Binary, Binary – to – Decimal, Decimal – to- Hexa Decimal,
BCD- to –Decimal, Binary – to- gray, gray- to -Binary

Exercise 13
Buffers / Derivers : Open ; collector Buffers

Exercise 14
Gates : CMOS / NMOS/TTL – Basic Operational Characteristics and parameters

Exercise 15
RAM, ROM, PROM, EPROM – Testing Memory Chips

REFERENCE BOOKS

1. Digital Fundamentals, Floyd & Jain , Pearson , 2005.
2. Digital Logic and Computer Organization, Rajaraman, Radhakrishnan, PHI, 2006

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JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA
I YEAR I SEMESTER M.C.A

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JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA
M.C.A - I YEAR II SEMESTER

Code	Subject	T	P
MCA2.1	OOPS through JAVA	4	-
MCA2.2	Operating Systems	4	-
MCA2.3	Organizational Structures and Personal Management	4	-
MCA2.4	Operations Research	4	-
MCA2.5	Business Data Processing	4	-
MCA2.6	OOPS through JAVA Lab	-	4
MCA2.7	Business Data Processing Lab	-	4

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JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA
M.C.A - I YEAR II SEMESTER
MCA 2.1 OOPS Through JAVA

Unit-I: Basics of Object Oriented Programming (OOP):
Need for OO paradigm, A way of viewing world – Agents, responsibility, messages, methods, classes and instances, class hierarchies (Inheritance), method binding, overriding and exceptions, summary of oop concepts, coping with complexity, abstraction mechanisms.

Unit-II: Java Basics:
Data types, variables, scope and life time of variables, arrays, operators, expressions, control statements, type conversion and costing, simple java program, classes and objects – concepts of classes, objects, constructors, methods, access control, this keyword, garbage collection, overloading methods and constructors, parameter passing, recursion, string handling.

Unit-III: Inheritance:
Hierarchical abstractions, Base class object, subclass, subtype, substitutability, forms of inheritance- specialization, specification, construction, extension, limitation, combination, benefits of inheritance, costs of inheritance. Member access rules, super uses, using final with inheritance, polymorphism, abstract classes.

Unit-IV: Packages and Interfaces:
Defining, Creating and Accessing a Package, Understanding CLASSPATH, importing packages, differences between classes and interfaces, defining an interface, implementing interface, applying interfaces, variables in interface and extending interfaces.

Unit-V: Exception handling and Multithreading:
Concepts of exception handling, benefits of exception handling, Termination or presumptive models, exception hierarchy, usage of try, catch, throw, throws and finally, built in exceptions, creating own exception sub classes. Differences between multi threading and multitasking, thread life cycle, creating threads, synchronizing threads, daemon threads, thread groups.

Unit-VI: Event Handling:
Events, Event sources, Event classes, Event Listeners, Delegation event model, handling mouse and keyboard events, Adapter classes, inner classes. The AWT class hierarchy, user interface components- labels, button, canvas, scrollbars, text components, check box, check box groups, choices, lists panels – scrollpane, dialogs, menubar, graphics, layout manager – layout manager types – boarder, grid, flow, card and grid bag.

Unit-VII: Applets:
Concepts of Applets, differences between applets and applications, life cycle of an applet, types of applets, creating applets, passing parameters to applets.

Unit-VIII: Swings:
Introduction, limitations of AWT, MVC architecture, components, containers, exploring swing- JApplet, JFrame and JComponent, Icons and Labels, text fields, buttons – The JButton class, Check boxes, Radio buttons, Combo boxes, Tabbed Panes, Scroll Panes, Trees, and Tables.

TEXT BOOKS:

1. Java - The complete reference, 7/e, Herbert schildt, TMH.

REFERENCES:

1. JAVA: How to Program, 8/e, Dietal, Dietal, PHI.
2. Introduction of Programming with JAVA, S. Dean, H. Dean, TMH.
3. Introduction to Java programming, 6/e, Y. Daniel Liang, Pearson .
4. Core Java 2, Vol 1 (Vol 2) Fundamentals (Advanced), 7/e, Cay.S.Horstmann, Gary Cornell, Pearson.
5. Big Java 2, 3/e, Cay.S.Horstmann, Wiley.
6. Object Oriented Programming through Java, P. Radha Krishna, University Press.
7. JAVA & Object Orientation an Introduction,2/e, John Hunt, Springer.
8. Introduction to JAVA Programming, 7/e, Y. Daniel Liang, Pearson.
9. JAVA Programming and Object-Oriented Application Development, Johnson, Cengage Learning.
10. First Encounter With JAVA,S. P. Bhuta, SPD.
11. JAVA for Professionals, B. M. Harwani, SPD.
12. Program with JAVA, Mahesh Bhave, Palekan, Pearson.
13. Programming with JAVA, 3/e,E.Balagurusamy, TMH.

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JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA
M.C.A - I YEAR II SEMESTER
MCA 2.2 OPERATING SYSTEMS

Unit - I: Overview

Introduction: Computer-System Organization, Computer-System Architecture, Operating-System Structure, Operating-System Operations, Process Management, Memory Management, Storage Management, Protection and Security, Distributed Systems, Special-Purpose Systems, Computing Environments

Operating System Structure: Operating-System Services, User Operating-System Interface, System Calls, System Programs, Operating-System Design and Implementation, Operating-System Structure, Virtual Machines

Unit - II: Process Management - 1

Processes: Process Concept, Process Scheduling, Operations on Processes, Interprocess Communication, Examples of IPC Systems, Communication in Client-Server Systems

Threads: Overview, Multithreading Models, Thread Libraries, Java Threads, Threading Issues, OS Examples

Unit - III: Process Management - 2

CPU Scheduling: Basic Concepts, Scheduling Criteria, Scheduling Algorithms, Multiple-Processor Scheduling, Thread Scheduling, Operating System Examples

Process Synchronization: Background, The Critical-Section Problem, Peterson's Solution, Synchronization Hardware, Semaphores, Classic Problems of Synchronization, Monitors, Atomic Transactions

Unit - IV: Deadlocks

System Model, Deadlock Characterization, Methods for Handling Deadlocks, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection and Recovery from Deadlock.

Unit - V: Memory Management

Main Memory: Swapping, Contiguous Memory Allocation, Paging, Structure of the Page Table, Segmentation

Virtual Memory: Background, Demand Paging, Copy-on-Write, Page Replacement, Allocation of Frames, Thrashing, Memory-Mapped Files

Unit - VI: Storage Management - 1

File-System Interface: Concept,Access Methods, Directory Structure, File-System Mounting, File Sharing, Protection

File-System Implementation: File-System Structure,Implementation, Directory Implementation, Allocation Methods, Free-Space Management, Efficiency and Performance, Recovery, Log-Structured File Systems, NFS

Unit - VII: Storage Management - 2

Mass-Storage Structure: Overview, Disk Structure, Disk Attachment, Disk Scheduling, Disk and Swap-Space Management, RAID Structure, Stable-Storage Implementation, Tertiary-Storage Structure

I/O Systems: Overview, I/O Hardware, Application I/O Interface, Kernel I/O Subsystem, Transforming I/O Requests to Hardware Operations, STREAMS, Performance

Unit - VIII: Protection and Security

Protection: Goals of Protection, Principles of Protection, Domain of Protection, Access Matrix, Implementation of Access Matrix, Access Control, Revocation of Access Rights, Capability-Based Systems, Language-Based Protection

Security: The Security Problem, Program Threats, System and Network Threats, Cryptography as a Security Tool, User Authentication, Implementing Security Defenses, Firewalling to Protect Systems and Networks.

TEXT BOOKS:

1. Operating System Concepts, 7/e, Abraham Silberschatz, Galvin, John Wiley & Sons, Inc.

REFERENCES:

1. Operating systems, 6/e, William Stallings, PHI/Pearson.
2. Operating Systems, 3/e, Dietal, Dietal, Pearson.
3. Operating Systems, 2/e, Dhamdhere, TMH.
4. An introduction to Operating Systems, Concepts and practice, Pramod Chandra P. Bhat, PHI.
5. Operating systems, Elmasri, Carrick, Levine, TMH.
6. Operating Systems, 3/e, Nutt, Chaki, Neogy, Pearson.
7. Operating systems, Brian L.Stuart, Cengage.
8. Operating systems, Haldar, Aravind, Pearson.
9. Operating systems, PAL Choudhury, PHI.
10. Operating Systems: design and Implementation, 3/e, Tanenbaum , Woodhull.

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JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA

M.C.A - I YEAR II SEMESTER

MCA 2.3 ORGANIZATIONAL STRUCTURE AND HUMAN RESOURCE MANAGEMENT

Unit-I: Introduction to Management:
Concepts, nature and definitions of management-management and administration, principles of management-functions of management-planning, organizing, directing and controlling-importance of management

Unit-II: Classical Theories of Organization:
Functional approach - division of labor, levels of authority, span of control, authority & responsibility, efficiency of management.

Unit-III: Behavioral Theories of Organizations:
Concept of organization structure-Formal and Informal organization, difficulties due to informal organization - group behavior- committee- motivation and theories of motivation.

Unit-IV: Human Resource Management:
Objectives, functions of HRM, duties and responsibilities of HR manager-position of HR department in the organization-changing, concept of personnel management in India.

Unit-V: HR Planning:
Preparation of man power inventory and forecasting, job description, recruitment, job specification and selection, interviewing techniques, transfers, promotion and its policies.

Unit-VI: Training and Development:
Objectives of training –identifying training needs-training methods-on the job training –off the job training-job evolution-training functions India-State –of-Art-survey.

Unit-VII: Communication:
Importance of communication, communication process-methods of communication-two way communication, barriers of Communication, organizational barriers-essentials of effective communication system

Unit-VIII: Strategic Management:
Introduction-study of strategic management-environmental scanning-internal environment and external environment SWOT analysis-challenges in LPG.

TEXT BOOKS:

1. Organization Structure and Personal Management, 2/e, Subbarao. P, HPH.
2. Personal and Human Resource Management, Recenzo , Robins, PHI.

REFERENCES:

1. Management Process and Organizational Behavior, Karam Pal, I.K int.
2. Human Resource Management, Jyothi, Oxford.
3. Organization and Management, Agarwal, TMH.
4. Fundamentals of HRM, David A. Decenzo , Stephen R. Robins, Wiley India.
5. Organizational Structure and Human Resurce Management, Varaprasad, Scitech.
6. Human Resource Management, Chabra.T.N, Dhanpat Rai .
7. Personal Management and Human Resouces, Venkat Ratnam, TMH.

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JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA
M.C.A - I YEAR II SEMESTER
MCA2.4 OPERATIONS RESEARCH

Unit-I: Development:
Definition, Characteristics and Phrases, scientific method. Types of models, general methods for solving, operations research modes.

Unit-II:
Allocation, introduction, linear programming formulation graphical solution, simplex method, artificial variable technique, duality principle.

Unit -III: Transportation problem:
Formulation, optimal solution, unbalanced transportation, assignment problem: formulation, optimal solution, variations problem, degeneracy i.e. non square (MXN) matrix, restrictions, sequencing: Introduction, optimal solution for processing each of n jobs through three machines, traveling salesman problem (i.e.) shortest acyclic route models.

Unit -IV: Replacement:
Introduction, replacement of items that deteriorate when money value is not counted and counted, and replacement of items that fail completely (i.e.) group replacements.

Unit -V: Waiting lines:
Introduction, single channel, poisson arrivals, exponential service time infinite population and unrestricted queue.

Unit -VI: Inventory:
Introduction, single item, deterministic models, production is instantaneous or at a constant rate, shortages are allowed or not allowed and with drawls from stock is continuous, purchase inventory model with one price break, shortages are not allowed, instantaneous production demand production or purchase cost is relevant, stochastic models, simple problems.

Unit -VII: Theory of Games:
Introduction, minimax (maximum), criterion and optimal strategy solution of games with saddle points, rectangular without saddle points. Dynamic programming: Introduction, Bellman's principle of optimality, solutions for simple problems.

Unit -VIII: Project Management:
PERT and CPM, difference between PERT and CPM, PERT/CPM network components and precedence relations, Time Estimates for activities.

TEXT BOOKS:

1. Operations Research, S. D. Sharma, Ramnath,& Kedarnath co, Meerut.
2. Operations Research, An introduction, 8/e, Taha, Pearson.

REFERENCES:

1. Operations Research, P. K. Gupta, D. S. Hira, S. Chand.
2. Operations Research, R. D. Asrhedkar, R. V. Kulkarni.
3. Operations Research, Problems & solutions, 3/e, JK Sharma, Macmillan.
4. Operations Research, 8/e, Hillier , Liberman , TMH.
5. Operations Research,2/e, Panneerselvam.

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JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA

M.C.A - I YEAR II SEMESTER

MCA 2.5 BUSINESS DATA PROCESSING

Unit-I:

Introduction to data processing, types of data processing

Overview of COBOL: History of COBOL, Coding formats of a COBOL program, Structure of a COBOL Program, Character set, Cobol words, data names and identifiers, literals, figurative constants, hierarchy of COBOL statements, continuation of lines, language description notation, implementation differences.

Unit-II:

Introduction to divisions (Identification, environment, data and procedure divisions), Format and functions of the different sections and paragraphs in each division.

Unit-III:

Data Division: Level structure (including special level Nos. 66, 77 and 88, picture clause, editing characters, concept of qualification of names, record structure, working storage section: VALUE clause, REDEFINES clause, RENAMES clause, USAGE clause, SIGN clause, JUSTIFIED clause, SYNCHRONIZED clause.

Unit-IV:

Procedure division: Organization of a COBOL program: Section, paragraph, sentence, statement, syntax and function of the different COBOL verbs.

Elementary verbs: add, subtract, multiply, divide, and compute.

Input-Output verbs: Accept, display.

Data movement: move verb

Unit-V:

Conditional and sequence control verbs:

types of conditions , condition name, condition, relation condition, class condition, sign condition, Relational operators, Logical operators, if and nested if statements, complex conditions, evaluation roles, abbreviated, compound conditions, EVALUATE statements, ALTER statement.

Miscellaneous verbs: GOTO, STOP, RUN, EXIT, CONTINUE

Perform verb: In-line and Out-Line PERFORM, Types of Out-line, PERFORM: PERFORM, PERFORM-UNTIL, PERFORM-VARYING, PERFORM-THRU, PERFORM-TIMES, Usage of TEST BEFORE and TEST AFTER clauses, nested PERFORM.

Unit-VI:

Table handling: basic concepts, OCCURS clause, Assigning values to table elements, single, multiple dimensional table, INDEX/SUBSCRIPT, SET verb: indexed by clause, usage in index clause, SEARCH concepts, SEARCH verb, serial/binary searching in COBOL, Handling sorted/unsorted tables.

String handling in COBOL: STRING statement, EXAMINE statement, INSPECT statement, UNSTRING statement.

Unit-VII:

File Handling: Basic file concepts, Characteristics, File Description, File Organization/access, file section and file control paragraphs, Sequential indexed and relevant file handling in COBOL, USE statement

Input-output statements: open, close, read, write, rewrite, delete, start.

Compiler directing verb: Copy.

Unit-VIII:

Sorting and Merging: Basic concepts, SORT verb, MERGE verb.

Inter-program communication: Basic concepts, subroutines, Linkage section, call verb, call be address and call by content.

Screen section, Report Writing

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M.C.A - I YEAR II SEMESTER

TEXT BOOKS:

1. COBOL Programming, D. Ghosh Dasthidar, M. K. Roy, TMH.
2. Structured COBOL, Phillipakis , Kazmier, MGH.

REFERENCES:

1.Structured COBOL Programming,8/e, Stern ,A.Stern, wiley.
2.COBOL for beginners, Worth, Thomas, PHI.

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JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA

M.C.A - I YEAR II SEMESTER

MCA 2.6 OOPS Through JAVA Lab

1. Use JDK 1.5 or above on any platform e.g. Windows or Unix.
2. Student is expected to complete any 16 programs.

1. The Fibonacci sequence is defined by the following rule. The first 2 values in the sequence are 1, 1. Every subsequent value is the sum of the 2 values preceding it. Write A Java Program (WAJP) that uses both recursive and non-recursive functions to print the n^{th} value of the Fibonacci sequence.
2. WAJP to demonstrate wrapper classes, and to fix the precision.
3. WAJP that prompts the user for an integer and then prints out all the prime numbers up to that Integer.
4. WAJP that checks whether a given string is a palindrome or not. Ex: MALAYALAM is a palindrome.
5. WAJP for sorting a given list of names in ascending order.
6. WAJP to check the compatibility for multiplication, if compatible multiply two matrices and find its transpose.
7. WAJP that illustrates how runtime polymorphism is achieved.
8. WAJP to create and demonstrate packages.
9. WAJP, using *StringTokenizer* class, which reads a line of integers and then displays each integer and the sum of all integers.
10. WAJP that reads on file name from the user then displays information about whether the file exists, whether the file is readable/writable, the type of file and the length of the file in bytes and display the content of the using *FileInputStream* class.
11. WAJP that displays the number of characters, lines and words in a text/text file.
12. Write an Applet that displays the content of a file.
13. WAJP that works as a simple calculator. Use a grid layout to arrange buttons for the digits and for the + - x / % operations. Add a text field to display the result.
14. WAJP for handling mouse events.
15. WAJP demonstrating the life cycle of a thread.
16. WAJP that correctly implements Producer-Consumer problem using the concept of Inter Thread Communication.
17. WAJP that lets users create Pie charts. Design your own user interface (with Swings & AWT).
18. WAJP that allows user to draw lines, rectangles and ovals.
19. WAJP that implements a simple client/server application. The client sends data to a server. The server receives the data, uses it to produce a result and then sends the result back to the client. The client displays the result on the console. For ex: The data sent from the client is the radius of a circle and the result produced by the server is the area of the circle.
20. WAJP to generate a set of random numbers between two numbers x1 and x2, and x1>0.
21. WAJP to create an abstract class named Shape, that contains an empty method named numberOfSides(). Provide three classes named Trapezoid, Triangle andHexagon, such that each one of the classes contains only the method numberOfSides(), that contains the number of sides in the given geometrical figure.
22. WAJP to implement a Queue, using user defined Exception Handling (also make use of throw, throws).
23. WAJP that creates 3 threads by extending Thread class. First thread displays “Good Morning” every 1 sec, the second thread displays “Hello” every 2 seconds and the third displays “Welcome” every 3 seconds. (Repeat the same by implementing Runnable)
24. Create an inheritance hierarchy of Rodent, Mouse, Gerbil, Hamster etc. In the base class provide methods that are common to all Rodents and override these in the derived classes to perform different behaviors, depending on the specific type of Rodent. Create an array of Rodent, fill it with different specific types of Rodents and call your base class methods.

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M.C.A - I YEAR II SEMESTER

MCA 2.7 BUSINESS DATA PROCESSING LAB

All the programs should be implemented in COBOL language. The standards that can be used are COBOL-68, COBOL-74, COBOL-85, MS-COBOL, COBOL 2002. The operating systems that can be used are: IBM's z/OS, Microsoft's Windows, and the POSIX families (Unix/Linux etc.) etc. At least two programs from each set of 9.

1. Beginners Programs - Simple programs using ACCEPT, DISPLAY and some arithmetic verbs.

1. Program illustrating usage of editing characters.
2. Programs for simplification the following equations using
   a) Arithmetic verbs b) COMPUTE verb
   The equations are i) $C=(5/9)(F-32)$ ii) $A=\Pi r^2$

2. Selection and Iteration - Selection (IF, EVALUATE) and Iteration (PERFORM) example programs.

1. Program to find factorial of a given number.
2. Program to input hours, minutes and seconds and display a digital clock in the centre of the screen.
3. Program that illustrates usage of REDEFINES and RENAMES Clause.

3. Tables - Example programs using tables.

1. Program that determines the multiplication on two matrices.
2. Programs for performing linear search and Binary search operations.

4. String handling - Example programs that show how to use Reference Modification, STRING, UNSTRING, INSPECT and UNSTRING.

1. A data item N**ame** contains 40 characters. Write a program to change all instances of "MR" or "Mr" by "Sri" and "MRS" or "Mrs" by "Smt".

5. Sequential Files - Programs that demonstrate how to process sequential files.

1. Develop a program to maintain and process a sequential file to generate electrical bills. The bill should have the following details. APSEB, House number, Operator, Owner's name, Zone, category, previous meter reading, current meter reading, unit charge, total.
2. Program to merge files and print the merged files. Take input from user.
3. Write a program which accepts student's details from a file and displays then along with grades. Input file should have details regarding Roll-no and marks in three subjects. Output file format should be

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Name RollNo Maths Physics Computers Total Grade

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6. Sorting and Merging - Examples that use INPUT PROCEDURE's and the SORT and MERGE verbs

- Write sample programs for sorting and merging of sequential files using SORT and MERGE verbs

7. Direct Access Files - Example programs that show how to process Indexed and Relative files.

1. Write a program that performs the conversion of sequential data to indexed data.
2. Write a program which converts the given sequential file into relative file.
3. Develop a program to maintain and generate bills in a supermarket. The master file is maintained as indexed organization with fields item-code, item-name, unit- price. Generate bills for customers with the random requests about items as common in any supermarket in the following format.

XYZ SUPERMARKET

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M.C.A - I YEAR II SEMESTER

S.No.	Code	Description	Unit price	Qty	Total
			Total Amount :		

8. CALLing sub-programs - Example programs that Demonstrate contained, and external, sub-programs.
- Sample programs illustrating Linkage Section.

9. The COBOL Report Writer - Example programs using the COBOL Report Writer.
1. Simple report using only one control break.
2. Report containing all the control breaks but not using declaratives.
3. Report containing all control breaks and using declaratives to calculate the sales person salary and commission

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JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA
M.C.A II YEAR I SEMESTER

MCA - III semester

Code	Subject	T	P
MCA 3.1	**Data Base Management System**	4	-
MCA 3.2	**Computer Communication**	4	-
MCA 3.3	**UNIX Programming**	4	-
MCA 3.4	**Management Information Systems**	4	-
MCA 3.5	**Computer Graphics**	4	-
MCA 3.6	**Data Base Management System Lab**	-	4
MCA 3.7	**UNIX Programming Lab**	-	4

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JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA

M.C.A II YEAR I SEMESTER

MCA 3.1 DATABASE MANAGEMENT SYSTEMS

UNIT I:

Data base System Applications, data base System VS file System, View of Data, Data Abstraction, Instances and Schemas, data Models, the ER Model, Relational Model, Other Models, Database Languages – DDL – DML – database Access for applications Programs – data base Users and Administrator – Transaction Management – data base System Structure – Storage Manager – the Query Processor – History of Data base Systems. Data base design and ER diagrams – Beyond ER Design Entities, Attributes and Entity sets – Relationships and Relationship sets – Additional features of ER Model – Concept Design with the ER Model – Conceptual Design for Large enterprises.

UNIT II:

Relational Model: Introduction to the Relational Model – Integrity Constraint Over relations – Enforcing Integrity constraints – Querying relational data – Logical data base Design – Introduction to Views – Destroying /altering Tables and Views.

Relational Algebra and Calculus: Relational Algebra – Selection and projection set operations – renaming – Joins – Division – Examples of Algebra overviews – Relational calculus – Tuple relational Calculus – Domain relational calculus – Expressive Power of Algebra and calculus.

UNIT III:

Form of Basic SQL Query – Examples of Basic SQL Queries – Introduction to Nested Queries – Correlated Nested Queries Set – Comparison Operators – Aggregative Operators – NULL values – Comparison using Null values – Logical connectivity's – AND, OR and NOTR – Impact on SQL Constructs – Outer Joins – Disallowing NULL values – Complex Integrity Constraints in SQL Triggers and Active Data bases.

UNIT IV:

Schema refinement – Problems Caused by redundancy – Decompositions – Problem related to decomposition – reasoning about FDS – FIRST, SECOND, THIRD Normal forms – BCNF – Lossless join Decomposition – Dependency preserving Decomposition – Schema refinement in Data base Design – Multi valued Dependencies – forth Normal Form.

UNIT V:

Overview of Transaction Management: ACID Properties – Transactions and Schedules – Concurrent Execution of transaction – Lock Based Concurrency Control – Performance Locking – Transaction Support in SQL – Introduction to Crash recovery.

UNIT VI:

Concurrency Control: Serializability, and recoverability – Introduction to Lock Management – Lock Conversions – Dealing with Dead Locks – Specialized Locking Techniques – Concurrency without Locking. Crash recovery: Introduction to ARIES – the Log – Other Recovery related Structures – the Write-Ahead Log Protocol – Check pointing – re3covering from a System Crash – Media recovery – Other approaches and Interaction with Concurrency control.

UNIT VII:

Overview of Storage and Indexing: Data on External Storage – File Organization and Indexing – Cluster Indexes, Primary and Secondary Indexes – Index data Structures – Hash Based Indexing – Tree base Indexing – Comparison of File Organizations – Indexes and Performance Tuning.

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M.C.A II YEAR I SEMESTER

UNIT VIII:

Overview of Query Evaluation: The System Catalogue – Introduction to Operator Evaluation – Algorithm for Relational Operations. Tree Structured Indexing: Intuitions for tree Indexes – Indexed Sequential Access Methods (ISAM) – B+ Trees: A Dynamic Index Structure. Hash Based Indexing: Static Hashing – Extendable hashing – Linear Hashing – Extendable vs. Liner hashing.

TEXT BOOKS :

1. Data base Management Systems, 3/e, Raghurama Krishnan, Johannes Gehrke, TMH
2. Data base System Concepts, 6/e, Silberschatz, Korth, TMH

REFERENCE BOOKS:

1. Data base Management System, 5/e, Elmasri Navathe, Pearson
2. Introduction to Database Systems, 8/e, C.J.Date, Pearson
3. Data base Systems design, Implementation, and Management,5/e, Rob , Coronel, Thomson
4. Database Management System, Connolly Begg, Pearson
5. Database Management systems, Farcia-Molina Ullman Widom, Pearson
6. Database Management Systems, Majumdr, Bhattacharyya, TMH ,96
7. Database System Concepts, Peter ROB,Coronel,Cengage.

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JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA

M.C.A II YEAR I SEMESTER

MCA 3.2 COMPUTER COMMUNICATIONS

UNIT I:

Network Hardware reference model: Transmission media, Narrowband ISDN, Broad band ISDN, ATM.

UNIT II:

The data Link layer : Design Issues, Error detection and correction, Elementary Data Link Protocols, Sliding window protocols : Data link layer in HDLC, Internet and ATM.

UNIT III:

Channel allocation methods: TDM, FDM, ALOHA, Carrier sense Multiple access protocols, Collision Free protocols – IEEE standard BO2 for LANS – Ethernet, Token Bus, Token ring, Bridges.

UNIT IV:

Network lyer Routing Algorithms: Shortest path, Flooding, Flow based Distance vector, Link state, Hierarchical, Broadcast routing, Congestion Control algorithms-General principles of congestion control, Congestion prevention polices, Choke packets and Load shedding.

UNIT V:

Internet Working : Tunneling, internetworking, Fragmentation, network layer in the internet – IP protocols, IP address, Subnets, Internet control protocols, DSPF, BOP, Internet multicasting, Mobile IP. Network layer in the ATM Networks – cell formats, connection setup, routing and switching, service categories, and quality of service, ATM LANs.

UNIT VI:

The Transport Layer: Elements of transport protocols – addressing, establishing a connection, releasing connection, flow control and buffering and crash recovery, end to end protocols : UDP, reliable Byte Stream (TCP) end to end format, segment format, connection establishment and termination, sliding window revisited, adaptive retransmission, TCP extension, Remote Procedure Call – BLAST, CHAN, SELECT, DCE.

UNIT VII:

Application Layer: Network Security, Cryptographic Algorithms: DES, RSA. Security Mechanisms : Authentication Protocols, Firewalls.

UNIT VIII:

Application Layer : Name service (DNS) Domains Hierarchy, Name servers. Traditional Applications : SMTP, MIME, World Wide Web : HTTP, Network Management : SNMP

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M.C.A II YEAR I SEMESTER

TEXT BOOKS :

1. Computer Networks and rew, Tanenbaum, 4/e, Pearson
2. Data and computer communications, stallings, 8/e, PHI

REFERENCE BOOKS

1. Data communications and networking Forouzan, 4/e, TMH
2. Computer Networks – A System Approach , Peterson ,Bruce Davie,2/e,Harcourt Asia
3. Compute communications and networking technologies, Gallo, Hancock,Cengage
4. An Engineering approach to compute networking, Kesha ,Pearson
5. Communication networks, 2/e , Leon-Garcia, TMH
6. Computer networks , Anuranjan Misra, ACME Learning
7. Computer networks, C R Sarma, Jaico,
8. Understanding data communications, Held, 7/e , Pearson

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JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA

M.C.A II YEAR I SEMESTER

MCA 3.3 UNIX PROGRAMMING

UNIT I:

Review of Unix Utilities and Shell Programming: File handling utilities, security by file permissions, process utilities, disk utilities, networking commands, backup utilities, text processing utilities, Working with the Bourne shell, What is a shell, shell responsibilities, pipes and input redirection, output redirection, here documents

UNIT II:

Shell as a programming language, shell meta characters, shell variables, shell commands, the environment, control structures, shell script examples.

UNIT III:

Unix Files: Unix file structure, directories, files and devices, System calls, library functions, low level file access, usage of open, creat, read, write, close, lseek, stat, fstat, octl, umask, dup, dup2. The standard I/O (fopen, fclose, fflush, fseek, fgetc, getc, getchar, fputc, putc, putchar, fgets, gets), formatted I/O, stream errors, streams and file descriptors, file and directory maintenance (chmod, chown, unlink, link, symlink, mkdir, rmdir, chdir, getcwd), Directory handling system calls (opendir, readdir, closedir, rewinddir, seekdir, telldir)

UNIT IV:

Unix Process: Threads and Signals: What is process, process structure, starting new process, waiting for a process, zombie process, process control, process identifiers, system call interface for process management, fork, vfork, exit, wait, waitpid, exec, system, Threads, Thread creation, waiting for a thread to terminate, thread synchronization, condition variables, cancelling a thread, threads vs. processes, Signals, Signal functions, unreliable signals, interrupted system calls, kill and raise functions, alarm, pause functions, abort, sleep functions.

UNIT V:

Data Management: Management Memory (simple memory allocation, freeing memory) file and record locking (creating lock files, locking regions, use of read/ write locking, competing locks, other commands, deadlocks).
Interprocess Communication: Introduction to IPC, IPC between processes on a single computer system, IPC between processes on different systems, pipes, FIFOs.

UNIT VI:

Message Queues: IPC, permission issues, Access permission modes, message structure, working message queues, Unix system V messages, Unix kernel support for messages, Unix APIs for messages, client/server example.

UNIT VII:

Semaphores: Unix system V semaphores, Unix kernel support for semaphores, Unix APIs for semaphores, file locking with semaphores.
Shared Memory: Unix system V shared memory, working with a shared memory segment, Unix kernel support for shared memory, Unix APIs for shared memory, semaphore and shared memory example.

UNIT VIII:

Sockets: Berkeley sockets, socket system calls for connection oriented protocol and connectionless protocol, example client/server program, advanced socket system calls, socket options.

TEXT BOOKS:

1. Unix Concepts and Applications, 3/e, Sumitabha Das, TMH

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2. Advanced Unix Programming, N B Venkateswarlu, BSP

REFERENCE BOOKS:

1. Unix and shell Programming, Sumitabha Das, TMH
2. A Beginner's Guide to Unix, N.P.Gopalan, B.Sivaselva, PHI
3. Unix Shell Programming, Stephen G.Kochan, Patrick Wood, 3/e, Pearson
4. Unix and shell Programming, N B Venkateswarlu, Reem, New Delhi
5. Unix Programming, Kumar Saurabh, Wiley,India
6. Unix Shell Programming, Lowell Jay Arthus & Ted Burns,3/e, GalGotia
7. Unix Concepts and Applications, Das, 4/e, TMH

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M.C.A II YEAR I SEMESTER

MCA 3.4 MANAGEMENT INFORMATION SYSTEMS

UNIT I:

Management Information systems: A Framework: Importance of MIS, Management Information systems: A Concept, MIS: A Definition, Nature and Scope of MIS

Structure and Classification of MIS: Structure of MIS, MIS Classification.

UNIT II:

Information and System Concepts: Information: A Definition, Types of Information, Information Quality, Dimensions of Information, Systems: a Definition, Kinds of Systems, System Related Concepts, Elements of a System, Human as an Information Processing System,

Information system as an Enabler: Introduction, changing concepts of IS, IS as an Enabler.

UNIT III:

Basics of Computer system: A computer System, Computer Hardware Classification, Computer Software, Programming Languages

Database Management: Introduction, Database Hierarchy, Files- The Traditional Approach, Databases- The Modern Approach, Database Structure, Database Management System, Types of Database Structures or Data Models, Structured Query Language (SQL), Normalisation, Advances in Database Technology.

UNIT IV:

Telecommunications and Networks: Telecommunications, Types of Signals, communication Channel, Characteristics of Communication Channels, Communications Hardware, Communication Networks, computer Networks in India, Applications of Communication

UNIT V:

E-Business and e-Commerce: Introduction, Cross- Functional Enterprise Information system, e-Commerce

Decision-Making and Decision-Support Systems: Decision-Making: A Concept, Simon's Model of Decision-Making, Types of Decisions, Methods for Choosing among Alternatives, Decision- Making and MIS, Decision support Systems – Why?, Decision Support Systems: A Framework, Characteristics and Capabilities of DSS

System Development Approaches: System Development Stages, System Development Approaches

UNIT VI:

Systems Analysis and Design Systems Analysis: Introduction, Requirement Determination, Strategies for Requirement Determination, Structured Analysis Tools Systems Design, Design Objectives, conceptual Design, Design Methods, Detailed System Design

UNIT VII:

Implementation, Maintenance, Evaluation and Security of IS: Implementation Process, Hardware and Software selection, System Maintenance, Evaluation of MIS, IS Security, Protecting Information System, IS Controls

UNIT VIII:

Information system Planning: Information System Planning, Planning Terminology, The Nolan Stage Model, The four-Stage Model of IS Planning, Selecting a Methodology, Information Resource Management (IRM), Organisation Structure and Location of MIS

TEXT BOOKS:

1. Management Information Systems, Managerial Perspectives,2/e, D P Goyal, Macmillan.
2. Management Information Systems: Managing the Digital Firm, 10/e, Laudon, Kenneth,PHI

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REFERENCE BOOKS:

1. Management Information systems, Conceptual foundations, structure and development, 2/e, Gordon B. Davis, Margrethe H. Olson, TMH
2. Management Information systems, 7/e, James A O'Brien,George M Marakas, TMH
3. Management Information systems, Mahadeo Jaiswal, Monika Mital, Oxford Higher Education
4. Management Information systems, 9/e, James A O'Brien, George M Marakas, Ramesh Behl, TMH
5. Management Information systems, The manager's view, Robert Schultheis, Mary sumner, TMH
6. Management Information System, W.S Jawadekar, TMH.
7. Management Information System, David Kroenke, TMH.
8. MIS and Corporate Communications, Wadwha, Jimmy Dawar, P.Bhaskara Rao, Kanishka pub.
9. Managing Information Technology, 6/e, Carol V. Brown, Daniel W. DeHayes, Jeffrey A. Hoffer, Martin, E. Wainright, and William C. Perkins. 2008, PHI
10. Information Technology for Management: Transforming Organizations in the Digital Economy, Turban, Efraim, Ephraim McLean, and James Wetherbe. 2007, John Wiley & Sons.
11. Management Information Systems, Nirmalya Bagchi, Vikas
12. Management Information Systes, Indrajit Chatterje, PHI

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M.C.A II YEAR I SEMESTER

MCA 3.5 COMPUTER GRAPHICS

UNIT I :

Introduction: Application areas of Computer Graphics, overview of graphics systems, video-display devices, raster-scan systems, random scan systems, graphics monitors and work stations and input devices.

UNIT II :

Output primitives : Points and lines, line drawing algorithms, mid-point circle and ellipse algorithms.Filled area primitives: Scan line polygon fill algorithm, boundary-fill and flood-fill algorithms.

UNIT III :

2-D geometrical transforms: Translation, scaling, rotation, reflection and shear transformations, matrix representations and homogeneous coordinates, composite transforms, transformations between coordinate systems. (p.nos 204-227 of text book-1).

UNIT IV :

2-D viewing : The viewing pipeline, viewing coordinate reference frame, window to view-port coordinate transformation, viewing functions, Cohen-Sutherland and Cyrus-beck line clipping algorithms, Sutherland – Hodgeman polygon clipping algorithm

UNIT V :

3-D object representation : Polygon surfaces, quadric surfaces, spline representation, Hermite curve, Bezier curve and B-Spline curves, Bezier and B-Spline surfaces. Basic illumination models, polygon rendering methods.

UNIT VI :

3-D Geometric transformations : Translation, rotation, scaling, reflection and shear transformations, composite transformations.

3-D Viewing : Viewing pipeline, viewing coordinates, view volume and general projection transforms and clipping

UNIT VII :

Visible surface detection methods: Classification, back-face detection, depth-buffer, scan-line, depth sorting, BSP-tree methods, area sub-division and octree methods

UNIT VIII :

Computer animation : Design of animation sequence, general computer animation functions, raster animation, computer animation languages, key frame systems, motion specifications.

TEXT BOOKS:

1. Computer Graphics *C version*, Donald Hearn, M.Pauline Baker, Pearson
2. Computer Graphics Principles & practice, 2/e, Foley, VanDam, Feiner, Hughes, Pearson

REFERENCE BOOKS:

1. Computer Graphics, Donald Hearn and M.Pauline Baker, 2/E, PHI
2. Computer Graphics, Zhigand xiang, Roy Plastock, Schaum's outlines, 2/E, TMH
3. Procedural elements for Computer Graphics, David F Rogers, 2/e, TMH
4. Principles of Interactive Computer Graphics, Neuman , Sproul, TMH.
5. Principles of Computer Graphics, Shalini Govil, Pai, 2005, Springer.
6. Computer Graphics, Steven Harrington, TMH

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7. Computer Graphics, Shirley, Marschner, Cengage
8. Computer Graphics, Rajesh Maurya, Wiley, india
9. Computer Graphics Pradeep Bhatiya, IK intentional

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M.C.A II YEAR I SEMESTER

MCA 3.6 DBMS Lab

1. Execute a single line and group functions for a table.
2. Execute DCL and TCL Commands.
3. Create and manipulate various DB objects for a table.
4. Create views, partitions and locks for a particular DB.
5. Write PL/SQL procedure for an application using exception handling.
6. Write PL/SQL procedure for an application using cursors.
7. Write a DBMS program to prepare reports for an application using functions.
8. Write a PL/SQL block for transaction operations of a typical application using triggers.
9. Write a PL/SQL block for transaction operations of a typical application using package.
10. Design and develop an application using any front end and back end tool (make use of ER diagram and DFD).
11. Create table for various relation
12. Implement the query in sql for a) insertion b) retrieval c) updation d) deletion
13. Creating Views
14. Writing Assertion
15. Writing Triggers
16. Implementing operation on relation using PL/SQL
17. Creating Forms
18. Generating Reports

Typical Applications – Banking, Electricity Billing, Library Operation, Pay roll, Insurance, Inventory etc.

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M.C.A II YEAR I SEMESTER

MCA 3.7 UNIX PRGRAMMING LAB

Note: Student needs exposure to all programs, but expected to complete at least 15

1. Programs using basic network commands
2. Program using system calls : create, open, read, write, close, stat, fstat, lseek
3. Program to implement inter process communication using pipes
4. Program to perform inter process cots : sniffer
5. Program using TCP sockets (Client and Server)
6. Program using UDP sockets (Client and Server)
7. Program using URL class to download webpages
8. Write a shell script for sorting, searching and insertion/deletion of elements in a list
9. Create two processes to run a for loop, which adds numbers 1 to n, say one process adds odd numbers and the other even
10. By creating required number of processors, simulate a communication between them as below:
11. Create a file that is shared among some users, write a program that finds whether a specific user has created read and write operations on the file
12. Create a shared lock and exclusive lock among some number of processes, say 1 to 10 on any data of 100 elements. For example, process 5 wants a shared lock on elements 5 to 50 or process 8 wants exclusive lock on elements 32 to 45. Create access violations on the locks and show what occurs, then.
13. Write a program demonstrating semaphore operation on a shared file for reading but not writing
14. Create a distributed key among some processes which exchange messages of the form (m, Ti, I) for resource sharing, where m=request, reply, release, Ti=time stamp and I=process id
15. Write a program demonstrating mutual exclusion principle
16. Write a program which reads a source file name and destination file name using command line arguments and then converts into specified format (i.e. either from lower case to upper case or upper case to lower case or inverse of each)
17. Write a program which takes a set of filenames along with the command line and print them based on their size in bytes either ascending or descending order
18. Write a program which takes directory name along the command line and displays names of the files which are having more than one link
19. Write a program to demonstrate the use of temporary files
20. Write a program to demonstrate the use of exec family functions
21. Write a program to display the good morning, good afternoon, good evening and good night depending on the users log on time
22. Write a program to demonstrate the working of simple signal handler that catches either of the two user defined signals and prints the signal number
23. Write a program to demonstrate the locking mechanism while accessing the shared files
24. Write a shell script containing a function mycd() using which, it is possible to shuttle between directories
25. write a shell script which works similar to the wc command. This script can receive the option -l, -w, -c to indicate whether number of lines/words/characters
26. Write a program to print prime numbers between x and y Write a shell script which deletes all lines containing the word
27. Write a shell script which deletes all lines containing the word "UNIX" in the files supplied as arguments to this shell script
28. Write a shell script which displays a list of all files in the current directory to which you have read, write and execute permissions
29. Write a menu-driven program which has the following options:
30. Write a shell script for renaming each file in the directory such that it will have the current shell's PID as an extension. The shell script should ensure that the directories do not get renamed
31. Write a program which demonstrates the shared memory functions

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CODE	SUBJECT	T	P
MCA09.4.1	Software Engineering	4	-
MCA09.4.2	Advanced JAVA & Web Technologies	4	-
MCA09.4.3	Data Warehousing and Mining	4	-
MCA09.4.4	Elective-I MCA09.4.4.1 Embedded Real Time Systems MCA09.4.4.2 Human Computer Interaction MCA09.4.4.3 ERP & Supply Chain Management	4	-
MCA09.4.5	Elective-II MCA09.4.5.1 Distributed Operating system MCA09.4.5.2 Mobile computing MCA09.4.5.3 Compiler Design	4	-
MCA09.4.6	Advanced JAVA & Web Technologies Lab	-	4
MCA09.4.7	Data Warehousing and Mining Lab	-	4

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MCA09.4.1 SOFTWARE ENGINEERING

UNIT I : Introduction to Software Engineering :
The evolving role of software, Changing Nature of Software,Software myths.
A Generic view of process : Software engineering- A layered technology, a process framework, The Capability Maturity Model Integration (CMMI), Process patterns, process assessment, personal and team process models.

UNIT II : Process models :
The waterfall model, Incremental process models, Evolutionary process models, The Unified process.
Software Requirements : Functional and non-functional requirements, User requirements, System requirements, Interface specification, the software requirements document.

UNIT III : Requirements engineering process :
Feasibility studies, Requirements elicitation and analysis, Requirements validation, Requirements management.
System models : Context Models, Behavioral models, Data models, Object models, structured methods.

UNIT IV : Design Engineering :
Design process and Design quality, Design concepts, the design model.
Creating an architectural design : Software architecture, Data design, Architectural styles and patterns, Architectural Design.

UNIT V : Object-Oriented Design :
Objects and object classes, An Object-Oriented design process, Design evolution.
Performing User interface design : Golden rules, User interface analysis and design, interface analysis, interface design steps, Design evaluation.

UNIT VI : Testing Strategies : A strategic approach to software testing, test strategies for conventional software, Black-Box and White-Box testing, Validation testing, System testing, the art of Debugging.
Product metrics : Software Quality, Metrics for Analysis Model, Metrics for Design Model, Metrics for source code, Metrics for testing, Metrics for maintenance.

UNIT VII : Metrics for Process and Products :
Software Measurement, Metrics for software quality.
Risk management : Reactive vs. Proactive Risk strategies, software risks, Risk identification, Risk projection, Risk refinement, RMMM, RMMM Plan.

UNIT VIII : Quality Management :
Quality concepts, Software quality assurance, Software Reviews, Formal technical reviews, Statistical Software quality Assurance, Software reliability, The ISO 9000 quality standards.

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TEXT BOOKS:

1. Software Engineering, 7/e , Roger S.Pressman , TMH
2. Software Engineering ,8/e, Sommerville, Pearson.

REFERENCE BOOKS

3. Software Engineering, A Precise approach, Pankaj Jalote, Wiley
4. Software Engineering, Kassem A. Saleh, Cengage.
5. Software Engineering principles and practice, W S Jawadekar, TMH
6. Software Engineering, James ,PHI
7. Software Engineering concepts, R Fairley, TMH

MCA09.4.2ADVANCED JAVA FOR WEB TECHNOLOGIES

UNIT I: Review of HTML4 ;
Common tags ,HTML Tables and formatting internal linking, Complex HTML forms.

UNIT II :Introduction to Scripting Languages:
Java Scripts, Control structures,functions, arrays & objects, DHTML, CSS, event model, filters & transitions.

UNIT III: Review of Applets, Class, Event Handling, AWT Programming:
Introduction to Swing: Japplet, Handling Swing Controls like Icons, Buttons, Text Boxes, Combo Boxes, Tabbed Pains, Scroll Pains, Trees, Tables, Differences between AWT Controls & Swing Controls, Developing a Home page using Applets & Swing.

UNIT IV :Java Beans:
Introduction to Java Beans, Advantages of Java Beans, BDK, Introspection, Using Bound properties, Bean Info Interface, Constrained properties, Persistence, Customizers, Java Beans API.

UNIT V: Introduction to Servelets:
Lifecycle of a Servelet, JSDK, The Servelet API, The javax.servelet Package, Reading Servelet parameters, Reading Initialization Parameters, The javax.servelet.HTTP package, Handling, Http Request & responses, Using Cookies, Session Tracking, Security Issues.

UNIT VI :Introduction to JSP:
The Problem with Servelets, The Anatomy of a JSP Page, JSP Processing, JSP Application Design with MVC.
Setting Up the JSP Environment: Installing the Java Software Development Kit, Tomcat Server & Testing Tomcat.

UNIT VII: JSP Application Development:
Generating Dynamic Content, Using Scripting Elements, Implicit JSP Objects, Conditional Processing – Displaying Values, Using an Expression to Set an Attribute, Declaring Variables and Methods, Error Handling and Debugging, Sharing Data Between JSP Pages, Requests, and Users, Passing Control and Data Between Pages – Sharing Session and Application Data Memory Usage Considerations.

UNIT VIII: Database Access:

Database Programming using JDBC, Studying Javax.sql.* package. Accessing a Database from a JSP Page, Application – Specific Database Actions Deploying JAVA Beans in a JSP Page.

TEXT BOOKS:

1. Internet and World Wide Web: How to program,6/e, Dietel, Dietel , Pearson.
2. The Complete Reference Java2, 3/e, Patrick Naughton, Herbert Schildt, TMH.
3. Java Server Faces, Hans Bergstan, O'reilly.

REFERENCE BOOKS:

4. Web Programming, building internet applications, 2/e, Chris Bates, Wiley Dreamtech
5. Programming world wide web, Sebesta, PEA
6. Web Tehnologies, 2/e, Godbole, kahate, TMH
7. An Introduction to web Design , Programming ,Wang,Thomson

MCA09.4.3DATA WAREHOUSING AND DATA MINING

UNIT I : Introduction :
Fundamentals of data mining, Data Mining Functionalities, Classification of Data Mining systems, Major issues in Data Mining.

Data Preprocessing : Needs Preprocessing the Data, Data Cleaning, Data Integration and Transformation, Data Reduction, Discretization and Concept Hierarchy Generation.

UNIT II: Data Warehouse and OLAP:
Data Warehouse and OLAP Technology for Data Mining Data Warehouse, Multidimensional Data Model, Data Warehouse Architecture, Data Warehouse Implementation, Further Development of Data Cube Technology, From Data Warehousing to Data Mining.

UNIT III : Data Mining Primitives, Languages, and System Architectures :
Data Mining Primitives, Data Mining Query Languages, Designing Graphical User Interfaces Based on a Data Mining Query Language Architectures of Data Mining Systems.

UNIT IV : Concepts Description , Characterization and Comparison :
Data Generalization and Summarization- Based Characterization, Analytical Characterization: Analysis of Attribute Relevance, Mining Class Comparisons: Discriminating between Different Classes, Mining Descriptive Statistical Measures in Large Databases.

UNIT V : Mining Association Rules in Large Databases :
Association Rule Mining, Mining Single-Dimensional Boolean Association Rules from Transactional Databases, Mining Multilevel Association Rules from Transaction Databases, Mining Multidimensional Association Rules from Relational Databases and Data Warehouses, From Association Mining to Correlation Analysis, Constraint-Based Association Mining.

UNIT VI : Classification and Prediction :
Issues Regarding Classification and Prediction, Classification by Decision Tree Induction, Bayesian Classification, Classification by Backpropagation, Classification Based on Concepts from Association Rule Mining, Other Classification Methods, Prediction, Classifier Accuracy.

UNIT VII : Cluster Analysis Introduction :
Types of Data in Cluster Analysis, A Categorization of Major Clustering Methods, Partitioning Methods, Density-Based Methods, Grid-Based Methods, Model-Based Clustering Methods, Outlier Analysis.

UNIT VIII : Mining Complex Types of Data :

Multimensional Analysis and Descriptive Mining of Complex, Data Objects, Mining Spatial Databases, Mining Multimedia Databases, Mining Time-Series and Sequence Data, Mining Text Databases, Mining the World Wide Web.

TEXT BOOKS :

1. Data Mining, Concepts and Techniques , Jiawei Han, Micheline Kamber, Harcourt India.
2. Data Mining, Introductory & Advanced Topics, M H Dunham,S.Sridhar,Pearson.

REFERENCE BOOKS :

3. Data Mining Introductory and advanced topics, Margaret H Dunham, Pearson.
4. Data Mining Techniques, Arun K Pujari, University Press.
5. Data Warehousing Fundamentals , Paulraj Ponnaiah, Wiley.
6. The Data Warehouse Life cycle Tool kit, Ralph Kimball, Wiley .

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MCA09.4.4.1 EMBEDDED SYSTEMS AND REAL TIME SYSTEMS
(Elective I)

Unit I: Introduction to Embedded systems:
What is an embedded system Vs. General computing system, history, classification, major application areas, purpose of embedded systems.
Core of embedded system, memory, sensors and actuators, communication interface, embedded firmware, other system components, PCB and passive components.

UNIT II: 8—bit microcontrollers architecture:
Characteristics, quality attributes, application specific, domain specific, embedded systems. Factors to be considered in selecting a controller, 8051 architecture, memory organization, registers, oscillator unit, ports, source current, sinking current, design examples.

UNIT III:
Interrupt, timers and serial ports of 8051
8051 interrupts, interfacing ADC 0801, Timers, serial port, Reset circuit, power saving modes.

UNIT IV: Programming the 8051Micro controller:
Addressing modes, Instruction set, sata transfer instructions, Arithmetic Instructions, Logical Instructions, Arithmetic Instructions, logical instructions, Boolean, Program control transfer instructions.

UNIT V:
RTOS and Scheduling
Operating basics, types, RTOS, tasks, process and threads, multiprocessing and multitasking, types of multitasking, non preemptive, preemptive scheduling.

UNIT VI:
Task communication of RTOS
Shared memory, pipes, memory mapped objects, message passing, message queue, mailbox, signaling, RPC and sockets, task communication/synchronization issues, racing, deadlock, live lock, the dining philosopher's problem.

UNIT VII:
The producer-consumer problem, Reader writers problem, Priority Inversion, Priority ceiling, Task Synchronization techniques, busy waiting, sleep and wakery, semaphore, mutex, critical section objects, events, device, device drivers, how to clause an RTOS, Integration and testing of embedded hardware and fire ware.

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UNIT VIII:

Simulators, emulators, Debuggers, Embedded Product Development life cycle (EDLC), Trends in embedded Industry, Introduction to ARM family of processor.

TEXT BOOKS:

1. Introduction to Embedded Systems, Shibu K V, TMH,2009.

REFERENCE BOOKS :

2. Embedded Systems, Rajkamal, TMH,2009.
3. Embedded Software Primer, David Simon, Pearson.
4. The 8051 Microcontroller and Embedded Systems, Mazidi, Mazidi, Pearson,.

MCA09.4.4.2 HUMAN COMPUTER INTERACTION
(Elective I)

UNIT I: Introduction:
Importance of user Interface, definition, importance of good design. Benefits of good design. A brief history of Screen design

UNIT II: The graphical user interface:
Popularity of graphics, the concept of direct manipulation, graphical system, Characteristics, Web user – interface popularity, characteristics- Principles of user interface.

UNIT III: Design process
Human interaction with computers, importance of human characteristics human consideration, Human interaction speeds, understanding business junctions.

UNIT IV: Screen Designing :
Design goals, Screen planning and purpose, organizing screen elements, ordering of screen data and content, screen navigation and flow, Visually pleasing composition, amount of information, focus and emphasis, presentation information simply and meaningfully, information retrieval on web, statistical graphics, Technological consideration in interface design.

UNIT V: Windows:
Windows new and Navigation schemes selection of window, selection of devices based and screen based controls.

UNIT VI: Components :
Components text and messages, Icons and increases, Multimedia, colors, uses problems, choosing colors.

UNIT VII: Software tools :
Specification methods, interface, Building Tools.

UNIT VIII: Interaction Devices:
Keyboard and function keys, pointing devices, speech recognition digitization and generation, image and video displays, drivers.

TEXT BOOKS :

1. Human Computer Interaction. 3/e, Alan Dix, Janet Finlay, Goryd, Abowd, Russell Beal, PEA,2004.
2. The Essential guide to user interface design,2/e, Wilbert O Galitz, Wiley DreamaTech.

REFERENCE BOOKS :

3. Designing the user interface. 4/e, Ben Shneidermann , PEA.
4. User Interface Design, Soren Lauesen , PEA.
5. Interaction Design PRECE, ROGERS, SHARPS, Wiley .
6. Human Computer, Interaction Dan R.Olsan, Cengage ,2010.

MCA09.4.4.3 ERP & SUPPLY CHAIN MANAGEMENT
(Elective I)

UNIT I: Introduction to ERP:
Overview – Benefits of ERP, ERP and Related Technologies, Business Process Reengineering, Data Warehousing, Data Mining – On–line Analytical Processing, Supply Chain Management.

UNIT II: ERP Implementation:
Implementation Life Cycle, Implementation Methodology, Hidden Costs, Organizing Implementation, Vendors, Consultants and Users, Contracts, Project Management and Monitoring.

UNIT III: Business Modules:
Business Modules in an ERP Package , Finance, Manufacturing, Human Resource, Plant Maintanance, Materials Management, Quality Management, Sales and Distribution.

UNIT IV: Fundamentals of Supply Chain Management:
Supply chain networks, Integrated supply chain planning, Decision phases in s supply chain, process view of a supply chain, supply chain flows, Overview of supply chain models and modeling systems, Supply chain planning: Strategic, operational and tactical, Understanding supply chain through process mapping and process flow chart.

UNIT V: SCM Strategies, Performance:
Supply chain strategies, achieving strategic fit, value chain, Supply chain drivers and obstacles, Strategic Alliances and Outsourcing, purchasing aspects of supply chain, Supply chain performance measurement: The balanced score card approach, Performance Metrics. Planning demand and supply: Demand forecasting in supply chain, Aggregate planning in supply chain, Predictable variability.

UNIT VI: Planning and Managing Inventories:
Introduction to Supply Chain Inventory Management. Inventory theory models: Economic Order Quantity Models, Reorder Point Models and Multiechelon Inventory Systems, Relevant deterministic and stochastic inventory models and Vendor managed inventory models.

UNIT VII: Distribution Management:
Role of transportation in a supply chain - direct shipment, warehousing, cross-docking; push vs. pull systems; transportation decisions (mode selection, fleet size), market channel structure, vehicle routing

problem. Facilities decisions in a supply chain. Mathematical foundations of distribution management, Supply chain facility layout and capacity planning.

UNIT VIII: Strategic Cost Management in Supply Chain:

The financial impacts, Volume leveraging and cross docking, global logistics and material positioning, global supplier development, target pricing, cost management enablers, Measuring service levels in supply chains, Customer Satisfaction/Value/Profitability/Differential Advantage.

TEXT BOOKS:

1. ERP Demystified, 2/e, Alexis Leon, TMH, 2007.
2. Supply Chain Management: Strategy, Planning, Operation, Sunil Chopra, Peter Meindel, PEA, 2002.

REFERENCE BOOKS:

3. Enterprise Resource Planning, Concepts and Planning, Vinod Kumar, Venkata Krishnan, PHI.
4. Enterprise Resource Planning Concepts and Practice, 7/e, Vinod Kumar, PHI.
5. Enterprise Resource Planning,Mary Sumner, PEA.
6. Supply Chain Management with APO, Thomas Dickerssbach,Springer.
7. Supply Chain Management on Demand, An Fromm, Springer.
8. Supply Chain Management and Advanced Planning, 2/e, Stadtler,Kilger, Springer.

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MCA II Year IV SEMESTER

MCA09.4.5.1 DISTRIBUTED OPERATING SYSTEMS
(Elective II)

UNIT I: Processes:

THREADS: Introduction to Threads, Threads in Distributed Systems; CLIENTS: User Interfaces, Client-Side Software for Distribution Transparency SERVERS: General Design Issues, Object Servers; CODE MIGRATION: Approaches to Code Migration, Migration and Local Resources, Migration in Heterogeneous Systems, Example: D'Agents

SOFTWARE AGENTS: Software Agents in Distributed Systems, Agent Technology.

UNIT II: Naming Systems:

NAMING ENTITIES: Names, Identifiers, and Addresses, Name Resolution, The Implementation of a Name Space, Example: DNS, X.500

LOCATING MOBILE ENTITIES: Naming versus Locating Entities, Simple Solutions, Home-Based Approaches, Hierarchical Approaches

REMOVING UNREFERENCED ENTITIES: The Problem of Unreferenced Objects, Reference Counting, Reference Listing, Identifying Unreachable Entities.

UNIT III: Synchronization:

Clock synchronization, logical clocks, global state, election algorithms, mutual exclusion, distributed transactions.

UNIT IV: Consistency and Replication:

Introduction, Data-Centric Consistency Models, Client-Centric Consistency Models, Distribution Protocols, Consistency Protocols, Examples: Orca and Causally-Consistent Lazy Replication.

UNIT V: Fault Tolerance:

Introduction to Fault Tolerance, Process Resilience, Reliable Client-Server Communication, Reliable Group Communication, Distributed Commit, Recovery.

UNIT VI: Distributed Object-Based Systems:

CORBA, Distributed Com, Globe and Comparison of CORBA, DCOM, and Globe.

UNIT VII: Distributed File Systems:

Sun Network File System, Coda File System, Plan~9, XFS and SFS, Scalable Security, Comparison of Distributed File Systems.

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UNIT VIII: Distributed Document-Based Systems and Coordination-Based Systems:

Distributed Document-Based Systems: The World Wide Web, Lotus Notes, Comparison of WWW and Lotus Notes.

Distributed Coordination-Based Systems: Introduction to Coordination Models, TIB/Rendezvous, JINI, Comparison of TIB/Rendezvous and JINI.

TEXT BOOKS:

1. Distributed Systems , Principles and Paradigms, 2/e, Tanenbaum, Maarten Van Steen, PHI.
2. Advanced concepts in Operating Systems, Mukesh Singhal, Niranjan G. Shivaratri, TMH, 2005.

REFERENCE BOOKS:

3. Distributed Operating Systems and Algorithm Analysis, Chow, Johnson, PEA
4. Distributed Systems Concepts and Design, 4/e, George Coulouris, Dollimore, Kindberg, PEA.
5. Distributed Operating Systems, Pradeep K. Sinha, PHI,2009.
6. Operating Systems, Internals & Design Principles, 6/e, William Stallings, PEA.

MCA09.4.5.2 MOBILE COMPUTING
(Elective II)

UNIT I : Introduction to Mobile Communications and Computing:
Mobile Computing (MC): Introduction to MC, novel applications, limitations, and architecture GSM: Mobile services, System architecture, Radio interface, Protocols, Localization and calling, Handover, Security, and New data services.

UNIT II : (Wireless) Medium Access Control:
Motivation for a specialized MAC (Hidden and exposed terminals, Near and far terminals), SDMA, FDMA, TDMA, CDMA.

UNIT III: Mobile Network Layer:
Mobile IP (Goals, assumptions, entities and terminology, IP packet delivery, agent advertisement and discovery, registration, tunneling and encapsulation, optimizations), Dynamic Host Configuration Protocol (DHCP).

UNIT IV: Mobile Transport Layer:
Traditional TCP, Indirect TCP, Snooping TCP, Mobile TCP, Fast retransmit/fast recovery, Transmission /time-out freezing, Selective retransmission, Transaction oriented TCP.

Unit V : Database Issues:
Hoarding techniques, caching invalidation mechanisms, client server computing with adaptation, power-aware and context-aware computing, transactional models, query processing, recovery, and quality of service issues.

UNIT VI : Data Dissemination:
Communications asymmetry, classification of new data delivery mechanisms, push-based mechanisms, pull-based mechanisms, hybrid mechanisms, selective tuning (indexing) techniques.

UNIT VII : Mobile Ad hoc Networks (MANETs):
Overview, Properties of a MANET, spectrum of MANET applications, routing and various routing algorithms, security in MANETs.

UNIT VIII: Protocols and Tools:
Wireless Application Protocol-WAP. (Introduction, protocol architecture, and treatment of protocols of all layers), Bluetooth (User scenarios, physical layer, MAC layer, networking, security, link management) and J2ME.

TEXT BOOKS:

1. Mobile Communications, 2/e, Jochen Schiller, 2004, *Addison Wesley*.
2. Handbook of Wireless Networks and Mobile Computing, Stojmenovic , Cacute, *Wiley*, 2002
3. Adhoc Wireless Networks, 2/e, Sivaram murthy, Manoj, PEA, 2009

REFERENCE BOOKS:

4. Mobile Computing Principles: Designing and Developing Mobile Applications with UML and XML, Reza Behravanfar, Cambridge, University Press, 2004.
5. Principles of Mobile Computing, 2/e, Hansmann, Merk, Nicklous, Stober, *Springer*, 2003.
6. Mobile and Wireless Design Essentials, Martyn Mallick, Wiley *DreamTech*, 2003
7. Mobile Computing, Rajkamal, Oxford, 2008

MCA09.4.5.3 COMPILER DESIGN
(Elective II)

UNIT I : Overview of Compilation:
Phases of Compilation – Lexical Analysis, Regular Grammar and regular expression for common programming language features, pass and Phases of translation, interpretation, bootstrapping, data structures in compilation – LEX lexical analyzer generator.

UNIT II : Parsing:
Context free grammars, Top down parsing – Backtracking, LL (1), recursive descent parsing, Predictive parsing, Preprocessing steps required for predictive parsing.
Bottom up parsing: - Shift Reduce parsing, LR and LALR parsing, Error recovery in parsing , handling ambiguous grammar, YACC – automatic parser generator.

UNIT III : Semantic analysis:
Intermediate forms of source Programs – abstract syntax tree, Attributed grammars, Syntax directed translation, Conversion of popular Programming languages language Constructs into Intermediate code forms, Type checker.

UNIT IV : Symbol Tables:
Symbol table format, organization for block structured languages, hashing, tree structures representation of scope information. Block structures and non block structure storage allocation: static, Runtime stack and heap storage allocation, storage allocation for arrays, strings and records.

UNIT V : Code Generation :
Processing the intermediate Code- Interpretation, Code generation, Simple code generation, code generation for basic blocks, BURS Code generation and dynamic programming, Register allocation by graph coloring, Evaluation of code generation techniques Preprocessing the intermediate code, post processing the target code, machine code generation.

UNIT VI : Code optimization:
Consideration for Optimization, Machine dependent and machine independent code optimization, Scope of Optimization, local optimization, loop optimization, frequency reduction, folding, DAG representation.

UNIT VII : Data flow analysis:
Dataflow Analysis, Intermediate representation for flow analysis , Various dataflow analyses , Transformations using dataflow analysis Speeding up dataflow analysis , Alias analysis.

UNIT VIII : Loop Optimizations:
Dominators, Loop-invariant computations, Induction variables, Array bounds checks, Loop unrolling

TEXT BOOKS:

1. Principles of Compiler Design, A.V. Aho, J.D.Ullman, PEA.
2. Compilers Principles , Techniques and Tools , A.V. Aho, Ravi Sethi, J.D. Ullman, PEA.

REFERENCE BOOKS :

3. Modern Compiler Design, Dick Grune, Henry E. Bal, Cariel T. H. Jacobs, Wiley dreamtech.
4. LEX & YACC , John R. Levine, Tony Mason, Doug Brown, O'reilly
5. Modern Compiler Implementation in C, Andrew N. Appel, Cambridge University Press.
6. Engineering a Compiler, Cooper, Linda, Elsevier.
7. Compiler Construction, Louden, Thomson.

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MCA III year I Sem (V semester)

Code	Subject	T	P
MCA09.5.1	Software Design Methodologies	4	-
MCA09.5.2	Multimedia Application Development	4	-
MCA09.5.3	Object Oriented Analysis and Design (using UML)	4	-
MCA09.5.4	Elective-III MCA09.5.4.1 Software Project Management MCA09.5.4.2 Information Retrieval Systems MCA09.5.4.3 E-Commerce	4	-
MCA09.5.5	Elective-IV MCA09.5.5.1 Middle Ware Technologies MCA09.5.5.2 Advanced Data Bases MCA09.5.5.3 Information Security	4	-
MCA09.5.6	UML Lab	-	4
MCA09.5.7	Multimedia Application Development Lab	-	4

MCA III year II Sem (VI semester)

Code	Subject
MCA09.6.1	Project Seminar
MCA09.6.2	Dissertation /Thesis Excellent/Good/Satisfactory/Not-Satisfactory

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MCA III year I Sem (V semester)

MCA09.5.1 SOFTWARE DESIGN METHODOLOGY

UNIT I:

Basic concepts of Design: Introduction, Characteristics of design activities

Essential elements of designs

Design Quality: Software quality models: Hierarchical models, Relational models

The effect of design on software quality: efficiency, Correctness and reliability, Portability, Maintainability, Reusability, Interoperability

UNIT II:

Quality attributes of software design: Witt, Baker and Merritt's design objectives , Parnas and Weiss's requirements of good designs, Quality of development process

Design Principles: Basic rules of software design: Causes of difficulties, Vehicles to overcome difficulties, Basic rules of software design

Design processes: The context of design in software development process, Generic design process: descriptive models, structure of software design methods

UNIT III:

Software Architecture:

The notion of architecture: Architecture in the discipline of buildings, Architecture in the discipline of computer hardware, the general notion of architecture: The notion of software architecture: Prescriptive models, Descriptive models, Multiple view models, the roles of architecture in software design, software architectural style: Introductory examples, the notion of software architectural style

UNIT IV:

Description of Software Architectures: The visual notation: Active and passive elements, Data and control Relationships, Decomposition/Composition of architectural elements

UNIT V:

Typical Architectural Styles: Data flow: The general data flow styles, the pipe- and filter sub-style, the batch sequential processing sub-style

Independent components: the general independent components style, the event-based implicit invocation systems sub-style

Call and return: The general call and return style, the layered systems sub-style, data abstraction: the abstract data type and object-oriented sub-styles, Data-centred style, Virtual machine Architecture

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UNIT VI:

Using Styles In Design:

Choices of styles, Combinations of styles, Hierarchical heterogeneous styles, simultaneously heterogeneous styles, Locationally heterogeneous styles, Case Study: Keyword frequency vector: specification of the problem, designs in various styles, Analysis and comparison

Architectural Design space: Theory of design spaces: Structure of design spaces, solving design synthesis and analysis problems, Design space of architectural elements: Behavior features, static features, Static features

Design space of architectural styles:

Characteristic features of architectural styles, Classification of styles

UNIT VII:

Analysis and Evaluation: The concept of scenario, scenarios for evaluating modifiability: Scenarios for evaluating reusability, specification of operational profiles, evaluation and analysis of performance, Scenarios for evaluating reusability:

Analysis and Evaluation of Modifiability: the SAAM Method:

The input and output, the process (Activities in SAAM Analysis)

UNIT VIII:

Quality Trade- Off Analysis: The ATAM Method: ATAM analysis process, ATAM analysis activities

Model-Based Analysis: The HASARD Method: Representation of quality models, construction of quality models, Hazard identification, Cause- consequence analysis, assembling graphic model, Identification of quality concerns

Derivation of quality features: contribution factors of a quality concern, sensitive quality attributes of a component, Quality risks, trade-off points.

TEXT BOOK:

1. Software Design Methodology: From Principles to Architectural Styles , Hong zhu, Elsevier,2009

REFERENCE BOOKS:

1. Software Architecture: Perspectives on an Emerging discipline, Shaw, M.,Garlan, PEA, 2008.
2. Software Architecture in Practice, Bass, L., Clements P,Kazman, PEA,2003
3. Evaluating Software Architectures: Methods and Case Studies, Clements, Kazman, Klien, PEA, 2002
4. Tutorial on Software Design Techniques, Freeman, Wasserman, A.I.(Es), IEEE, 1980
5. Design and Use of Software Architectures- Adopting and Evolving a product – Line Approach, Bosch, J., ACM Press , Addison Wesley, 2000
6. Software Architecture and Design, Bernard Witt, Baker, Merritt, Von Nostrand Reinhold,NY, 1994.

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MCA III year I Sem (V semester)

MCA09.5.2 MULTIMEDIA APPLICATION DEVELOPMENT

UNIT I :

Fundamental concepts in Text and Image:

Multimedia and hypermedia, world wide web, overview of multimedia software tools. Graphics and image data representation graphics/image data types, file formats, Color in image and video: color science, color models in images, color models in video.

UNIT II:

Fundamental Concepts in Video and Digital Audio:

Types of video signals, analog video, digital video, digitization of sound, MIDI, quantization and transmission of audio.

UNIT III:

Action Script I:

Action Script Features, Object-Oriented Action Script, Datatypes and Type Checking, Classes, Authoring an Action Script Class.

UNIT IV:

Action Script II :

Inheritance, Authoring an Action Script 2.0 Subclass, Interfaces, Packages, Exceptions.

UNIT IV:

Application Development:

An OOP Application Frame work, Using Components with Action Script Movie Clip Subclasses.

UNIT VI:

Multimedia Data Compression:

Lossless compression algorithm: Run-Length Coding, Variable Length Coding, Dictionary Based Coding, Arithmetic Coding, Lossless Image Compression, Lossy compression algorithm: Quantization, Transform Coding, Wavelet-Based Coding, Embedded Zerotree of Wavelet Coefficients Set Partitioning in Hierarchical Trees (SPIHT).

UNIT VII:

Basic Video Compression Techniques:

Introduction to video compression, video compression based on motion compensation, search for motion vectors, MPEG, Basic Audio Compression Techniques.

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MCA III year I Sem (V semester)

UNIT VIII:

Multimedia Networks:

Basics of Multimedia Networks, Multimedia Network Communications and Applications: Quality of Multimedia Data Transmission, Multimedia over IP, Multimedia over ATM Networks, Transport of MPEG-4, Media-on-Demand (MOD).

TEXT BOOKS:

1. Fundamentals of Multimedia , Ze-Nian Li , Mark S. Drew, PHI/PEA.
2. Multimedia Systems, Parag Havaldar, Gerard Medioni, cengage, 2009.

REFERENCE BOOKS:

1. Essentials Action Script 3.0, Colin Moock, SPD O, Reilly,2007.
2. Multimedia Applications, Steinmetz, Nahrstedt, Springer.
3. Digital Multimedia, Nigel Chapman, Jenny Chapman, Wiley-Dreamtech.
4. Multimedia & Communications Technology, Steve Heath, Elsevier .
5. Multimedia Technology & Applications, David Hilman , Galgotia.
6. Multimedia Technologies, Banerji, Mohan Ghosh, MGH.

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MCA III year I Sem (V semester)

MCA09.5.3 OBJECT ORIENTED ANALYSIS AND DESIGN (USING UML)

UNIT I:

Introduction to UML:

The meaning of Object-Orientation, object identity, encapsulation, information hiding, polymorphism, genericity, importance of modeling, principles of modeling, object oriented modeling, conceptual model of the UML, Architecture.

UNIT II:

Basic structural Modeling:

Classes, relationships, common mechanisms, diagrams, Advanced structural modeling: advanced relationships, interfaces, types & roles, packages, instances.

UNIT III:

Class & object diagrams:

Terms, concepts, examples, modeling techniques, class & Object diagrams.

UNIT IV:

Collaboration diagrams:

Terms, Concepts, depicting a message, polymorphism in collaboration diagrams, iterated messages, use of self in messages.

UNIT V:

Sequence diagrams:

Terms, concepts, differences between collaboration and sequence diagrams, depicting synchronous messages with/without priority call back mechanism broadcast message.

UNIT VI:

Behavioral Modeling:

Interactions, use cases, use case diagrams, activity diagrams.

UNIT VII:

Advanced Behavioral Modeling:

Events and signals, state machines, processes & threads, time and space, state chart diagrams.

UNIT VIII:

Architectural Modeling:

Terms, concepts, examples, modeling techniques for component diagrams and deployment diagrams.

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TEXT BOOKS:

1. The Unified Modeling Language User Guide, Grady Booch, Rambaugh, Ivar Jacobson, PEA
2. Fundamentals of Object Oriented Design in UML, Meilir Page-Jones, Addison Wesley

REFERENCE BOOKS:

1. Head First Object Oriented Analysis & Design, Mclaughlin,SPD OReilly,2006
2. Object oriented Analysis& Design Using UML, Mahesh ,PHI
3. The Unified Modeling Language Reference Manual, 2/e, Rambaugh, Grady Booch,etc., PEA
4. Object Oriented Analysis & Design, Satzinger, Jackson, Thomson
5. Object Oriented Analysis Design & implementation, Dathan.,Ramnath, University Press
6. Object Oriented Analysis & Design, John Deacon, PEA
7. Fundamentals of Object Oriented Analysis and Design in UML, M Pages-Jones, PEA
8. Object-Oriented Design with UML, Barclay,Savage,Elsevier,2008

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MCA III year I Sem (V semester)

MCA09.5.4.1 SOFTWARE PROJECT MANAGEMENT

(Elective-III)

UNIT I:

Conventional Software Management :

The waterfall model, conventional software Management performance.

Evolution of Software Economics : Software Economics, pragmatic software cost estimation.

UNIT II:

Improving Software Economics :

Reducing Software product size, improving software processes, improving team effectiveness, improving automation, Achieving required quality, peer inspections.

The old way and the new : The principles of conventional software Engineering, principles of modern software management, transitioning to an iterative process.

UNIT III:

Life cycle phases :

Engineering and production stages, inception, Elaboration, construction, transition phases.

Artifacts of the process : The artifact sets, Management artifacts, Engineering artifacts, programmatic artifacts.

UNIT IV:

Model based software architectures :

A Management perspective and technical perspective.

Work Flows of the process : Software process workflows, Iteration workflows.

UNIT V :

Checkpoints of the process :

Major mile stones, Minor Milestones, Periodic status assessments.

Iterative Process Planning : Work breakdown structures, planning guidelines, cost and schedule estimating, Iteration planning process, Pragmatic planning.

UNIT VI:

Project Organizations and Responsibilities :

Line-of-Business Organizations, Project Organizations, evolution of Organizations.

Process Automation : Automation Building blocks, The Project Environment.

UNIT VII:

Project Control and Process instrumentation :

The seven core Metrics, Management indicators, quality indicators, life cycle expectations, pragmatic Software Metrics, Metrics automation.

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MCA III year I Sem (V semester)

Tailoring the Process : Process discriminates.

UNIT VIII:
Future Software Project Management :
Modern Project Profiles, Next generation Software economics, modern process transitions.
Case Study: The command Center Processing and Display system- Replacement (CCPDS-R)

TEXT BOOKs:

1. Software Project Management, Walker Royce, PEA, 2005.

REFERENCE BOOKS:

1. Software Project Management, Bob Hughes,3/e, Mike Cotterell, TMH
2. Software Project Management, Joel Henry, PEA
3. Software Project Management in practice, Pankaj Jalote, PEA, 2005,
4. Effective Software Project Management, Robert K.Wysocki, Wiley,2006
5. Project Management in IT, Kathy Schwalbe, Cengage
6. Quality Software Project Management, Futrell,Donald F. Shafer, Donald I. Shafer, PEA

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MCA09.5.4.2 INFORMATION RETRIEVAL SYSTEMS
(Elective III)

UNIT I :

Introduction to Information storage and retrieval systems:

Domain Analysis of IR systems, IR and other types of Information Systems, IR System Evaluation

Introduction to Data structures and algorithms related to Information Retrieval: Basic Concepts, Data structures, Algorithms.

UNIT II:

Inverted Files:

Introduction, Structures used in Inverted Files, Building an Inverted file using a sorted array, Modifications to the Basic Techniques.

UNIT III:

Signature Files :

Introduction, Concepts of Signature files, Compression, Vertical Partitioning, Horizontal Partitioning.

UNIT IV:

New Indices for Text:

PAT Trees and PAT Arrays: Introduction, PAT Tree structure, Algorithms on the PAT Trees, Building PAT Trees as PATRICA Trees, PAT representation as Arrays.

UNIT V:

Lexical Analysis and Stoplists:

Introduction, Lexical Analysis, Stoplists.

UNIT VI:

Stemming Algorithms:

Introduction, Types of Stemming algorithms, Experimental Evaluations of Stemming, Stemming to Compress Inverted Files.

UNIT VII:

Thesaurus Construction:

Introduction, Features of Thesauri, Thesaurus Construction, Thesaurus construction from Texts, Merging existing Thesauri.

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MCA III year I Sem (V semester)

UNIT VIII:

String Searching Algorithms:

Introduction, Preliminaries, The Naive Algorithm, The Knutt-Morris-Pratt Algorithm, The Boyer-Moore Algorithm, The Shift-Or Algorithm, The Karp-Rabin Algorithm.

TEXT BOOKS:

1. Modern Information Retrieval, Ricardo Baeza-Yates, Neto, PEA,2007.
2. Information Storage and Retrieval Systems: Theory and Implementation, Kowalski, Gerald, Mark Academic Press, 2000.
3. Information Retrieval: Algorithms and Heuristics , 2/e, Grossman, Ophir Frieder, , Springer, 2004.

REFERENCE BOOKS:

1. Information Retrieval Data Structures and Algorithms , Frakes, Ricardo Baeza-Yates, PEA
2. Information Storage and Retieval, Robert Korfhage, Wiley & Sons.
3. Introduction to Information Retrieval, Manning, Raghavan, Cambridge .

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MCA III year I Sem (V semester)

MCA09.5.4.3 E - COMMERCE
(Elective - III)

UNIT I:

Electronic Commerce, Frame work, anatomy of E-Commerce applications, E-Commerce Consumer applications, E-Commerce organization applications.

UNIT II:

Consumer Oriented Electronic commerce, Mercantile Process models.

UNIT III:

Electronic payment systems - Digital Token-Based, Smart Cards, Credit Cards, Risks in Electronic Payment systems.

UNIT IV:

Inter Organizational Commerce - EDI, EDI Implementation, Value added networks.

UNIT V:

Intra Organizational Commerce - work Flow, Automation Customization and internal Commerce, Supply chain Management.

UNIT VI:

Corporate Digital Library - Document Library, digital Document types, corporate Data Warehouses. Advertising and Marketing, Information based marketing, Advertising on Internet, on-line marketing process, market research.

UNIT VII:

Consumer Search and Resource Discovery, Information search and Retrieval, Commerce Catalogues, Information Filtering.

UNIT VIII:

Multimedia - key multimedia concepts, Digital Video and electronic Commerce, Desktop video processings, Desktop video conferencing.

TEXT BOOK :

1. Frontiers of Electronic Commerce , Kalakata, Whinston, PEA,2006.

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MCA III year I Sem (V semester)

REFERENCE BOOKS:

1. E-Commerce Fundamentals and Applications Hendry Chan, Raymond Lee,Dillon,Chang, John Wiley.
2. E-Commerce,A Managerial Perspective, Turban E, Lee J , King ,Chung H.M.,PEA,2001.
3. E-Commerce An Indian Perspective , 3/e, P.T. Joseph, PHI,2009.
3. E-Commerce, S.Jaiswal , Galgotia.
5. Electronic Commerce , Gary P.Schneider, Thomson.

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MCA III year I Sem (V semester)

MCA09.5.5.1 MIDDLEWARE AND ENTERPRISE INTEGRATION TECHNOLOGIES (Elective IV)

UNIT I :

Introduction to Object Oriented Systems :

Preview of Object-orientation, Concept of distributed object systems, Reasons to distribute for centralized bjects. Client-server system architecture, Multi tier system architectures. File Server, Database Server, Group Server, Object Server, Web Server.

UNIT II :

Introduction to Middleware Technologies:

General Middleware, Service Specific Middleware, Client/Server Building blocks,RPC - messaging, Peer,to,Peer, Java RMI.

UNIT III :

Introduction to Distributed Objects :

Computing standards, OMG, Overview of CORBA, Overview of COM/DCOM, and Overview of EJB.

UNIT IV :

EJB Architecture :

Overview of EJB software architecture, View of EJB Conversation, Building and Deploying EJBs, Roles in EJB.

UNIT V :

CORBA :

Introduction and concepts, distributed objects in CORBA, CORBA components, architectural features, method invocations, static and dynamic: IDL (Interface Definition Language) models and interfaces. Structure of CORBA IDL, CORBA's self-describing data; CORBA interface repository. Building an application using CORBA.

UNIT VI :

CORBA Services and CORBA Component Model :

Overview of CORBA Services, Object location Services, Messaging Services, CORBA Component Model.

UNIT VII :

COM and NET:

Evolution of DCOM, Introduction to COM, COM clients and servers, COM IDL, COM Interfaces, COM Threading Models, Marshalling, Custom and standard marshalling, Comparison COM and CORBA, Introduction to .NET, Overview of .NET architecture, Remoting.

UNIT VIII :

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MCA III year I Sem (V semester)

Service Oriented architecture (SAO) Fundamentals:

Defining SOA, Business value of SOA, SOA characteristics, Concept of a service, Basic SOA , Enterprise Service Bus (ESB), SOA enterprise Software Models.

TEXT BOOKS:

1. Distributed Component Architecture, G. Sudha Sadasivam , Wiley
2. Service Oriented Architecture: Concepts , Technology & Design, Thomas Erl, PHI
3. Java programming with CORBA, 3/e, G. Brose, A Vogel, K. Duddy, Wiley-dreamtech
4. Distributed Systems, 2/e, Tanenbaum, Van Steen, PEA

REFERENCE BOOKS :

1. Client/server Programming with Java & Corba W/cd, Robert Orfali, Dan Harkey, Wiley
2. Component Software: Beyond Object-Oriented Programming, Clemens Szyperski, PEA.
3. Inside CORBA, Mowbray, PEA
2. COM and CORBA side by side, Jason Pritchard, PEA
3. Enterprise JavaBeans 3.0, 5/e, Bill Burke, O'Reilly .
4. Component Based technology, Sudha Sadasivam, Wiley

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MCA III year I Sem (V semester)

MCA09.5.5.2 ADVANCED DATABASES
(Elective IV)

UNIT I:

Introduction:

Distributed Data Processing, Distributed Databases System, promises of DDBS, Problem areas.

Overview of Relational DBMS: Relational Databases Concepts, Normalization, Integrity rules, Relational data languages.

UNIT II:

Distributed DBMS Architecture:

Architectural Models for Distributed DBMS, DDMBS Architecture.

Distrubuted Database Design:

Alternative Design Strategies, Distribution Design issues, Fragmentation, Allocation.

UNIT III:

Query Processing and Decomposition:

Query processing Objectives, Characterization of query processors, layers of query of query processing, query decomposition, Localization of distributed data.

UNIT IV:

Distributed query Optimization:

Query optimization, centralized query optimization, Distributed query optimization algorithms.

UNIT V:

Transaction Management:

Definition, properties of transaction, types of transactions. Distributed concurrency control. Serialization, concurrency control Mechanism & Algorithms. Time stamped and Optimistic concurrency control Algorithms, Dead lock Management.

UNIT VI:

Distributed DBMS Reliability:

Reliability concepts and Measures, fault-tolerance in Distributed systems, failures in Distributed DBMS, local & Distributed Reliability Protocols, site failures and Network partitioning.

Parallel Database Systems: Database Series, Parallel Architecture, Parallel DBMS Techniques, Parallel exception problems, Parallel Execution for Hierarchical architecture.

UNIT VII:

Distributed object Database Management Systems:

Fundamental object concepts and Models, Object Distributed Design, Architectural Issues, Object Management, Distributed Object storage, Object query Processing.

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UNIT VIII:

Object Oriented Data Model:

Inheritance, object identity, persistent programming languages, persistence of objects, comparing ODDBMS and ORDBMS.

TEXT BOOKS:

1. Principles of Distributed Database Systems, 2/e, OZSU, Valduriez, Sridhar, PEA, 2001
2. Distributed Databases, Stefan Seri, Pelagatti Willipse, TMH

REFERENCE BOOKS:

3. Database System Concepts, 5/e, Korth, Silberschatz, Sudershan, TMH
4. Database Management Systems, 3/e, Raghuramakrishnan, Johhanes Gehrke, TMH
5. Data Base Principles, Programming, and Performance, 2/e, P O' Neil, E O'Neil, Elsevier

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MCA III year I Sem (V semester)

MCA09.5.5.3 INFORMATION SECURITY
(Elective IV)

UNIT I :

Introduction:

Security Attacks (Interruption, Interception, Modification and Fabrication), Security Services (Confidentiality, Authentication, Integrity, Non-repudiation, access Control and Availability) and Mechanisms, A model for Internetwork security, Internet Standards and RFCs, Buffer overflow & format string vulnerabilities, TCP session hijacking, ARP attacks, route table modification, UDP hijacking, and man-in-the-middle attacks.

UNIT II :

Conventional Encryption:

Conventional Encryption Principles, Conventional encryption algorithms, cipher block modes of operation, location of encryption devices, key distribution Approaches of Message Authentication, Secure Hash Functions and HMAC,

UNIT III :

Public key:

Public key cryptography principles, public key cryptography algorithms, digital signatures, digital Certificates, Certificate Authority and key management Kerberos, X.509 Directory Authentication Service

UNIT IV :

Email Privacy:

Pretty Good Privacy (PGP) and S/MIME.

UNIT V :

IP Security:

IP Security Overview, IP Security Architecture, Authentication Header, Encapsulating Security Payload, Combining Security Associations and Key Management

UNIT VI :

Web Security:

Web Security Requirements, Secure Socket Layer (SSL) and Transport Layer Security (TLS), Secure Electronic Transaction (SET)

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MCA III year I Sem (V semester)

UNIT VII :

SNMP:

Basic concepts of SNMP, SNMPv1 Community facility and SNMPv3, Intruders, Viruses and related threats

UNIT VIII :

Fire walls:

Firewall Design principles, Trusted Systems, Intrusion Detection Systems

TEXT BOOKS:

1. Network Security Essentials: Applications and Standards, William Stallings, PEA.
2. Hack Proofing your Network, Russell, Kaminsky, Forest Puppy, Wiley Dreamtech

REFERENCE BOOKS:

1. Network Security & Cryptography, Bernard Menezes, Cengage,2010
2. Fundamentals of Network Security, Eric Maiwald, Dream Tech
3. Network Security: Private Communication in a Public World, Kaufman, Perlman, PEA/PHI.
4. Principles of Information Security, Whitman, Thomson.
5. Cryptography and Network Security, 3/e, Stallings, PHI/PEA
6. Network Security: The complete reference, Robert Bragg, Mark Rhodes, TMH
7. Introduction to Cryptography, Buchmann, Springer

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