

B. S. ABDUR RAHMAN UNIVERSITY, CHENNAI – 48.**MASTER OF COMPUTER APPLICATIONS (MCA)
(Six Semesters / Full Time)****CURRICULAM**

Sl. No.	Code	Subject	L	T	P	C	TC
SEMESTER I							
Theory							
1.	MA617	Mathematical Foundations for Computer Applications	3	1	0		4
2.	CA601	Problem Solving and Programming in C	3	0	0		3
3.	CA602	Computer Architecture	3	0	0		3
4.	CA603	Database Management Systems	3	0	0		3
5.	CA604	Software Engineering	3	0	0		3
6.	CA605	Computer Networks	3	0	0		3
Practical							
1.	CA606	C Programming Lab	0	0	6		2
2.	CA607	DBMS Lab	0	0	6		2 23
SEMESTER II							
Theory							
1.	MS681	Accounting and Financial Management	3	1	0		4
2.	MA618	Resource Management Techniques	3	1	0		4
3.	CA608	Data Structures	3	0	0		3
4.	CA609	Operating Systems	3	0	0		3
5.	CA610	Design and Analysis of Algorithms	3	0	0		3
6.	CA611	Object Oriented Programming using C++	3	0	0		3
Practical							
1.	CA612	Object Oriented Programming Lab	0	0	6		2
2.	CA613	Algorithms and Data Structures Lab	0	0	6		2 24
SEMESTER III							
Theory							
1.	CA701	Internet and Java Programming	3	0	0		3
2.	CA702	Computer Graphics and Multimedia Systems	3	0	0		3
3.	CA703	Microprocessors and its Applications	3	0	0		3
4.	CA704	Distributed Computing	3	0	0		3
5.		Elective I	3	0	0		3
6.		Elective II	3	0	0		3

Practical

1.	CA705	Java Programming and Graphics & Multimedia Lab	0	0	6	2
2.	CA706	Microprocessor Lab	0	0	6	2 22

Semester IV**Theory**

1.	CA707	Object Oriented Analysis and Design	3	0	0	3
2.	CA708	Web Graphics	3	0	0	3
3.	CA709	Unix and Network Programming	3	0	0	3
4.	CA710	XML and Web Services	3	0	0	3
5.		Elective III	3	0	0	3
6.		Elective IV	3	0	0	3

Practical

1.	CA711	Unix and Network Programming Lab	0	0	6	2
2.	CA712	XML and Web Services Lab	0	0	6	2 22

Semester V**Theory**

1.	CA801	Principles of Compiler Design	3	0	0	3
2.	CA802	Human Resource Management Systems	3	0	0	3
3.	CA803	Middleware Technologies	3	0	0	3
4.		Elective V	3	0	0	3
5.		Elective VI	3	0	0	3

Practical

1.	CA804	Middleware Lab	0	0	6	2
2.	CA805	Mini Project	0	0	6	6 23

Semester VI**Practical**

1.	CA806	Project	0	0	36	18 18
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Total Credits : 132

LIST OF ELECTIVES

CAY001	Management Information System	3	0	0	3
CAY002	E-Commerce	3	0	0	3
CAY003	Advanced Databases	3	0	0	3
CAY004	Digital Image Processing	3	0	0	3
CAY005	TCP/IP Protocol Suite	3	0	0	3
CAY006	Visual Programming	3	0	0	3
CAY007	Mobile Computing	3	0	0	3
CAY008	Software Quality Management	3	0	0	3
CAY009	Data Mining and Data Warehousing	3	0	0	3
CAY010	Component Based Technology	3	0	0	3
CAY011	Supply Chain Management	3	0	0	3
CAY012	Business Processes	3	0	0	3
CAY013	Software Project Management	3	0	0	3
CAY014	Enterprise Resource Planning	3	0	0	3
CAY015	Software Agents	3	0	0	3
CAY016	Unix Internals	3	0	0	3
CAY017	Grid Computing	3	0	0	3
CAY018	Network Security	3	0	0	3
CAY019	Embedded Systems	3	0	0	3
CAY020	Software Quality Assurance	3	0	0	3
CAY021	Adhoc Networks	3	0	0	3
CAY022	Special Elective	3	0	0	3

MASTER OF COMPUTER APPLICATIONS (MCA) (Six Semesters / Full Time) SYLLABUS

MA617 MATHEMATICAL FOUNDATIONS FOR COMPUTER APPLICATIONS L T P C

3 1 0 4

1. MATRIX ALGEBRA

12

Matrices, Rank of Matrix, Solving System of Equations-Eigen Values and Eigen Vectors-Inverse of a Matrix - Cayley Hamilton Theorem

2. BASIC SET THEORY

12

Basic Definitions - Venn Diagrams and set operations - Laws of set theory - Principle of inclusion and exclusion - partitions- Permutation and Combination - Relations- Properties of relations - Matrices of relations - Closure operations on relations - Functions - injective, surjective and bijective functions.

3. MATHEMATICAL LOGIC

12

Propositions and logical operators - Truth table - Propositions generated by a set, Equivalence and implication - Basic laws- Some more connectives - Functionally complete set of connectives- Normal forms - Proofs in Propositional calculus - Predicate calculus.

4. FORMAL LANGUAGES

12

Languages and Grammars-Phrase Structure Grammar-Classification of Grammars-Pumping Lemma For Regular Languages-Context Free Languages.

5. FINITE STATE AUTOMATA

12

Finite State Automata-Deterministic Finite State Automata(DFA), Non Deterministic Finite State Automata (NFA)-Equivalence of DFA and NFA-Equivalence of NFA and Regular Languages.

L : 45, T : 15

Total : 60

TEXT BOOK :

1. Kenneth H.Rosen, " Discrete Mathematics and Its Applications", Tata McGraw Hill, Fourth Edition, 2002 (Unit 1,2 & 3).

REFERENCES :

1. Hopcroft and Ullman, "Introduction to Automata Theory, Languages and Computation", Narosa Publishing House, Delhi, 2002. (Unit 4,5)
2. A.Tamilarasi & A.M.Natarajan, "Discrete Mathematics and its Application", Khanna publishers, 2nd Edition 2005.
3. M.K.Venkataraman "Engineering Mathematics", Volume II, National Publishing Company, 2nd Edition,1989.

CA601

ROBLEM SOLVING AND PROGRAMMING IN C

L T P C
3 0 0 3**1. INTRODUCTION TO COMPUTER PROBLEM SOLVING 9**

Introduction – The Problem Solving aspect – Top down Design – Implementation of Algorithms – Program Verification – Efficiency of Algorithms – Analysis of Algorithms

2. FUNDAMENTAL ALGORITHMS 9

Introduction – Exchanging the values – Counting – Factorial Computation – SINE computation – Base Conversion – Factoring Methods – Array Techniques.

3. INTRODUCTION TO C LANGUAGE 9

Overview of C – Constants, Variables and Data Types – Operators and Expressions – Managing Input/Output Operations – Formatted I/O – Decision Making - Branching -- IF, Nested IF – Switch – goto - Looping- While, do, for statements.

4. ARRAYS, FUNCTIONS, STRUCTURES AND UNIONS 9

Arrays – dynamic and multi-dimensional arrays - Character arrays and Strings – String handling Functions - User defined Functions – Categories of Functions – Recursion - Structures and Unions – Array of Structures – Structures and Functions

5. POINTERS AND FILE MANAGEMENT 9

Pointers – Declaration, Accessing a variable, character strings, pointers to functions and structures - File Management in C – Dynamic Memory allocation – Linked Lists – Preprocessors.

Total: 45**TEXT BOOKS :**

1. R.G.Dromey “ How to Solve it by Computer ”, PHI , 1998
2. E.Balagurusamy “ Programming in ANSI C ” , Tata McGraw Hill, 2004

REFERENCES :

1. Deitel and Deitel “ C How to Program ”, Addisson Wesley , 2001
2. Brian W.Kernighan & Dennis Ritchie “C Programming Language”, PHI, 1990
3. Byron.S.Gottfried “Schaum’s Outline of Programming with C ”, 2nd Edition,1996

CA602

COMPUTER ARCHITECTURE

L T P C
3 0 0 3**1. INTRODUCTION TO DIGITAL DESIGN****9**

Data Representation – Data Types – Complements – Arithmetic Operations – Representations – Fixed –Point, Floating – Point , Decimal Fixed – Point – Binary Codes- Logic Gates, Boolean Algebra, Map Simplification – Combinational Circuits: Half-Adder, Full Adder- Flip Flops - Sequential Circuits

2. DIGITAL COMPONENTS REGISTER TRANSFER & MICRO OPERATIONS**9**

ICs – Decoders – Multiplexers – Registers – Shift Registers – Binary Counters – Memory Unit – Register Transfer Language – Register Transfer – Bus And Memory Transfers – Arithmetic , Logic And Shift Micro Operations , Arithmetic Logic Shift Unit.

3. COMPUTER ARCHITECTURE AND PROGRAMMING**9**

Instruction Codes – Computer Registers – Computer Instructions – Timing And Control – Instruction Cycle – Memory Reference Instructions – I/O And Interrupt – Machine Language – Assembly Language – Assembler - Program Loops – Programming Arithmetic And Logic Operations – Subroutines – I/O Programming.

4. INPUT – OUTPUT ARCHITECTURE**9**

Peripheral Devices – Input-Output Interface – Asynchronous Data Transfer – Modes Of Transfer – Priority Interrupt – DMA – IOP – Serial Communication.

5. MEMORY ARCHITECTURE AND CPU**9**

Memory Hierarchy – Main Memory – Auxiliary Memory – Associative Memory – Cache Memory – Virtual Memory – Memory Management Hardware – CPU: General Register Organization – Control Word – Stack Organization – Instruction Format – Addressing Modes – Data Transfer And Manipulation – Program Control.

Total : 45

TEXTBOOK :

1. M.Morris Mano,"Computer System Architecture",Prentice Hall of India, 2001.

REFERNCES :

1. John .p.Hayes,"Computer Architecture and Organization", Tata McGraw Hill, 1996.
2. V.C.Hamatcher,et al "Computer Organization", Tata Mcgraw Hill,1996

CA603

DATABASE MANAGEMENT SYSTEMS

L T P C
3 0 0 3

1. INTRODUCTION**9**

Database Systems vs. File Systems-View of Data- Data Models-Database Languages-Transaction Management-Database Systems Structure-History of Database Systems-Database Systems Applications-Entity Relationship Model

2. RELATIONAL DATABASES**9**

SQL-Basic Structure-Set Operations-Complex Queries-Joined Queries-DDL-Embedded SQL-Dynamic SQL-Other SQL Functions-Query by Example-Integrity and Security of searching-Relational Database Design

3. DATA STORAGE AND INDEXING**9**

Storage & File Structure-Disks-RAID-File Organization-Indexing & Hashing-B+ TREE-B Tree-Static Hashing-Dynamic Hashing-Multiple Key Access

4. QUERY EVALUATION & OPTIMIZATION**9**

Query Processing-Selection Operation-Sorting-Join Operation-Evaluation of Expressions-Query Optimization

5. TRANSACTION MANAGEMENT**9**

Transaction Concept-Static Implementation-Concurrency Control-Protocols-Deadlock Handling-Recovery Systems-Recovery with Concurrent Transactions-Shadow Paging-Buffer Management-Case Studies-Oracle-Microsoft SQL Server

Total: 45**TEXT BOOK:**

1. Abraham Silberschatz, Henry F.Korth and S.Sudharssan, "Database System Concepts", 4th Edition, Tata McGraw Hill, 2002

REFERENCE :

1. Raghu Ramakrishnan & Johannesgerhrke, "Data Base Management Systems", Mc Graw Hill International Edition, 2000

CA604

SOFTWARE ENGINEERING

L T P C
3 0 0 3**1. INTRODUCTION****9**

A Generic View of Process – Process Models-The Waterfall Model-Incremental Model-Evolutionary Model-Specialized Model-The Unified Process–Agile Process – Agile Models – Software Cost Estimation – Planning – Risk Analysis – Software Project Scheduling.

2. REQUIREMENT ANALYSIS**9**

System Engineering Hierarchy – System Modeling – Requirements Engineering: Tasks- Initiating The Process-Eliciting Requirements-Developing Use Cases-Negotiating Requirements-Validating Requirements – Building the Analysis Models: Concepts

3. SOFTWARE DESIGN**9**

Design Concepts – Design Models – Pattern Based Design – Architectural Design – Component Level Design – Component – Class Based And Conventional Components Design – User Interface – Analysis And Design

4. SOFTWARE TESTING**9**

Software Testing – Strategies: Conventional - Object Oriented – Validation Testing – Criteria – Alpha – Beta Testing- System Testing – Recovery – Security – Stress – Performance - Testing Tactics – Testing Fundamentals-Black Box – White Box – Basis Path-Control Structure

5. SCM AND QUALITY ASSURANCE**9**

Software Configuration And Management-Features-SCM Process-Software Quality Concepts – Quality Assurance – Software Review–Technical Reviews – Formal Approach To Software Quality Assurance – Reliability – Quality Standards – Software Quality Assurance Plan

Total: 45**TEXT BOOK :**

1. Roger Pressman.S., “Software Engineering: A Practitioner's Approach”, 6th Edition, Mcgraw Hill, 2005.

REFERENCES :

1. P. Fleeger, “Software Engineering”, Prentice Hall, 1999.
2. Carlo Ghezzi, Mehdi Jazayari, Dino Mandrioli, “Fundamentals Of Software Engineering”, Prentice Hall Of India 1991.
3. I. Sommerville, “Software Engineering” , 5th Edition: Addison Wesley, 1996.

CA605

COMPUTER NETWORKS

L T P C
3 0 0 3

1. INTRODUCTION**9**

Building a network – Requirements – Network Architecture – OSI – Internet – Direct Link Networks – Hardware building blocks – Framing – Error detection – Reliable transmission.

2. NETWORK FUNDAMENTALS**9**

LAN Technology – LAN Architecture – BUS/Tree – Ring – Star – Ethernet – Token Rings – Wireless.

3. NETWORK LAYER**9**

Packet Switching – Switching and Forwarding – Bridges and LAN switches – Internetworking – Simple Internetworking – Routing.

4. TRANSPORT LAYER**9**

Reliable Byte Stream (TCP) – Simple Demultiplexer (UDP) – TCP Congestion Control – Congestion Avoidance Mechanisms.

5. PRESENTATION LAYER and APPLICATIONS**9**

Presentation formatting – Data compression – Cryptographic Algorithms: RSA - DES — Applications – Domain Name Service – Email - SMTP – MIME – HTTP – SNMP.

Total: 45**TEXT BOOK :**

1. Larry L. Peterson & Bruce S. Davie, "Computer Networks - A systems Approach", 2nd Edition, Harcourt Asia/Morgan Kaufmann, 2000.

REFERENCES :

1. James F. Kurose and Keith W. Ross, "Computer Networking - A Top Down Approach featuring the Internet", 1st Edition, Addison Wesley Publishing Company, 2001.
2. William Stallings, "Data and Computer Communications", 5th Edition, PHI, 1997.
3. Andrew S. Tanenbaum, "Computer Networks", Tata Mcgraw Hill, 3rd Edition, 2001

1. Display the following:
 - (i) Floyd's triangle
 - (ii) Pascal Triangle

2. Generate the following series of numbers:
Armstrong numbers between 1 to 100
Prime numbers between 1 to 50
Fibonacci series up to N numbers

3. Manipulate the strings with following operations.
 - (i) Concatenating two strings
 - (ii) Reversing the string
 - (iii) Finding the substring
 - (iv) Replacing a string
 - (v) Finding length of the string

4. Find the summation of the following series:
 - (i) Sine
 - (ii) Cosine
 - (iii) Exponential

5. Create the sales report for M sales person and N products using two dimensional array.

6. Simulate following Banking operations using functions.
 - (i) Deposit
 - (ii) Withdrawal
 - (iii) Balance Enquiry

7. Implement using recursion
 - I, Find the solution of Towers of Hanoi problem using recursion.
 - II, Fibonacci number generation.
 - III, Factorial

8. Generate Student mark sheets using structures.

9. Create a collection of books using arrays of structures and do the following:
 - (i) Search a book with title and author name
 - (ii) Sorts the books on title.

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).

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

SEMESTER – II

MS681	ACCOUNTING AND FINANCIAL MANAGEMENT	L T P C
		3 1 0 4

1. FINANCIAL ACCOUNTING **12**

Meaning and Scope of Accounting-Principles-Concepts-Conventions-Accounting Standards-Final Accounts-Trial Balance-Trading Account-Profit and Loss Account-Balance Sheet-Accounting Ratio Analysis-Funds Flow Analysis-Cash Flow Analysis

2. ACCOUNTING **12**

Meaning-Objectives-Elements of Cost-Cost Sheet-Marginal Costing and Cost Volume Profit Analysis-Break Even Analysis-Applications-Limitations-Standard Costing and Variance Analysis-Material-Labor-Overhead-Sales-Profit Variances

3. BUDGETS AND BUDGETING CONTROL **12**

Budgets and Budgetary Control-Meaning-Types-Sales Budget-Production Budget-Cost of Production Budget-Flexible Budgeting-Cash Budget-Master Budget-Zero Base Budgeting-Computerized Accounting

4. INVESTMENT DECISION AND COST OF CAPITAL **12**

Objectives and Functions of Financial Management-Risk-Return Relationship-Time Value of Money Concepts-Capital Budgeting-Methods of Appraisal-Cost of Capital Factors Affecting Cost of Capital-Computation for Each Source of Finance and Weighted Average Cost of Capital

5. FINANCING DECISION AND WORKING CAPITAL MANAGEMENT **12**

Capital Structure-Factors Affecting Capital Structure-Dividend Policy-Types of Dividend Policy-Concepts of Working Capital-Working Capital Policies-Factors affecting Working Capital-Estimation of Working Capital Requirements

L : 45, T : 15
Total: 60

TEXTBOOKS :

1. S.N.Maheswari, "Financial and Management Accounting", Sultan Chand & Sons, 2003
2. I.M.Pandey, "Financial Management", Vikas Publications, 4th Reprint, 2002

REFERENCES :

1. S.P.Iyengar, "Cost and Management Accounting", Sultan Chand & Co,
2. I.M.Pandey, "Elements of Management Accounting" Vikas Publishing House, 19993

MA618

RESOURCE MANAGEMENT TECHNIQUES

L	T	P	C
3	1	0	4

1. LINEAR PROGRAMMING MODELS**12**

Mathematical Formulation - Graphical Solution of linear programming models – Simplex method – Artificial variable Techniques- Variants of Simplex method

2. TRANSPORTATION AND ASSIGNMENT MODELS**12**

Mathematical formulation of transportation problem- Methods for finding initial basic feasible solution – optimum solution - degeneracy – Mathematical formulation of assignment models – Hungarian Algorithm – Variants of the Assignment problem

3. INTEGER PROGRAMMING MODELS**12**

Formulation – Gomory's IPP method – Gomory's mixed integer method – Branch and bound technique.

4. SCHEDULING BY PERT AND CPM**12**

Network Construction – Critical Path Method – Project Evaluation and Review Technique – Resource Analysis in Network Scheduling

5. QUEUEING MODELS**12**

Characteristics of Queuing Models – Poisson Queues - $(M / M / 1) : (FIFO / \infty / \infty)$, $(M / M / 1) : (FIFO / N / \infty)$, $(M / M / C) : (FIFO / \infty / \infty)$, $(M / M / C) : (FIFO / N / \infty)$ models.

L : 45, T : 15
Total : 60

TEXT BOOK :

1. Taha H.A., "Operations Research : An Introduction " 7th Edition, Pearson Education, 2004.

REFERENCES :

1. A.M.Natarajan, P.Balasubramani, A.Tamilarasi, "Operations Research", Pearson Education, Asia, 2005.
2. Prem Kumar Gupta, D.S. Hira, "Operations Research", S.Chand & Company Ltd, New Delhi, 3rd Edition , 2003.

CA608

DATA STRUCTURES

3 0 0 3

L T P C

1. DATA STRUCTURES**9**

Introduction – Arrays – Structures – Stack: Definition and examples, Representing Stacks - Queues and lists: Queue and its Representation, lists – Applications of Stack, Queue and Linked Lists.

2. TREES**9**

Binary Trees – Operations on binary trees - Binary Tree Representations – node representation, internal and external nodes, implicit array representation – Binary tree Traversals - Huffman Algorithm – Representing Lists as Binary Trees

3. SORTING AND SEARCHING**9**

General Background – Exchange sorts – Selection and Tree Sorting – Insertion Sorts – Merge and Radix Sorts – Basic Search Techniques – Tree Searching – General Search Trees – Hashing.

4. GRAPHS AND THEIR APPLICATIONS**9**

Graphs – An application of graphs – Representation – transitive closure - Warshall's algorithm – Shortest path algorithm - a flow Problem – Dijkstra's algorithm – An application of scheduling - Linked representation of Graphs – Graph Traversals

5. STORAGE MANAGEMENT**9**

General Lists: Operations, linked list representation, using lists, Freeing list nodes - Automatic list Management: Reference count method, Garbage Collection, Algorithms, Collection and compaction

Total: 45**TEXT BOOK :**

1..Tanaenbaum A.S.,Langram Y. Augestein M.J “ Data Structures using C” Pearson Education , 2004

REFERENCES:

1. Robert Kruse & ClovisL.Tondo “ Data Structures and Program Design in C”,Prentice Hall , 2nd edition.,1991.
2. Weiss “Data Structures and Algorithm Analysis in C ” ,Addison Wesley , Second Edition, 1997.

CA609

OPERATING SYSTEMS**L T P C**
3 0 0 3**1. INTRODUCTION****7**

Definition of OS-Mainframe System-Desktop Systems-Multi processor System-Distributed-Clustered-Real time Systems-Handheld Systems-Operating System Structure-System Components-Services-System Calls-System Programs-System Design and Implementation

2. PROCESS MANAGEMENT**8**

Concepts-Process Scheduling-Operations on Processes-Co-operating Processes-Inter Process Communication-CPU Scheduling-Scheduling Concepts-Criteria-Scheduling Algorithms-Multiprocessor Scheduling-Real time Scheduling

3. PROCESS SYNCHRONIZATION**10**

Critical Section-Synchronization Hardware-Semaphores-Problems of Synchronization-Critical Regions-Monitors-Deadlocks-Characterization-Handling Deadlocks-Deadlock Prevention-Avoidance-Detection-Deadlock Recovery

4. MEMORY MANAGEMENT**10**

Storage Hierarchy-Storage Management Strategies-Contiguous-Non Contiguous Storage Allocation-Single User-Fixed Partition-Variable Partition-Swapping-Virtual Memory-Basic Concepts-Multilevel Organization-Block Mapping-Paging-Segmentation-Page Replacement Methods-Locality-Working Sets

5. I/O AND FILE SYSTEMS**10**

Disk Scheduling-File Concepts-File System Structure-Access Methods-Directory Structure-Protection-Directory Implementation-Allocation Methods-Free Space Management-Case Study: Linux System

Total: 45**TEXT BOOK :**

1. Silberschatz and Galvin, Operating System Concepts, 6th Edition, John Wiley & Sons, Inc., 2004

REFERENCES :

1. Milankovic M., Operating System Concepts and Design, 2nd Edition, McGraw Hill, 1992
2. P.C.Bhatt, An Introduction to Operating Systems-Concepts and Practice, Prentice Hall Of India, 2004
3. H.M.Deitel, An Introduction to Operating Systems, 2nd Edition, Pearson Education, 2002

CA610

DESIGN AND ANALYSIS OF ALGORITHMS

L T P C
3 0 0 3**1. INTRODUCTION****8**

Fundamentals of algorithmic problem solving – Important problem types – Fundamentals of the analysis of algorithm efficiency – analysis frame work – Asymptotic notations – Mathematical analysis for recursive and non-recursive algorithms.

2. DIVIDE AND CONQUER METHOD AND GREEDY METHOD**7**

Divide and conquer methodology – Merge sort – Quick sort – Binary search – Binary tree traversal – Multiplication of large integers – Strassen's matrix multiplication – Greedy method – Prim's algorithm – Kruskal's algorithm – Dijkstra's algorithm.

3. DYNAMIC PROGRAMMING**10**

Computing a binomial coefficient – Warshall's and Floyd' algorithm – Optimal binary search tree – Knapsack problem – Memory functions.

4. BACKTRACKING AND BRANCH AND BOUND**10**

Backtracking – N-Queens problem – Hamiltonian circuit problem – Subset sum problem – Branch and bound – Assignment problem – Knapsack problem – Traveling salesman problem.

5. NP-HARD AND NP-COMPLETE PROBLEMS**10**

P & NP problems – NP-complete problems – Approximation algorithms for NP-hard problems – Traveling salesman problem – Knapsack problem.

Total: 45**TEXT BOOK:**

1. Anany Levitin "Introduction to the Design and Analysis of Algorithms" Pearson Education 2003.

REFERENCE:

1. Thomas H.Cormen, Charles E.Leiserson, Ronald L.Rivest, "Introduction to algorithms" Prentice Hall 1990.

CA611	OBJECT ORIENTED PROGRAMMING USING C++	L T P C
		3 0 0 3

1. OOP PARADIGAM	8
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Programming Paradigms-Procedural Programming-Modularity-Exception Handling-Data Abstraction-User Defined Types-Concrete Types-Abstract Types-Virtual Functions-Object Oriented Programming-Generic Programming-Containers-Algorithms

2. INTRODUCTION TO C++	11
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Overview of C++-Classes and Objects-Friend Functions-Friend Classes-Inline Function-Static Members-Arrays-Pointers-References-Dynamic Allocation

3. OVERLOADING	7
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Function Overloading-Overloading Constructor Functions-Copy Constructors-Default Argument-Operator Overloading-Member Operator Overloading-Overloading new and delete

4. ADDITIONAL FEATURES	10
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Inheritance-Base Class-Access Control-Virtual Functions-Pure Virtual Functions-Templates-Generic Functions-Applying Generic Functions-Generic Classes-Exception Handling-C++ I/O Streams-File I/O-STL-Overview-Container Classes-Lists-Maps-Algorithms Using Functions and Objects-String Class

5. DESIGN CONCEPTS	9
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Role of Classes-Kinds of Classes-Concrete Types-Abstract Types-Nodes-Changing Interfaces-Object I/O-Actions-Interface Classes-Handles-Use Counts Applications frame works

Total: 45

TEXT BOOKS :

1. Herbert Schildt,"C++ The Complete Reference", Tata McGrawHill Edition, 2003 (unit 2, 3, 4)
2. Bjanne Stroustrup,"The C++ Programming Language",3rd Edition, Addison Wesley, 2000 (Unit 1 & 5)

REFERENCES

1. Robert Lafore."Waite Groups OOP in Turbo C++",Galgotia Publications, 2001
2. Stanley, B.Lippman,Jove Lagrie,"C++Primer",3rd Edition, Addison Wesley,1998

1. Programs using Constructor and Destructor.
2. Creation of classes and use of different types of functions.
3. Count the number of objects created for a class using static member function.
4. Write programs using function overloading and operator overloading.
5. Programs using inheritance.
6. Program using friend functions.
7. Program using virtual function.
8. Write a program using exception handling mechanism.
9. Programs using files.
10. Programs using function templates.

ALGORITHMS:

1. Apply the divide and Conquer technique to arrange a set of numbers using merge sort method.
2. Perform Strassen's matrix multiplication using divide and conquer method.
3. Solve the knapsack problem using greedy method.
4. Construct a minimum spanning tree using greedy method.
5. Construct optimal binary search trees using dynamic programming method of problem solving.
6. Find the solution for traveling salesperson problem using dynamic programming approach.
7. Perform graph traversals.
8. Implement the 8 Queens Problem using backtracking.
9. Implement knapsack problem using backtracking.
10. Find the solution of traveling salesperson problem using branch and bound technique.

DATA STRUCTURES:

1. Represent the given sparse matrix using one dimensional array and linked list.
2. Create a Stack and do the following operations using arrays and linked lists
(i)Push (ii) Pop (iii) Peep
3. Create a Queue and do the following operations using arrays and linked lists
(i)Add (ii) Remove
4. Implement the operations on singly linked list, doubly linked list and circular linked list.
5. Create a binary search tree and do the following traversals
(i)In-order (ii) Pre order (iii) Post order
6. Implement the following operations on a binary search tree.
(i) Insert a node (ii) Delete a node
7. Sort the given list of numbers using heap and quick sort.
8. Perform the following operations in a given graph
(i) Depth first search (ii) Breadth first search
9. Find the shortest path in a given graph using Dijkstra algorithm

SEMESTER – III

CA701	INTERNET AND JAVA PROGRAMMING	L T P C
		3 0 0 3

1. BASIC INTERNET CONCEPTS 8

Connecting to the Internet – Domain Name System - Exchanging E-mail – Sending and Receiving Files - Fighting Spam, Sorting Mail and avoiding e-mail viruses – Chatting and Conferencing on the Internet – Online Chatting - Messaging – Usenet Newsgroup – Internet Relay chat (IRC) – Instant Messaging - Voice and Video Conferencing.

2. WORLD WIDE WEB 8

Overview – Web Security, Privacy, and site-blocking – Audio and Video on the web – Creating and Maintaining the Web – Web site creation concepts – Web Page Editors – Optimizing Web Graphics – Web Audio Files – Forms, Interactivity, and Database-Driven Web sites – File Transfer and downloading – FTP – Peer to Peer – Downloading and Installing software.

3. JAVA FUNDAMENTALS 8

Java features – Java Platform – Java Fundamentals – Expressions, Operators, and Control Structures – Classes, Packages and Interfaces – Exception Handling.

4. PACKAGES 12

AWT package – Layouts – Containers – Event Package – Event Model – Painting – Garbage Collection - Multithreading – Language Packages.

5. ADVANCED JAVA PROGRAMMING 9

Utility Packages – Input Output Packages – Inner Classes – Java Database Connectivity - Servlets - RMI – Java Beans.

Total : 45**TEXT BOOKS :**

1. Margaret Levine Young, "Internet and WWW", 2nd Edition, Tata McGraw Hill, 2002. (Unit 1 & 2)
2. Herbert Schildt, The Complete Reference – Java 2 , 4th Edition, Tata McGraw Hill, 2001. (Unit 3, 4 & 5)

REFERENCES :

1. Keyur shah, "Gateway to Java Programmer Sun Certification", Tata Mc Graw Hill 2002.
2. Deitel & Deitel, Java How to Program, Prentice Hall 1999.

CA702 COMPUTER GRAPHICS AND MULTIMEDIA SYSTEMS**L T P C**
3 0 0 3**1. INTRODUCTION****9**

Overview of Graphics System - Bresenham technique – Line Drawing and Circle Drawing Algorithms
- DDA - Line Clipping - Text Clipping.

2. 2D TRANSFORMATIONS**9**

Two dimensional transformations – Scaling and Rotations - Interactive Input methods - Polygons -
Splines – Bezier Curves - Window view port mapping transformation.

3. 3D TRANSFORMATIONS**9**

3D Concepts - Projections – Parallel Projection - Perspective Projection – Visible Surface Detection
Methods - Visualization and polygon rendering – Color models – XYZ-RGB-YIQ-CMY-HSV Models -
animation – Key Frame systems - General animation functions - morphing.

4. OVERVIEW OF MULTIMEDIA**9**

Multimedia hardware & software - Components of multimedia – Text, Image – Graphics – Audio –
Video – Animation – Authoring.

5. MULTIMEDIA SYSTEMS AND APPLICATIONS**9**

Multimedia communication systems – Data base systems – Synchronization Issues – Presentation
requirements – Applications – Video conferencing – Virtual reality – Interactive video – video on
demand

Total : 45**TEXT BOOKS :**

- 1.Hearn D and Baker M.P, “Computer graphics – C Version”, 2nd Edition, Pearson Education, 2004(unit 1, 2 &3)
- 2.Ralf Steinmetz, Klara Steinmetz, “Multimedia Computing, Communications and Applications”, Pearson education, 2004(unit 4 & 5)

REFERENCES :

1. Siamon J. Gibbs and Dionysios C. Tschritzis, “Multimedia programming”, Addison Wesley, 1995.
2. John Villamil, Casanova and Leony Fernanadez, Eliar, “Multimedia Graphics”, PHI, 1998.

CA703	MICROPROCESSORS AND APPLICATIONS	L T P C
		3 0 0 3

1. INTRODUCTION TO 8085 MICRO PROCESSOR **9**

Evolution of the Microprocessor - INTEL 8085- Introduction- Register Architecture - Memory Addressing - 8085 Addressing Modes -8085 Instruction Set -Timing Methods 8085 Pins and Signals -8085 Instruction Timing and Execution –Interrupts-DMA- Serial port-8085 Based System Design

2. INTRODUCTION TO 8086 MICROPROCESSOR **9**

Introduction -8086 Architecture -8086 Addressing Modes -8086 Instruction Set –Data Movement Instructions Arithmetic and Logic Instructions - Program Control Instructions

3. 8086 MICROPROCESSOR INTERFACING **9**

System Design Using 8086- Basic System concepts-Bus Cycle - Address and data bus concepts-interfacing with memories-RAM - EPROM - DRAMs - Programmed I/O : 8086-Based Microcomputer.

4. 80386 AND PENTIUM MICRO PROCESSORS **9**

Introduction to Intel 80386- Basic Programming model - Memory Organisation - I/O Space - 80386 pins and signals- Bus transfer techniques - 80386 Modes – Introduction to Intel Pentium Microprocessor: Block diagram and Registers.

5. PERIPHERAL INTERFACING **9**

Keyboard Display Interface-Hex key and display interface to 8085, 8279 Keyboard display controller chip- Printer Interface: LR 7040 Printer interface using 8295 printer controller-CRT controller interface: CRT Fundamentals, 8275 CRT Controller- Coprocessors.

Total : 45_

TEXT BOOK :

1. Mohamed Rafiquzzaman "Introduction to Microprocessors and Microcomputer- Based System Design" 2nd edition, CRC Press,1995.

REFERENCES :

1. Walter A.Triebel, Avtar Singh, "the 8088and8086 Microprocessors Programming, Interfacing, Software, Hardware and Applications", Prentice Hall of India Pvt. Ltd., 2002.
2. Barry B.Brey,"The INTEL microprocessors 8086/8088, 80186, 80286, 80386 and 80486 Architecture, Programming and Interfacing," Prentice Hall of India, 2001.

CA704

DISTRIBUTED COMPUTING**L T P C**
3 0 0 3**1. INTRODUCTION****9**

Characterization of Distributed Systems - Examples - Resource Sharing and the Web - Challenges - System Models - Architectural and Fundamental Models - Networking and Internetworking - Types of Networks - Network Principles - Internet Protocols - Case Studies.

2. PROCESSES AND DISTRIBUTED OBJECTS**9**

Interprocess Communication - The API for the Internet Protocols - External Data Representation and Marshalling - Client-Server Communication - Group Communication - Case Study - Distributed Objects and Remote Invocation - Communication Between Distributed Objects - Remote Procedure Call - Events and Notifications - Java RMI - Case Study.

3. OPERATING SYSTEM ISSUES – I**9**

The OS Layer - Protection - Processes and Threads - Communication and Invocation – OS Architecture - Security - Overview - Cryptographic Algorithms - Digital Signatures - Cryptography Pragmatics - Case Studies - Distributed File Systems - File Service Architecture - Sun Network File System - The Andrew File System

4. OPERATING SYSTEM ISSUES – II**9**

Name Services -Domain Name System - Directory and Discovery Services - Global Name Service - X.500 Directory Service - Clocks, Events and Process States - Synchronizing Physical Clocks - Logical Time And Logical Clocks - Global States - Distributed Debugging - Distributed Mutual Exclusion – Elections – Multicast Communication Related Problems.

5. DISTRIBUTED TRANSACTION PROCESSING**9**

Transactions - Nested Transactions - Locks - Optimistic Concurrency Control - Timestamp Ordering - Comparison - Flat and Nested Distributed Transactions - Atomic Commit Protocols - Concurrency Control in Distributed Transactions - Distributed Deadlocks - Transaction Recovery - Overview of Replication And Distributed Multimedia Systems

Total: 45**TEXT BOOK:**

1. George Coulouris, Jean Dollimore and Tim Kindberg, Distributed Systems Concepts and Design, Pearson Education, 3rd Edition, 2002.

REFERENCES:

- 1.Sape Mullender, Distributed Systems, Addison Wesley, 2nd Edition, 1993.
- 2.Albert Fleishman, Distributes Systems- Software Design and Implementation, Springer-Verlag, 1994
- 3.M.L.Liu, Distributed Computing Principles and Applications, Pearson Education, 2004.
- 4.Andrew S Tanenbaum , Maarten van Steen,Distibuted Systems –Principles and Pardigms,Pearson Education, 2002
- 5Mugesh Singhal,Niranjan G Shivaratri,Advanced Concepts in Operating Systems,Tata McGraw Hill Edition, 2001.

JAVA PROGRAMMING:

1. Program to illustrate the use of overloading and overriding.
2. Program to implement the concept of Interfaces and packages.
3. Generate the program using exceptions handling mechanism..
4. Implement the file operations.
5. Program using Applets.
6. Program using JDBC.
7. Program using JNI concepts.
8. Program using Servlets.

GRAPHICS AND MULTIMEDIA:

1. Write a Java program for Line drawing using Bresenham, DDA Line Drawing Algorithms.
2. Write a Java program for Circle Drawing using Bresenham Circle Drawing Algorithms.
3. Write a Java program for Line Clipping using Cohen-Sutherland Line clipping algorithm.
4. Write a Java program for 2D and 3D Transformations like Translations and Scaling and Rotations.
5. Create Frame by Frame Animations using multimedia authoring tools.
6. Develop a presentation for a product using techniques like Guide Layer, masking and onion Skin using authoring tools.
7. Create a JPEG image which demonstrates the various features of an image editing tool.

CA706**MICROPROCESSORS LAB****L T P C**
0 0 6 2

1. Write an assembly language program to perform arithmetic operations on block of data using Hexadecimal numbers.
2. Write an assembly language program to perform arithmetic operations on block of data using BCD numbers.
3. Write an assembly language program to perform byte and string manipulation.
4. Write an assembly language program to interface Programmable Peripheral Interface.
5. Write an assembly language program to interface Programmable Timer.
6. Write an assembly language program to interface Programmable Communication Interface.
7. Write an assembly language program to interface Keyboard/Display Controller.
8. Write a program to Perform Power On Self Test.
9. Write a program for floppy disk trouble shooting.
10. Write a program for printer trouble shooting.

SEMESTER – IV

CA707	OBJECT ORIENTED ANALYSIS AND DESIGN	L T P C
		3 0 0 3

1. INTRODUCTION **9**

An overview – Object basics – Object state and properties – Behavior – Methods – Messages – Information hiding – Class hierarchy – Relationships – Associations – Aggregations- Identity – Dynamic binding – Persistence – Metaclasses – Object oriented system development life cycle.

2. METHODOLOGY AND UML **9**

Introduction – Survey – Rumbaugh, Booch, Jacobson methods – Patterns – Frameworks – Unified approach – Unified modeling language – Static and Dynamic models – UML diagrams – Class diagram – Usecase diagrams – Dynamic modeling – Model organization – Extensibility.

3. OBJECT ORIENTED ANALYSIS **9**

Identifying Usecase – Business object analysis – Usecase driven object oriented analysis – Usecase model – Documentation – Classification – Identifying object, relationships, attributes, methods – Super-sub class – A part of relationships Identifying attributes and methods – Object responsibility

4. OBJECT ORIENTED DESIGN **9**

Design process – Axioms – Colollaries – Designing classes – Class visibility – Refining attributes – Methods and protocols – Object storage and object interoperability – Databases – Object relational systems – Designing interface objects – Macro and Micro level processes – The purpose of a view layer interface

5. SOFTWARE QUALITY **9**

Quality assurance – Testing strategies – Object orientation testing – Test cases – Test Plan – Debugging principles – Usability – Satisfaction – Usability testing – Satisfaction testing

Total : 45**TEXT BOOK :**

1. Ali Bahrami, "Object Oriented System Development", McGraw Hill International Edition, 1999.

REFERENCES :

1. Craig Larman, Applying UML and Patterns, 2nd Edition, Pearson, 2002.
2. Grady Booch, James Rumbaugh, Ivar Jacobson, "The Unified Modeling Language User Guide", Addison Wesley Long man, 1999.
3. Bernd Bruegge, Allen H. Dutoit, Object Oriented Software Engineering using UML, Patterns and Java, Pearson 2004

CA708

WEB GRAPHICS**L T P C**
3 0 0 3**1. INTRODUCTION****9**

HTML coding - Basic web graphics - Web page design and site building - Image maps - Adding multimedia to the web.

2. PAINT SHOP PRO/PHOTOSHOP**9**

Introduction - Image Basics - File Formats - GIF - JPEG - Color Palette - Layers - Creating new Images - Brushes - Grids - Scaling Images - Moving and Merging Layers - Tool Palette - Screen capturing - Grey styling - Using style Palette - Animation.

3. IMAGE HANDLING**9**

Scanning Images - Adding Text to the images - Designing icons - Creating background images - Color models - Color depths - Color calibration - Creating gradients - Oil paint effect.

4. MULTIMEDIA**9**

Creating clippings - Animations with sound effects - Adding audio or Video - Windows Media Player ActiveX Control - Agent control - Embedding VRML in a web page - Real Player ActiveX control.

5. APPLICATIONS**9**

Creating web site with a particular theme using all the utilities - Graphics - Animations and Interaction.

Total: 45**TEXT BOOKS :**

1. Richard Schrand, Photoshop 6 Visual Jumpstrat, Adobe Press 2000. (Unit 1,2 & 3)
2. James L. Mohles, Flash 5.0 Graphics, Animation & Interaction, Macromedia 2000. (Unit 4 & 5)

REFERENCES :

1. Internet and World Wide Web How to program , Deitel – Prentice Hall 2003
2. Robert Reinhardt, Jon Warren Lentz ,”Flash 5 Bible”, Hungry Minds Inc, 2001.

CA709

UNIX AND NETWORK PROGRAMMING

L T P C
3 0 0 3**1. INTRODUCTION & FILE SYSTEM****9**

Overview of UNIX OS - File I/O – File Descriptors – File sharing - Files and directories – File types - File access permissions – File systems – Symbolic links - Standard I/O library – Streams and file objects – Buffering - System data files and information - Password file – Group file – Login accounting – system identification.

2. PROCESSES**9**

Environment of a UNIX process – Process termination – command line arguments - Process control – Process identifiers - Process relationships terminal logins – Signals -threads.

3. INTERPROCESS COMMUNICATION**9**

Introduction - Message passing (SVR4)- pipes – FIFO – message queues - Synchronization (SVR4) – Mutexes – condition variables – read – write locks – file locking – record locking – semaphores – Shared memory(SVR4).

4. SOCKETS**9**

Introduction – transport layer – socket introduction - TCP sockets – UDP sockets - raw sockets – Socket options - I/O multiplexing - Name and address conversions.

5. APPLICATIONS**9**

Debugging techniques - TCP echo client server - UDP echo client server - Ping - Trace route - Client server applications like file transfer and chat.

Total: 45**TEXT BOOKS :**

- 1.W.Richard Stevens, Advanced programming in the UNIX environment, Addison Wesley, 1999.(Unit 1,2 &3)
- 2.[W.Stevens](#), [BillFenner](#), [AndrewRudoff](#), "Unix Network Programming", Volume 1,**The Sockets Networking API,3rd Edition, Pearson education, Nov 2003.(unit 4 & 5)**

REFERENCE BOOK :

- 1.Meeta Gandhi,Tilak Shetty and Rajiv Shah – The 'C' Odyssey Unix –The open Boundless C ,1st Edition ,BPB Publications1992.

CA710**XML AND WEB SERVICES****L T P C
3 0 0 3****1. INTRODUCTION****9**

Role Of XML – XML and The Web – XML Language Basics – SOAP – Web Services – Revolutions Of XML – Service Oriented Architecture (SOA).

2. XML TECHNOLOGY**9**

XML – Name Spaces – Structuring With Schemas and DTD – Presentation Techniques – Transformation – XML Infrastructure.

3. SOAP**9**

Overview Of SOAP – HTTP – XML-RPC – SOAP: Protocol – Message Structure – Intermediaries – Actors – Design Patterns And Faults – SOAP With Attachments.

4. WEB SERVICES**9**

Overview – Architecture – Key Technologies - UDDI – WSDL – ebXML – SOAP And Web Services In E-Com – Overview Of .NET And J2EE.

5. XML SECURITY**9**

Security Overview – Canonicalization – XML Security Framework – XML Encryption – XML Digital Signature – XKMS Structure – Guidelines For Signing XML Documents – XML In Practice.

Total: 45**TEXT BOOK:**

1. Frank. P. Coyle, XML, Web Services And The Data Revolution, Pearson Education, 2002.

REFERENCES:

1. Ramesh Nagappan , Robert Skoczylas and Rima Patel Sriganesh, “ Developing Java Web Services”, Wiley Publishing Inc., 2004.
2. Sandeep Chatterjee, James Webber, “Developing Enterprise Web Services”, Pearson Education, 2004.
3. McGovern, et al., “Java Web Services Architecture”, Morgan Kaufmann Publishers,2005.

CA711**UNIX AND NETWORK PROGRAMMING LAB****L T P C****0 0 6 2**

1. Program 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 communication using message queues
5. Program to perform inter process communication using shared memory
6. Program to perform synchronization using semaphores
7. Program to capture packets : sniffer
8. Program using TCP sockets (Client and Server)
9. Program using UDP sockets (Client and Server)
10. Program using URL class to download webpages

1. Create an XML document to store an address book.
2. Create an XML document to store information about books and create the DTD files.
3. Create an XML schema for the book's XML document from exercise 2.
4. Create an XML document to store resumes for a job web site and create the DTD file
5. Present the book's XML document using cascading style sheets (CSS).
6. Write an XSLT program to extract book titles, authors, publications, book rating from the book's XML document and use formatting.
7. Use Microsoft DOM to navigate and extract information from the book's XML document.
8. Use Microsoft DSO to connect HTML form or VB form to the book's XML document and display the information.
9. Create a web service for temperature conversion with appropriate client program.
10. Create a web service for currency conversion (at five currencies) with appropriate client program.

SEMESTER – V

CA801	PRINCIPLES OF COMPILER DESIGN	L T P C
		3 0 0 3
1. INTRODUCTION		9
Basic concepts - Grammar - Language - Parts of a compiler – Grouping of phases - Compiler construction tools.		
2. LEXICAL ANALYZER		9
Role of a lexical analyzer – Input buffering - Specification and recognition of tokens - Finite automata - Regular expression to finite automation – Optimization of DFA-based pattern matchers-Use of a tool for generating lexical analyzer.		
3. SYNTAX ANALYZER		9
Role of a parser - Context-free grammars - Top-down parsing - Bottom-up parsing - Use of a tool to generate parsers.		
4. INTERMEDIATE CODE GENERATION		9
Intermediate languages - Declaration - Assignment statements - Boolean expressions - Flow control statements –Back patching.		
5. CODE GENERATION		9
Introduction to optimization techniques - Issues in the design of a code generator - Run-time storage management - Design of a simple code generator.		

Total:45**TEXT BOOK :**

1. A.V. Aho, Ravi Sethi, J.D. Ullman, Compilers - Principles, Techniques and Tools, Addison-Wesley, 1988.

REFERENCES:

1. Fischer Leblanc, Crafting Compiler, Benjamin Cummings, Menlo Park, 1988.
2. Kenneth C.Louden, Compiler Construction Principles and Practice, Vikas publishing House, 2003.
3. Allen I. Holub, Compiler Design in C, Prentice Hall of India, 2001.

CA802 HUMAN RESOURCE MANAGEMENT SYSTEMS L T P C
3 0 0 3

1. LEADERSHIP 9

Technical Leadership - Leader's Goal, Conviction, Vision - Transformational and Transactional Leadership - Leader's Vision - Professionalism : Importance, Elements - Managing Awareness - Performance - Manager's Role in Professionalism.

2. MANAGING TECHNICAL AND PROFESSIONAL PEOPLE 9

Goals of Engineers and Scientists - Work Assignment - Need for Influence - Professional Career and Goals - Age and Creativity - Performance - Motivation - Employee Partnership - Career Risks - Technical Competence - Professional Discipline - Manager's Role in Professional Discipline - Guidelines.

3. IDENTIFICATION AND DEVELOPMENT OF TALENTED PEOPLE 9

Talented Professionals – Importance - Characterization - Identification – Assessment and Recognizing Talent - Development - Development Needs - Counseling.

4. INNOVATION 9

The Importance of Innovation - Risk of Failure - Nature of Creativity - Imagination - Managing Innovative Teams - Needs of Creative Teams - Team Dynamics - A Software Development Example - Manager's Responsibility - Team's Personal Needs - Political versus Technical Solutions - Team Synergism.

5. TEAM ENVIRONMENT AND RECOGNITION 9

Innovative Team Environment -Award Programs - Recognition Programs - An Example Award Plan - Industry Award Plans - Award Guidelines - Incentive Plans - A Caution on Recognition Programs

Total: 45

TEXT BOOK :

1.Watts S. Humphrey, "Managing Technical People: Innovation, Teamwork, and the Software Process", Addison-Wesley, 1996.

REFERENCES :

1. Biswajeet Pattanayak, "Human Resource Management", Prentice Hall of India, 2002.
2. K. Aswathappa, Human Resource and Personnel Management text and cases, Tata Mc-Graw Hill publishing Co. Ltd., 2002.

CA803

MIDDLEWARE TECHNOLOGIES

L T P C
3 0 0 3**1. Client / Server Concepts**

(9)

Client – Server – File Server, Database server, Group server, Object server, Web server. Middleware – General middleware – Service specific middleware. Client / Server Building blocks – RPC – Messaging – Peer – to- Peer.

2. EJB Architecture

(9)

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

3. EJB Applications

(9)

EJB Session Beans – EJB entity beans – EJB clients – EJB Deployment – Building an application with EJB.

4. ASP.net

(9)

Basics of HTML - Introduction to Microsoft Visual Studio 2005 API - Overview of the .NET 2.0 Framework - Language Primer - Understanding Web Form Pages - Form Validation - Building Business Components - Building User Controls - Designing Web Sites with Master Pages - Adding Standard Navigation Elements - Securing ASP.NET 2.0 Web Sites - Building Applications.

5. VB.net and ADO.net

(9)

Overview of VB.Net - Variables, Constants, Operators and Calculations - Conditions, Switches and Loops - Arrays - Structures and Enumerators - Class, Methods, Objects and Namespaces - Method overloading and Object overloading - Delegates - Inheritance - Exception Handling - Multi-Threading - Overview of ADO.NET 2.0 - Displaying and Editing Data - Crystal Report - Building Applications.

Total No of periods: **45****TEXT BOOKS :**

1. Robert Orfali, Dan Harkey and Jeri Edwards, "The Essential Client/Server Survival Guide", Galgotia Publications Pvt. Ltd., 2002. (Unit 1)
2. Tom Valesky, "Enterprise Java Beans", Pearson Education, 2002.(Unit 2 & 3)
3. DreamTech Software Team, "ASP.Net 2.0 Black Book", DreamTech Press, 2006. (Unit 4)
4. Jeffrey R.Shapiro, "Visual Basic.Net - Complete Refrence" (Unit 5)

REFERENCE:

1. Greg Buczek, "ASP.Net Developer Guide", Tata McGraw-Hill.

CA804**MIDDLEWARE LAB****L T P C**
0 0 6 2

1. Create a distributed application to download various files from various servers using RMI
 2. Create a Java Bean to draw various graphical shapes and display it using or without using BDK
 3. Develop an Enterprise Java Bean for Banking operations
 4. Develop an Enterprise Java Bean for Library operations
 5. Create an Active-X control for File operations
 6. Develop a middleware component for retrieving Stock Market Exchange information using .NET
 7. Develop a middleware component for retrieving Weather Forecast information using .NET
 8. Develop a component for converting the currency values using VB.NET
 9. Develop a component for encryption and decryption using VB.NET
 10. Develop a component for retrieving employee information from a Database Table (Oracle or Access) using VB.NET and ADO.NET
- 1.

CA805

MINI PROJECT

L T P C
0 0 6 2

Develop Software using CASE tools for the applications like:

1. Online railway reservation system
2. Payroll processing application
3. Inventory system
4. Automating the banking process
5. Software for game
6. Library management system
7. Create a dictionary
8. Text editor
9. Telephone directory
10. Create an E-Book of your choice

Software required:

Languages: C/C++/Java/JSDK/Web browser.

Any front end tool (like VB, VC++, Developer 2000) etc

Any backend tool (Oracle, Ms-Access, SQL) etc.

Opensource software

Framework (.Net)

Any CASE tool

ELECTIVES**CAY001****MANAGEMENT INFORMATION SYSTEMS L T P C**
3 0 0 3**1. SYSTEM CONCEPTS****7**

Definition – Computer based user machine system – Integrated system – Need for a database – Utilization of models – Evolution – Subsystems – Organizational subsystems – Activities subsystems.

2.ORGANIZATIONAL STRUCTURE**9**

Basic model – Hierarchical – Specialization – Formalization – Centralization – Modifications of basic organizational structure – Project organization – Lateral relations – Matrix organization – Organizational culture and power organizational change

3. STRUCTURE OF MIS**10**

Operating elements – Physical components – Processing functions – Outputs – MIS support for decision making – Structured programmable decisions – Unstructured non-programmable decisions – MIS structure based on management activity and organizational functions – Synthesis of MIS structure

4. SYSTEM SUPPORT**10**

Data representation – Communication network – Distributed systems – Logical data concepts – Physical storage devices – File organizations – Data base organization – Transaction processing

5. DEVELOPMENT AND MANAGEMENT**9**

A contingency approach to choosing an application – Developing strategy – Lifecycle definition stage – Lifecycle development stage – Lifecycle installation and operation stage – Project management

Total: 45**TEXT BOOK :**

1. Gordon B. Davis, Margrethe H. Olson, Management Information Systems: Conceptual foundations, Structure and development –2nd Edition – Tata-Mc Graw hill International book company, 2000

REFERENCES :

- 1.E.Wainright Martin, Carol V. Brown, Danial W. DeHayes, Jeffrey A. Hoffer, William C. Perkins, “Managing Information Technology” 3rd Edition, Prentice Hall International edition 1999.
2. Harold Koontz, Heinz Weihrich, “Essentials of Management”, 5th Edition, Tata McGraw Hill 1998.

CAY002

E - COMMERCE

L T P C
3 0 0 3**1. INTRODUCTION****6**

Networks and Commercial Transactions - Internet and Other Novelties - Electronic Transactions Today - Commercial Transactions - Establishing Trust - Internet Environment - Internet Advantage - World Wide Web.

2. SECURITY TECHNOLOGIES**9**

Why Internet Is Unsecure - Internet Security Holes - Cryptography : Objective - Codes and Ciphers - Breaking Encryption Schemes - Data Encryption Standard - Trusted Key Distribution and Verification - Cryptographic Applications - Encryption - Digital Signature - Nonrepudiation and Message Integrity.

3. ELECTRONIC PAYMENT METHODS**9**

Traditional Transactions : Updating - Offline and Online Transactions - Secure Web Servers - Required Facilities - Digital Currencies and Payment Systems - Protocols for the Public Transport - Security Protocols - SET - Credit Card Business Basics.

4. ELECTRONIC COMMERCE PROVIDERS**9**

Online Commerce Options - Functions and Features - Payment Systems : Electronic, Digital and Virtual Internet Payment System - Account Setup and Costs - Virtual Transaction Process - InfoHaus - Security Considerations – CyberCash: Model - Security - Customer Protection - Client Application - Selling through CyberCash.

5. ONLINE COMMERCE ENVIRONMENTS**12**

Servers and Commercial Environments - Payment Methods - Server Market Orientation - Netscape Commerce Server - Microsoft Internet Servers - Digital Currencies - DigiCash - Using Ecash - Ecash Client Software and Implementation - Smart Cards - The Chip - Electronic Data Interchange - Internet Strategies, Techniques and Tools.

Total: 45**TEXT BOOK :**

1. Pete Loshin, "Electronic Commerce", 4th Edition, Firewall media, An imprint of laxmi publications Pvt. Ltd., New Delhi, 2004.

REFERENCES :

1. Jeffrey F. Rayport and Bernard J. Jaworski, "Introduction to E-Commerce", 2nd Edition, Tata Mc-Graw Hill Pvt., Ltd., 2003.
2. Greenstein, "Electronic Commerce", Tata Mc-Graw Hill Pvt., Ltd., 2000.

CAY003	ADVANCED DATABASES	L T P C
		3 0 0 3
1. RELATIONAL DATABASES		9
Relational Model - Querying - Storage Structures - Query Processing - Normalization.		
2. OBJECT ORIENTED DATABASES		9
Introduction to Object Oriented Data Bases - Approaches - Modeling and Design - Persistence - Transaction - Concurrency - Recovery - Database Administration.		
3. EMERGING SYSTEMS		9
Enhanced Data Models - Client/Server Model - Data Warehousing and Data Mining - Web Databases – Mobile Databases.		
4. CURRENT ISSUES		9
Rules - Knowledge Bases - Active and Deductive Databases - Distributed Databases and Parallel databases.		
5. DATABASE DESIGN ISSUES		9
Security - Integrity - Consistency - Database Tuning - Optimization and Research Issues.		
		Total: 45

TEXT BOOK :

1. R. Elmasri and S.B. Navathe, Fundamentals of Database Systems, Addison Wesley, 2000.

REFERENCES :

1. Gary W. Hanson and James V. Hanson, Database Management and Design, Prentice Hall of India Pvt Ltd, 1999.
2. Alex Benson, Stephen Smith and Kurt Thearling, Building Data Mining Applications for CRM, Tata McGraw-Hill, 2000.

CAY004

DIGITAL IMAGE PROCESSING
L T P C
3 0 0 3
1. DIGITAL IMAGE FUNDAMENTALS**9**

Image formation, Image transforms – fourier transforms, Walsh, Hadamard, Discrete cosine, Hotelling transforms.

2. IMAGE ENHANCEMENT & RESTORATION**9**

Histogram modification techniques - Image smoothening - Image Sharpening - Image Restoration - Degradation Model – Noise models - Spatial filtering – Frequency domain filtering.

3. IMAGE COMPRESSION & SEGMENTATION**9**

Compression Models - Elements of information theory - Error free Compression -Image segmentation –Detection of discontinuities - Edge linking and boundary detection - Thresholding – Region based segmentation - Morphology.

4. REPRESENTATION AND DESCRIPTION**9**

Representation schemes- Boundary descriptors- Regional descriptors - Relational Descriptors

5. OBJECT RECOGNITION AND INTERPRETATION**9**

Patterns and pattern classes - Decision-Theoretic methods - Structural methods.

Total: 45**TEXT BOOK :**

1. Gonzalez.R.C & Woods. R.E., Digital Image Processing, II Ed., Pearson Education, 2002.

REFERENCES :

1. Anil Jain.K, Fundamentals of Digital image Processing, Prentice Hall of India, 1989.
2. Sid Ahmed, Image Processing, McGraw Hill, New York, 1995.

CAY005

TCP/IP PROTOCOL SUITE

L T P C
3 0 0 3**1. INTRODUCTION****10**

Standards – Internet – History- OSI model – Protocol suite – Addressing – Transmission media – Local Area and Wide Area Networks – Switching – Connecting devices – IP addressing

2. INTERNET PROTOCOL**10**

Subnetting – Supernetting – IP packets – Delivery – Routing – Routing model – Routing table – Datagram – Fragmentation – Checksum – IP Design – ARP – RARP – Internet control message protocol – Internet group management protocol

3. TRANSMISSION CONTROL PROTOCOL**8**

User Datagram protocol – UDP operation – Use – UDP design – TCP services – Flow control – Error control – TCP operation and design – connection – Transition diagram – Congestion control

4. APPLICATION LAYER AND CLIENT SERVER MODEL**8**

Concurrency – BOOTP – DHCP – Domain name system – Name space – Distribution – Resolution – Messages – Telnet – Rlogin – Network Virtual Terminal – Character Set – Controlling the server – Remote login

5. APPLICATION PROTOCOLS**9**

File Transfer Protocol – Connections – Communication – Simple Mail Transfer Protocol – Simple Network Management Protocol – Hyper Text Transfer Protocol – Transaction – Request and Response messages

Total: 45**TEXT BOOK :**

1. Behrouz A. Forouzan, "TCP/IP Protocol Suite", Tata McGraw Hill Edition 2000.

REFERENCE :

1. Douglas E. Comer, David L. Stevens, "Internetworking with TCP/IP – Volume I, II and III", Prentice-Hall of India Pvt. Ltd., 2nd Edition 1994

CAY006

VISUAL PROGRAMMING

L T P C

3 0 0 3

1. INTRODUCTION**8**

GUI Concepts – Overview of Windows programming – Creating the window - Displaying the window - message Loop – windows procedure-WM_PAINT message - WM_DESTROY message – An Introduction to GDI – Scroll Bars – Keyboard – Mouse – Menus.

2.VISUAL BASIC PROGRAMMING**9**

IDE – First Visual Basic Program - Introduction to Forms –Intrinsic Controls –working with Files - Accessing databases with data control - Classes and Objects – ADO Object Model.

3. VISUAL C++ PROGRAMMING**9**

Windows Programming Model - Visual C++ components – Microsoft foundation classes Library Application Framework – Getting Started with AppWizard – Basic Event handling, Mapping modes, and a Scrolling View - Graphics Device Interface, Colors and fonts – Modal Dialog and Windows Common Dialogs – Modeless Dialog and windows Common dialogs – Using ActiveX controls – Windows Message Processing and Multithreading.

4. ADVANCED CONCEPTS**9**

Menus – Keyboard Accelerators – Rich Edit Control – Tool bars – Status bars – A reusable Frame Window Base Class - Reading and writing documents - SDI and MDI environments – splitter windows and multiple views.

5. APPLICATIONS OF WINDOWS PROGRAMMING**10**

Dynamic link library – Component Object Model - Object linking and embedding – Data Base Management With Microsoft ODBC.

Total: 45**TEXT BOOKS :**

1. Charles Petzold, "Windows Programming", Microsoft press, 1996. Chapters: 2,5,6,9,10.
2. Francesco Balena, "Programming Microsoft Visual Basic6.0", Microsoft press, Indian Reprint, 2001. Chapters: 1,2,3,5,6,13.
3. David Kruglirski.J, "Programming Microsoft Visual C++", Fifth Edition, Microsoft press, 1998. Chapters: 1,2,3,4,5,6,7,8,12,13,14,15,17,18,20,22,24,31.

REFERENCES :

1. G.Cornell, "Visual Basic 6", Tata McGraw Hill, 1998.
2. Deitel & Deitel, T.R.Nieto, "Visual Basic 6, How to program", Prentice Hall of India, 1999.

CAY007

MOBILE COMPUTING
L T P C
3 0 0 3
1. INTRODUCTION**9**

Medium Access Control : Motivation for Specialized MAC- SDMA- FDMA- TDMA- CDMA- Comparison of Access mechanisms – Tele communications : GSM- DECT- TETRA – UMTS- IMT-200 – Satellite Systems: Basics- Routing- Localization- Handover- Broadcast Systems: Overview – Cyclic Repetition of Data- Digital Audio Broadcasting – Digital Video Broadcasting

2. WIRELESS NETWORKS**9**

Wireless LAN: Infrared Vs Radio Transmission – Infrastructure Networks- Ad hoc Networks- IEEE 802.11 – HIPERLAN – Bluetooth- Wireless ATM: Working Group- Services- Reference Model – Functions – Radio Access Layer – Handover- Location Management- Addressing Mobile Quality of Service- Access Point Control Protocol

3. MOBILE NETWORK LAYER**9**

Mobile IP : Goals – Assumptions and Requirement – Entities – IP packet Delivery- Agent Advertisement and Discovery – Registration – Tunneling and Encapsulation – Optimization – Reverse Tunneling – IPv6 – DHCP- Ad hoc Networks

4. MOBILE TRANSPORT LAYER**9**

Traditional TCP- Indirect TCP- Snooping TCP- Mobile TCP- Fast retransmit/ Fast Recovery- Transmission/ Timeout Freezing – Selective Retransmission- Transaction Oriented TCP

5. WAP**9**

Architecture – Datagram Protocol- Transport Layer Security- Transaction Protocol- Session Protocol- Application Environment-Wireless Telephony Application

Total: 45**TEXT BOOK :**

1. J.Schiller, Mobile Communication, Addison Wesley, 2000.

REFERENCES :

1. William C.Y.Lee, Mobile Communication Design Fundamentals, John Wiley, 1993.
2. William Stallings, Wireless Communication and Networks, Pearson Education, 2003.
3. Singhal, WAP-Wireless Application Protocol, Pearson Education, 2003.

CAY008

SOFTWARE QUALITY MANAGEMENT
L T P C
3 0 0 3
1. INTRODUCTION**9**

Software Process assessment overview - Assessment phases - Assessment principles - Assessment conduct - Implementation consideration - Quality management - Quality assurance plan - Considerations – Verification and Validation.

2. CONFIGURATION MANAGEMENT**9**

Need for configuration Management - Software product nomenclature - configuration management functions - Baselines - Responsibilities - Need for automated tools - plan – SCM support functions - The requirement phase Design control - The implementation phase - Test phase - SCM Tools - Configuration accounting and audit.

3. SOFTWARE STANDARDS AND INSPECTION**9**

Definitions - Reason for software standards - Benefits - Establishing standards - Guidelines - Types of reviews - Inspection of objectives - Basic inspection principles - The conduct of inspection - Inspection training.

4. TESTING AND MANAGING SOFTWARE QUALITY**9**

Testing: principles - Types - Planning - Development - Execution and reporting – Tools and methods - Real Time testing - quality management paradigm - Quality motivation – Measurement criteria - Establishing a software quality program - Estimating software quality.

5. DEFECT PREVENTION**9**

Principles of software defect prevention - Process changes for defect prevention - Defect prevention considerations - Managements role - Framework for software process change - Managing resistance to software process change - Case studies.

Total: 45**TEXT BOOK :**

1. Watts S. Humphrey, Managing the software process, Addison Wesley, 1999.

REFERENCES :

1. Tsum S.Chow, Software Quality Assurance a Practical Approach, IEEE Computer Society press, 1985.

2. Richard E. Fairley, Software Engineering - A Practitioner's approach, McGraw Hill, 1982.

CAY009

DATA MINING AND DATA WAREHOUSING

L T P C
3 0 0 3**1. INTRODUCTION****9**

Relation To Statistics, Databases- Data Mining Functionalities-Steps In Data Mining Process-Architecture Of A Typical Data Mining Systems- Classification Of Data Mining Systems - Overview Of Data Mining Techniques.

2. DATA PREPROCESSING AND ASSOCIATION RULES**9**

Data Preprocessing-Data Cleaning, Integration, Transformation, Reduction, Discretization Concept Hierarchies-Concept Description: Data Generalization And Summarization Based Characterization-Mining Association Rules In Large Databases.

3. PREDICTIVE MODELING**9**

Classification And Prediction: Issues Regarding Classification And Prediction-Classification By Decision Tree Induction-Bayesian Classification-Other Classification Methods-Prediction-Clusters Analysis: Types Of Data In Cluster Analysis- Categorization Of Major Clustering Methods: Partitioning Methods –Hierarchical Methods

4. DATA WAREHOUSING**9**

Data Warehousing Components -Multi Dimensional Data Model- Data Warehouse Architecture-Data Warehouse Implementation- -Mapping the Data Warehouse to Multiprocessor Architecture- OLAP.- Need- Categorization of OLAP Tools.

5. APPLICATIONS**9**

Applications of Data Mining-Social Impacts Of Data Mining-Tools-An Introduction To DB Miner-Case Studies-Mining WWW-Mining Text Database-Mining Spatial Databases.

Total: 45**TEXT BOOK :**

1.Jiawei Han, Micheline Kamber, "Data Mining: Concepts and Techniques", Morgan Kaufmann Publishers, 2002.

REFERENCES :

1. Alex Berson, Stephen J. Smith, "Data Warehousing, Data Mining, & OLAP", Tata McGraw- Hill, 2004.
2. Usama M. Fayyad, Gregory Piatetsky - Shapiro, Padhraic Smyth And Ramasamy Uthurusamy, "Advances In Knowledge Discovery And Data Mining", The M.I.T Press, 1996.
3. Ralph Kimball, "The Data Warehouse Life Cycle Toolkit", John Wiley & Sons Inc., 1998.
4. Sean Kelly, "Data Warehousing In Action", John Wiley & Sons Inc., 1997.

CAY010

COMPONENT BASED TECHNOLOGY
L T P C
3 0 0 3
1. INTRODUCTION**8**

Definition - Industrialization of software development - CBD drivers and benefits - Technology evolution - Components and network computing

2. FUNDAMENTALS**10**

Basic concepts of CBD - Scenarios for CBD - Evolution or revolution - Build,find and use components and objects.

3. MODELS**10**

Basic concepts of object models - Components and interfaces - Working with interfaces - Component and interface modeling - Specification models - domain modeling - Describing classes - Patterns and frameworks.

4. Using CBD**9**

Categorizing & deploying components - CORBA, DCOM.

5. FRAMEWORKS**8**

Class libraries - Encapsulated components - Software frameworks - Pre - built applications.

Total: 45**TEXT BOOK :**

1. Kuth Short, Component Based Development and Object Modeling, Sterling software,1997.

REFERENCE :

1. Clemens Szyperski, Component software - Beyond object - Oriented programming, Addison - Wesley, 2000.

CAY011

SUPPLY CHAIN MANAGEMENTL T P C
3 0 0 3**1.BASIC CONCEPTS****9**

Introduction to supply chain management (SCM) – concept of SCM – Components of SCM, an overview – features of SCM – strategic issues in SCM – Systems View - SCM current scenario – value chain management and customer relations management.

2.INTERFACES WITH OTHER DISCIPLINES**10**

Marketing and Supply Chain Interface – Customer focus in SCM – Demand planning Purchase planning – Make or Buy decision – Indigenous and global sourcing – Development and management of suppliers – legal aspects of buying – cost management – negotiating for purchasing/subcontracting – purchase insurance – evaluation of purchase performance (performance indices).Inventory management.- Finance and Supply Chain Interface. Financial impact of inventory.

3.MANUFACTURING AND WAREHOUSING**9**

Manufacturing scheduling – Manufacturing flow system – work flow automation – Flexibility in manufacturing to achieve dynamic optimization. Material handling system design and decision. Warehousing and store keeping – strategies of warehousing and storekeeping – space management.

4.LOGISTICS MANAGEMENT**8**

Logistics management – Role of logistics in SCM – Integrated Logistics management – transportation design and decision – multi modalism – third party logistics services and providers – facilities management (port/airport.ICD's) channels of distribution – logistics and customer service.

5.INFORMATION TECHNOLOGY AND SCM**9**

Information technology and SCM – EDI, ERP, Internet and Intranet, E-Commerce, Bar coding, Telecommunication Network, Advanced planning system, Decision support models for Supply Chain Management, Artificial Intelligence for SCM- Best practice in supply chain management – organizational issues to implement SCM.

Total: 45**TEXT BOOK :**

1. B.S.Sahay, Supply chain management for global competitiveness, Macmillan India Limited, 2000.

REFERENCES :

1. Donald J.Bowersox & David J.Closs, Logistical Management, Tata McGraw-Hill Editions, New Delhi, 2000.
2. David Simchi-Levi, Designing and managing the supply chain, Tata McGraw-Hill Editions, New Delhi, 2000

CAY012

BUSINESS PROCESSESL T P C
3 0 0 3**1. ORGANIZATIONAL STRUCTURE****9**

Types of Business Organizations-Organizational Structures-Definition-Complexity-Formulization-Size-Technology-Culture-Forms and Outcomes-Explanations of Structures-IT Industry and Organizational Structures-Case Studies

2. ORGANIZATIONAL OUTCOMES**9**

Organizational Power and Power Outcomes-Leadership and Decision Making-Communication and Organizational Change-Organizational Environments and Effects-Inter and Intra organizational Relationships-Organizational Effectiveness-Case Studies

3. BUSINESS PROCESS RE-ENGINEERING**9**

Introduction to Business Process Re-engineering (BPR)-Meaning-Types-Process-Impetorative for Survival-Strategic Approach-Implementing Business Process Re-engineering-Methodology and Steps-Indian Scenario of Implementing BPR-Case Studies

4. BPR AND IT INDUSTRY**9**

BPR and Information Technology Process-People View and Perspectives-Empowering People through IT-Managing Change in the Global Environment-BPR Rediscovering Indian Paradigm-Need of Reengineering-Case Studies

5. E-BUSINESS PROCESS**9**

E-Business-Introduction-E-business vs. E-commerce-Execution of E-business-Trends-Design for Execution-Construction-Types-Organizational Frame Work and Implementation-E-business Application Areas(CRM,ERP,SCM and Selling)-E-business and India-Case Studies

Total: 45**TEXTBOOKS :**

1. Richard H.Hall, "Organizations-Structures, Processes and Outcomes", Pearson Education, 2004
2. M.S.Jayaraman et. Al, "Business Process Reengineering", Tata Mc Graw Hill Publications, 2001
3. Ravi Kalakota and Marcia Robinson, "E-Business; Roadmap for Success; Pearson Education, 2000

REFERENCES :

1. Gareth Jones, "Organizational Theory, Design and Change", Pearson Education, 4th Edition, 2004
2. Dave Chaffey, "E-business and E-Commerce" Pearson Education, 2nd Edition,2003

CAY013	SOFTWARE PROJECT MANAGEMENT	L T P C
		3 0 0 3

1. INTRODUCTION	9
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Introduction to Competencies - Product Development Techniques - Management Skills - Product Development Life Cycle - Software Development Process and models - The SEI CMM - International Organization for Standardization.

2. DOMAIN PROCESSES	9
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Managing Domain Processes - Project Selection Models - Project Portfolio Management - Financial Processes - Selecting a Project Team - Goal and Scope of the Software Project - Project Planning - Creating the Work Breakdown Structure - Approaches to Building a WBS - Project Milestones - Work Packages - Building a WBS for Software.

3. SOFTWARE DEVELOPMENT	9
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Tasks and Activities - Software Size and Reuse Estimating - The SEI CMM - Problems and Risks - Cost Estimation - Effort Measures - COCOMO: A Regression Model - COCOMO II - SLIM: A Mathematical Model - Organizational Planning - Project Roles and Skills Needed.

4. SCHEDULING ACTIVITIES	9
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Project Management Resource Activities - Organizational Form and Structure - Software Development Dependencies - Brainstorming - Scheduling Fundamentals - PERT and CPM - Leveling Resource Assignments - Map the Schedule to a Real Calendar - Critical Chain Scheduling.

5. QUALITY ASSURANCE	9
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Quality: Requirements – The SEI CMM - Guidelines - Challenges - Quality Function Deployment - Building the Software Quality Assurance - Plan - Software Configuration Management: Principles - Requirements - Planning and Organizing - Tools - Benefits - Legal Issues in Software - Case Study.

Total: 45

TEXT BOOK :

1. Robert T. Futrell, Donald F. Shafer, Linda I. Safer, "Quality Software Project Management", Pearson Education, Asia, 2002.

REFERENCES :

1. Pankaj Jalote, "Software Project Management in Practice", Addison Wesley, 2002.
2. Hughes, "Software Project Management, 3/E", Tata McGraw-Hill, 2004.

CAY014

ENTERPRISE RESOURCE PLANNING
L T P C
3 0 0 3
1.INTRODUCTION TO ERP**9**

Integrated Management Information Seamless Integration – Supply Chain Management – Integrated Data Model – Benefits of ERP – Business Engineering and ERP – Definition of Business Engineering – Principle of Business Engineering – Business Engineering with Information Technology.

2.BUSINESS MODELLING FOR ERP**9**

Building the Business Model – ERP Implementation – An Overview – Role of Consultant, Vendors and Users, Customisation – Precautions – ERP Post Implementation Options-ERP Implementation Technology –Guidelines for ERP Implementaion.

3.ERP AND THE COMPETITIVE ADVANTAGE**9**

ERP domain MPGPRO – IFS/Avalon – Industrial and Financial Systems – Baan IV SAP-Market Dynamics and Dynamic Strategy.

4.COMMERCIAL ERP PACKAGE**9**

Description – Multi-Client Server Solution – Open Technology – User Interface- Application Integration.

5.ARCHITECTURE**9**

Basic Architectural Concepts – The System Control Interfaces – Services – Presentation Interface – Database Interface.

Total: 45**TEXT BOOK :**

1. Vinod Kumar Garg and N.K.Venkita Krishnan, “Enterprise Resource Planning – Concepts and Practice”, PHI, 1998.

REFERENCE :

- i. Jose Antonio Fernandz, The SAP R/3 Handbook, TMH, 1998.

CAY015

SOFTWARE AGENTS**L T P C**
3 0 0 3**1. AGENT AND USER EXPERIENCE****9**

Interacting with Agents - Agent From Direct Manipulation to Delegation - Interface Agent Metaphor with Character - Designing Agents - Direct Manipulation versus Agent Path to Predictable

2. AGENTS FOR LEARNING IN INTELLIGENT ASSISTANCE**9**

Agents for Information Sharing and Coordination - Agents that Reduce Work Information Overhead - Agents without Programming Language - Life like Computer character - S/W Agents for cooperative Learning - Architecture of Intelligent Agents

3. AGENT COMMUNICATION AND COLLABORATION**9**

Overview of Agent Oriented Programming - Agent Communication Language - Agent Based Framework of Interoperability

4. AGENT ARCHITECTURE**9**

Agents for Information Gathering - Open Agent Architecture - Communicative Action for Artificial Agent

5. MOBILE AGENTS**9**

Mobile Agent Paradigm - Mobile Agent Concepts - Mobile Agent Technology - Case Study: Tele Script, Agent Tel

Total: 45**TEXT BOOKS :**

1. Jeffrey M. Bradshaw, " Software Agents ", MIT Press, 2000. (Unit 1,2,3 & 4)
2. William R. Cockayne, Michael Zyda, "Mobile Agents", Prentice Hall, 1998
(5th Unit)

REFERENCES :

1. Russel & Norvig, " Artificial Intelligence: A Modern Approach ", Prentice Hall, 2nd Edition, 2002
2. Joseph P. Bigus & Jennifer Bigus, "Constructing Intelligent agents with Java: A Programmer's Guide to Smarter Applications ", Wiley, 1997.

CAY016**UNIX INTERNALS****L T P C
3 0 0 3****1. INTRODUCTION TO UNIX****9**

Unix operating system - History - System structure –Users Perspective- OS Services- Hardware-Architecture- System Concepts- Kernel data structures – System Administration – Buffer Cache-Heaters – Structure of the Buffer Pool- Scenarios-Reading and writing Disk Blocks.

2. FILE SYSTEMS**9**

INODES - Structure of a regular file- Directories – Conversion of a path name to an INODE - Super Block- INODE assignment – Disk Blocks- System calls for the file system

3. PROCESSES**9**

Process States and Transitions – Layout of System Memory – Context of a Process – Manipulation of the process address space – Sleep – Process Control – Creation – Signals – Awaiting process termination – The Shell – System Boot and Init Process – Process Scheduling and Time – System calls for time – Clock.

4. MEMORY MANAGEMENT**9**

Swapping – Segmentation - Demand Paging – Driver Interfaces – Disk Drivers – Terminal Drivers - Streams.

5.INTERPROCESS COMMUNICATION**9**

Process Tracing – System V IPC – Network Communications - Sockets – Problem of Multiprocessor Systems – Solution with Master and Slave Processors – Semaphores – Distributed Unix Systems – Satellite Processors – Newcastle connection – Transparent distributed file systems – System Calls.

Total: 45**TEXT BOOK :**

1. Bach M.J., The Design of the Unix Operating System, Prentice Hall India, 1986.

REFERENCES :

1. Goodheart B., Cox.J., The Magic Garden Explained, Prentice Hall India, 1994.
2. Leffler S.J., Mckusick M.K., Karels M.J and Quarterman J.S., The Design and Implementation of the 4.3 BSD Unix Operating System. Addison Wesley, 1998.

CAY017

GRID COMPUTING
L T P C
3 0 0 3
1. INTRODUCTION**9**

Grid Computing values and risks – History of Grid computing – Grid computing model and protocols – overview of types of Grids.

2. TYPES OF GRIDS**9**

Desktop Grids : Background – Definition – Challenges – Technology – Suitability – Grid server and practical uses; Clusters and Cluster Grids; HPC Grids; Scientific in sight – application and Architecture – HPC application development environment and HPC Grids; Data Grids; Alternatives to Data Grid – Data Grid architecture.

3. ARCHITECTURE AND MANAGEMENT**9**

The open Grid services Architecture – Analogy – Evolution – Overview – Building on the OGSA platform – implementing OGSA based Grids – Creating and Managing services – Services and the Grid – Service Discovery – Tools and Toolkits – Universal Description Discovery and Integration (UDDI)

4. NATIVE PROGRAMMING AND SOFTWARE APPLICATIONS**9**

Desktop supercomputing – parallel computing – parallel programming paradigms – problems of current parallel programming paradigms – Desktop supercomputing programming paradigms – parallelizing existing applications – Grid enabling software applications – Needs of the Grid users – methods of Grid deployment – Requirements for Grid enabling software – Grid enabling software applications.

5. APPLICATIONS, SERVICES AND ENVIRONMENTS**9**

Application integration – application classification – Grid requirements – Integrating Applications with Middleware platforms – Grid enabling Network services – managing Grid environments – Managing Grids – Management reporting – Monitoring – Data catalogs and replica management – portals – Different application areas of Grid computing.

Total: 45**TEXT BOOK:**

1. Ahmar Abbas, “ Grid Computing , A Practical Guide to Technology and Applications”, Firewall media , 2004.

REFERENCES :

1. Joshy Joseph , Craig Fellenstein , “Grid Computing”, Pearson Education , 2004. Foster , “Grid Blue print foe new computing”.

CAY018

NETWORK SECURITY**L T P C**
3 0 0 3**1. INTRODUCTION****9**

Attacks - Services - Mechanisms - Conventional Encryption - Classical And Modern Techniques – Encryption Algorithms - Confidentiality.

2. PUBLIC KEY ENCRYPTION**9**

RSA - Elliptic Curve Cryptography - Number Theory Concepts

3. MESSAGE AUTHENTICATION**9**

Hash Functions - Digest Functions - Digital Signatures - Authentication Protocols.

4. NETWORK SECURITY PRACTICE**9**

Authentication, Applications - Electronic Mail Security - IP Security - Web Security.

5. SYSTEM SECURITY**9**

Intruders – Viruses – Worms – Firewalls Design Principles – Trusted Systems.

Total: 45**TEXT BOOK :**

1. Stallings, Cryptography & Network Security - Principles & Practice, Prentice Hall, 3rd Edition 2002.

REFERENCES:

1. Bruce, Schneier, Applied Cryptography, 2nd Edition, Toha Wiley & Sons, 1996.
2. Man Young Rhee, "Internet Security", Wiley, 2003.
3. Pfleeger & Pfleeger, "Security in Computing", Pearson Education, 3rd Edition, 2003.

CAY019 EMBEDDED SYSTEMS

L T P C
3 0 0 3

1. INTRODUCTION TO EMBEDDED SYSTEMS 9

Definition and Classification – Overview of Processors and hardware units in an embedded system – Software embedded into the system – Exemplary Embedded Systems – Embedded Systems on a Chip (SoC) and the use of VLSI designed circuits

2. DEVICES AND BUSES FOR DEVICES NETWORK 9

I/O Devices - Device I/O Types and Examples – Synchronous - Iso-synchronous and Asynchronous Communications from Serial Devices - Examples of Internal Serial-Communication Devices - UART and HDLC - Parallel Port Devices - Sophisticated interfacing features in Devices/Ports- Timer and Counting Devices - '12C', 'USB', 'CAN' and advanced I/O Serial high speed buses- ISA, PCI, PCI-X, cPCI and advanced buses.

3. EMBEDDED PROGRAMMING 9

Programming in assembly language (ALP) vs. High Level Language - C Program Elements, Macros and functions -Use of Pointers - NULL Pointers - Use of Function Calls – Multiple function calls in a Cyclic Order in the Main Function Pointers – Function Queues and Interrupt Service Routines Queues Pointers – Concepts of EMBEDDED PROGRAMMING in C++ - Objected Oriented Programming – Embedded Programming in C++, 'C' Program compilers – Cross compiler – Optimization of memory codes.

4. REAL TIME OPERATING SYSTEMS – PART - 1 9

OS Services – Interrupt Routines Handling, Task scheduling models - Handling of task scheduling and latency and deadlines as performance metrics - Inter Process Communication And Synchronisation – Shared data problem – Use of Semaphore(s) – Priority Inversion Problem and Deadlock Situations – Inter Process Communications using Signals – Semaphore Flag or mutex as Resource key – Message Queues – Mailboxes – Pipes – Virtual (Logical) Sockets – RPCs.

5. REAL TIME OPERATING SYSTEMS – PART - 2 9

Study of RTOS, VxWorks - Basic Features - Task Management Library at the System - Library Header File - VxWorks System Functions and System Tasks - Inter Process (Task) Communication Functions - Case Study of Coding for Sending Application Layer Byte Streams on a TCP/IP Network Using RTOS Vxworks

Total : 45

TEXT BOOK :

1. Rajkamal, Embedded Systems Architecture, Programming and Design, TATA McGraw Hill, First reprint 2003

REFERENCE :

1. David E.Simon, An Embedded Software Primer, Pearson Education Asia, First Indian Reprint 2000.

CAY020

SOFTWARE QUALITY ASSURANCE

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1. CONCEPTS**9**

Concepts of Quality Control, Quality Assurance, Quality Management - Total Quality Management; Cost of Quality; QC tools - 7 QC Tools and Modern Tools; Other related topics - Business Process Re-engineering –Zero Defect, Six Sigma, Quality Function Deployment, Benchmarking, Statistical process control.

2. SOFTWARE ENGINEERING CONCEPTS**9**

Software Engineering Principles, Software Project Management, Software Process, Project and Product Metrics, Risk Management, Software Quality Assurance; Statistical Quality Assurance - Software Reliability, Muse Model; Software Configuration Management; Software Testing; CASE (Computer Aided Software Engineering).

3. QUALITY ASSURANCE MODELS**9**

Models for Quality Assurance-ISO-9000 - Series, CMM, SPICE, Malcolm Baldrige Award.

4. SOFTWARE QUALITY ASSURANCE RELATED TOPICS**9**

Software Process - Definition and implementation; internal Auditing and Assessments; Software testing -Concepts, Tools, Reviews, Inspections & Walkthroughs; P-CMM.

5. FUTURE TRENDS**9**

PSP and TSP, CMMI, OO Methodology, Clean-room software engineering, Defect injection and prevention.

Total: 45**TEXT BOOK :**

1. Watts Humphery, "Managing Software Process ", Addison - Wesley, 1998.

REFERENCES:

1. Philip B Crosby, " Quality is Free: The Art of Making Quality Certain ", Mass Market, 1992.
2. Roger Pressman, "Software Engineering ", Sixth Edition, McGraw Hill, 2005.

CAY021

ADHOC NETWORKS

L T P C
3 0 0 3**1. INTRODUCTION**

9

Introduction-Fundamentals of Wireless Communication Technology - The Electromagnetic Spectrum - Radio Propagation Mechanisms - Characteristics of the Wireless Channel - IEEE 802.11a,b Standard – Origin Of Ad hoc: Packet Radio Networks - Technical Challenges - Architecture of PRNETs - Components of Packet Radios – Ad hoc Wireless Networks -What Is an Ad Hoc Network? Heterogeneity in Mobile Devices - Wireless Sensor Networks - Traffic Profiles - Types of Ad hoc Mobile Communications - Types of Mobile Host Movements - Challenges Facing Ad Hoc Mobile Networks-Ad hoc wireless Internet

2. ADHOC ROUTING PROTOCOLS

9

Introduction - Issues in Designing a Routing Protocol for Ad Hoc Wireless Networks - Classifications of Routing Protocols -Table-Driven Routing Protocols - Destination Sequenced Distance Vector (DSDV) - Wireless Routing Protocol (WRP) - Cluster Switch Gateway Routing (CSGR) - Source-Initiated On-Demand Approaches - Ad Hoc On-Demand Distance Vector Routing (AODV) - Dynamic Source Routing (DSR) -Temporally Ordered Routing Algorithm (TORA) - Signal Stability Routing (SSR) -Location-Aided Routing (LAR) - Power-Aware Routing (PAR) - Zone Routing Protocol (ZRP)

3. MULTICASTROUTING IN ADHOC NETWORKS

9

Introduction - Issues in Designing a Multicast Routing Protocol - Operation of Multicast Routing Protocols - An Architecture Reference Model for Multicast Routing Protocols -Classifications of Multicast Routing Protocols - Tree-Based Multicast Routing Protocols- Mesh-Based Multicast Routing Protocols - Summary of Tree-and Mesh-Based Protocols - Energy-Efficient Multicasting - Multicasting with Quality of Service Guarantees - Application-Dependent Multicast Routing - Comparisons of Multicast Routing Protocols

4. TRANSPORT LAYER, SECURITY PROTOCOLS

9

Introduction - Issues in Designing a Transport Layer Protocol for Ad Hoc Wireless Networks - Design Goals of a Transport Layer Protocol for Ad Hoc Wireless Networks -Classification of Transport Layer Solutions - TCP Over Ad Hoc Wireless Networks -Other Transport Layer Protocols for Ad Hoc Wireless Networks - Security in Ad Hoc Wireless Networks - Network Security Requirements - Issues and Challenges in Security Provisioning - Network Security Attacks - Key Management - Secure Routing in Ad Hoc Wireless Networks

5. QoS AND ENERGY MANAGEMENT

9

Introduction - Issues and Challenges in Providing QoS in Ad Hoc Wireless Networks -Classifications of QoS Solutions - MAC Layer Solutions - Network Layer Solutions - QoS Frameworks for Ad Hoc Wireless Networks Energy Management in Ad Hoc Wireless Networks –Introduction - Need for Energy Management in Ad Hoc Wireless Networks - Classification of Energy Management Schemes - Battery Management Schemes - Transmission Power Management Schemes - System Power Management Schemes

TEXT BOOK :

1. C. Siva Ram Murthy and B.S. Manoj “Ad Hoc Wireless Networks: Architectures and Protocols”, Prentice Hall PTR,2004

REFERENCES:

- 1 C.K. Toh, Ad Hoc Mobile Wireless Networks: Protocols and Systems, Prentice Hall PTR ,2001
2. Charles E. Perkins, Ad Hoc Networking, Addison Wesley, 2000

CAY022

SPECIAL ELECTIVE

ANNEXURE - XVI

L T P C
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