AFFILIATED INSTITUTIONS

ANNA UNIVERSITY CHENNAI : : CHENNAI 600 025

REGULATIONS - 2009

CURRICULUM I TO VI SEMESTERS (FULL TIME)

M.C.A. (MASTER OF COMPUTER APPLICATIONS)

SEMESTER I

SL. NO	COURSE CODE	COURSE TITLE	L	T	P	C
THEORY						
1	MC9211	Computer Organization	3	0	0	3
2	MC9212	Problem Solving and Programming	3	0	0	3
3	MC9213	Database Management Systems	3	0	0	3
4	MC9214	Data Structures	3	1	0	4
5	MC9215	Accounting and Financial Management	3	1	0	4
PRACTICAL						
6	MC9217	Programming and Data Structures Lab	0	0	3	2
7	MC9218	DBMS Lab	0	0	3	2
		TOTAL	**15**	**2**	**6**	**21**

SEMESTER II

SL. NO	COURSE CODE	COURSE TITLE	L	T	P	C
THEORY						
1	**MA9221**	Mathematical Foundations of Computer Science	3	1	0	4
2	MC9222	Object Oriented Programming	3	0	0	3
3	MC9223	Design and Analysis of Algorithms	3	1	0	4
4	MC9224	System Software	3	0	0	3
5	MC9225	Operating Systems	3	0	0	3
PRACTICAL						
6	MC9227	Object Oriented Programming Lab	0	0	3	2
7	MC9228	System Software Lab	0	0	3	2
8	MC9229	Algorithms Lab	0	0	3	2
		TOTAL	**15**	**2**	**9**	**23**

SEMESTER III

SL. NO	COURSE CODE	COURSE TITLE	L	T	P	C
THEORY						
1	MC9231	Computer Networks	3	0	0	3
2	MC9232	Microprocessors and its Applications	3	0	0	3
3	MC9233	Software Engineering	3	0	0	3
4	MC9234	Computer Graphics	3	0	0	3
5	MC9235	Web Programming	3	0	0	3
PRACTICAL						
6	MC9237	Graphics Lab	0	0	3	2

7	MC9238	Microprocessor Lab	0	0	3	2
8	MC9239	Web Programming Lab	0	0	3	2
		TOTAL	**15**	**0**	**9**	**21**

SEMESTER IV

SL. NO	COURSE CODE	COURSE TITLE	L	T	P	C
THEORY						
1	MC9241	Network Programming	3	0	0	3
2	MC9242	Resource Management Techniques	3	0	0	3
3	MC9243	Visual Programming	3	0	0	3
4	MC9244	Object Oriented Analysis and Design	3	1	0	4
5	E1	Elective – I	3	0	0	3
PRACTICAL						
6	MC9246	Visual Programming Lab	0	0	3	2
7	MC9247	Network Programming Lab	0	0	3	2
8	MC9248	Case Tools Lab	0	0	3	2
		TOTAL	**15**	**1**	**9**	**22**

SEMESTER V

SL. NO	COURSE CODE	COURSE TITLE	L	T	P	C
THEORY						
1	MC9251	Middleware Technologies	3	0	0	3
2	MC9252	Software Project Management	3	0	0	3
3	E2	Elective II	3	0	0	3
4	E3	Elective III	3	0	0	3
5	E4	Elective IV	3	0	0	3
PRACTICAL						
6	MC9254	Middleware Technology Lab	0	0	3	2
7	MC9255	Software Development Lab	0	0	3	2
		TOTAL	**15**	**0**	**6**	**19**

SEMESTER VI

SL. NO	COURSE CODE	COURSE TITLE	L	T	P	C
PRACTICAL						
1	MC9261	Project Work	0	0	24	12
		TOTAL	**0**	**0**	**24**	**12**

Total No of Credits to be earned for the Award of Degree 21+23+21+22+19+12 = 118

LIST OF ELECTIVES FOR M.C.A.
(MASTER OF COMPUTER APPLICATIONS)

SL. NO	COURSE CODE	COURSE TITLE	L	T	P	C
		IV SEMESTER				
1	MA9227	Numerical and Statistical Methods	3	1	0	4
2	MC9271	Electronic Commerce	3	0	0	3
3	MC9272	Information Systems	3	0	0	3
4	MC9273	Web Graphics	3	0	0	3
5	MC9274	Human Resource Management	3	0	0	3
		V SEMESTER				
6	MC9276	Advanced Databases	3	0	0	3
7	MC9277	Software Quality Management	3	0	0	3
8	MC9278	TCP/IP Design and Implementation	3	0	0	3
9	MC9279	Distributed Systems	3	0	0	3
10	MC9280	Data Mining and Data Warehousing	3	0	0	3
11	MC9281	Component Based Technology	3	0	0	3
12	MC9282	Managerial Economics	3	0	0	3
13	MC9283	Mobile Computing	3	0	0	3
14	MC9284	Digital Imaging	3	0	0	3
15	MC9285	Enterprise Resource Planning	3	0	0	3
16	MC9286	Agent Based Intelligent Systems	3	0	0	3
17	MC9287	Natural Language Processing	3	0	0	3
18	MC9288	Software Agents	3	0	0	3
19	MC9289	Supply Chain Management	3	0	0	3
20	MC9290	Healthcare Systems	3	0	0	3
21	MC9291	Portfolio Management	3	0	0	3
22	MC9292	Unix Internals	3	0	0	3
23	MC9293	Compiler Design	3	0	0	3
24	MC9294	Artificial Intelligence	3	0	0	3
25	MC9295	Parallel and Distributed Computing	3	0	0	3
26	MC9296	Soft Computing	3	0	0	3

MC9211   COMPUTER ORGANIZATION

L T P C
3 0 0 3

UNIT I   DIGITAL FUNDAMENTALS   8

Number Systems and Conversions – Boolean Algebra and Simplification – Minimization of Boolean Functions – Karnaugh Map, Logic Gates – NAND – NOR Implementation.

UNIT II   COMBINATIONAL AND SEQUENTIAL CIRCUITS   10

Design of Combinational Circuits – Adder / Subtracter – Encoder – Decoder – MUX / DEMUX – Comparators, Flip Flops – Triggering **–** Master – Slave Flip Flop – State Diagram and Minimization **–** Counters – Registers.

UNIT III   BASIC STRUCTURE OF COMPUTERS   9

Functional units – Basic operational concepts – Bus structures – Performance and Metrics – Instruction and instruction sequencing – Hardware – Software Interface – Addressing modes – Instructions – Sets – RISC and CISC – ALU design – Fixed point and Floating point operation.

UNIT IV   PROCESSOR DESIGN   9

Processor basics – CPU Organization – Data path design – Control design – Basic concepts – Hard wired control – Micro programmed control – Pipeline control – Hazards – Super scalar operation.

UNIT V   MEMORY AND I/O SYSTEM   9

Memory technology – Memory systems – Virtual memory – Caches – Design methods – Associative memories – Input/Output system – Programmed I/O – DMA and Interrupts – I/O Devices and Interfaces.

TOTAL = 45

TEXT BOOKS:

1.   Morris Mano, "Digital Design", Prentice Hall of India, 1997.
2.   Carl Hamacher, Zvonko Vranesic and Safwat Zaky, Firth Edition, "Computer Organization", Tata McGraw Hill, 2002.

REFERENCES:

1.   Charles H. Roth, Jr., "Fundamentals of Logic Design", Jaico Publishing House, Mumbai, Fourth Edition, 1992.
2.   William Stallings, "Computer Organization and Architecture – Designing for Performance", Sixth Edition, Pearson Education, 2003.
3.   David A. Patterson and John L. Hennessy, "Computer Organization and Design: The Hardware/Software interface", Second Edition, Morgan Kaufmann, 2002.
4.   John P. Hayes, "Computer Architecture and Organization", Thrid Edition, Tata McGraw Hill, 1998.

MC9212   PROBLEM SOLVING AND PROGRAMMING

L T P C
3 0 0 3

UNIT I   INTRODUCTION TO PROGRAMMING   9
Introduction to computing – building blocks for simple programs – problem to program – Decision structures – loop structures – problem analysis – programming style – documentation and testing.

UNIT II   PROGRAMMING PARADIGMS   9
Procedural – functional – recursive – rule-based – structured programming.

UNIT III   PROBLEM SOLVING TECHNIQUES   9
Programming life cycle phases – problem solving – implementation – maintenance – pseudo code representation – flow charts - algorithms – algorithmic efficiency – complexity of algorithms.

UNIT IV   C PROGRAMMING FUNDAMENTALS   9
Structured program development – Data types – operators – expressions – control flow – arrays and pointers – functions – Input – output statements – storage classes.

UNIT V   ADVANCED FEATURES   9
Strings - Recursion – structures – unions – bit manipulations – enumerations – file processing – fundamental data structures.

TOTAL = 45

REFERENCES:

1.   Kernigan Brian W., and Dennis M. Ritchie, "The C Programming Language", Seconde Edition, Prentice Hall, 1988.
2.   Deitel and Deitel, "C How to program", Prentice Hall, 1994.
3.   Cormen, Leiserson, Rivest, Stein "Introduction to algorithms", McGraw Hill publishers, 2002.

5

MC9213   DATABASE MANAGEMENT SYSTEMS

L T P C
3 0 0 3

UNIT I   INTRODUCTION   9
Historical perspective - Files versus database systems - Architecture - E-R model -
Security and Integrity - Data models.

UNIT II   RELATIONAL MODEL   9
The relation - Keys - Constraints - Relational algebra and Calculus - Queries -
Programming and triggers

UNIT III   DATA STORAGE   9
Disks and Files - file organizations - Indexing - Tree structured indexing - Hash Based
indexing

UNIT IV   QUERY EVALUATION AND DATABASE DESIGN   9
External sorting - Query evaluation - Query optimization - Schema refinement and
normalization - Physical database design and tuning - Security

UNIT V   TRANSACTION MANAGEMENT   9
Transaction concepts - Concurrency control - Crash recovery - Decision support - Case
studies

TOTAL = 45

REFERENCES:

1.   Raghu RamaKrishnan and Johannes Gehrke, "Database Management Systems",
        McGraw Hill International Editions, 2000.
2.   C. J. Date, "An Introduction to Database Systems", Seventh Edition, Addison
        Wesley, 1997.
3.   Abraham Silberschatz, Henry. F. Korth and S. Sudharshan, "Database system
        Concepts", Third Edition, Tata McGraw Hill, 1997.

MC9214   DATA STRUCTURES

L T P C
3 1 0 4

UNIT I   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.

UNIT II   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

UNIT III   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.

UNIT IV   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

UNIT V   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

L 45 T 15 Total: 60

TEXTBOOK

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

REFERNCES

1. Robert Kruse & <u>Clovis L. Tondo</u> " 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.

MC9215   ACCOUNTING AND FINANCIAL MANAGEMENT

L T P C
3 1 0 4

UNIT I   FINANCIAL ACCOUNTING   9
Meaning and Scope of Accounting-Principles-Concepts-Conventions-Accounting Standards-Final Accounts-Trail Balance-Trading Account-Profit and Loss Account-Balance Sheet-Accounting Ratio Analysis-Funds Flow Analysis-Cash Flow Analysis

UNIT II   ACCOUNTING   9
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

UNIT III   BUDGETS AND BUDGETING CONTROL   9
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

UNIT IV   INVESTMENT DECISION AND COST OF CAPITAL   9
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

UNIT V   FINANCING DECISION AND WORKING CAPITAL MANAGEMENT   9
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

TEXTBOOK

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

MC9217   PROGRAMMING AND DATA STRUCTURES LAB

L T P C
0 0 3 2

1. Stack and Queue
2. Binary tree Traversals
3. Merge Sort
4. DFS and BFS
5. Warshall's Algorithm
6. Dijkstra's Algorithm
7. Huffman's Algorithm
8. Insertion Sort

MC9218   DBMS LAB

L T P C
0 0 3 2

1. Creation of base tables and views.
2. Data Manipulation
   INSERT, DELETE and UPDATE in tables
   SELECT, Sub Queries and JOIN
3. Data Control Commands
4. High level language extensions – PL/SQL. Or Transact SQL
5. Use of Cursors, Procedures and Functions
6. Embedded SQL or Database Connectivity.
7. Oracle or SQL Server Triggers.
8. Working with Forms, Menus and Reports.
9. Front-end tools – Visual Basic/Developer 2000

Total= 45

MA9221   MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE

L T P C
3 1 0 4

UNIT I   MATRIX ALGEBRA   12
Matrices, Rank of Matrix, Solving System of Equations-Eigen Values and Eigen Vectors-Inverse of a Matrix - Cayley Hamilton Theorem

UNIT II   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.

UNIT III   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.

UNIT IV   FORMAL LANGUAGES   12
Languages and Grammars-Phrase Structure Grammar-Classification of Grammars-Pumping Lemma For Regular Languages-Context Free Languages.

UNIT V   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.

                                                            Total No. of Periods: 60
REFERENCES

1. Kenneth H.Rosen, " Discrete Mathematics and Its Applications", Tata McGraw Hill, Fourth Edition, 2002 (Unit 1,2 & 3).
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.
4. M.K.Venkataraman "Engineering Mathematics", Volume II, National Publishing Company, 2nd Edition,1989.

MC9222   OBJECT ORIENTED PROGRAMMING

                                                                    L T P C
                                                                    3 0 0 3
UNIT I   FUNDAMENTALS   9
Object–Oriented Programming concepts – Encapsulation – Programming Elements – Program Structure – Enumeration Types –– Functions and Pointers – Function Invocation – Overloading Functions – Scope and Storage Class – Pointer Types – Arrays and Pointers – Call–by–Reference – Assertions – Standard template library.

UNIT II   IMPLEMENTING ADTS AND ENCAPSULATION   9
Aggregate Type struct – Structure Pointer Operators – Unions – Bit Fields – Data Handling and Member Functions – Classes – Constructors and Destructors – Static Member – this Pointer – reference semantics – implementation of simple ADTs.

UNIT III   POLYMORPHISM   9
ADT Conversions – Overloading – Overloading Operators – Unary Operator Overloading – Binary Operator Overloading – Function Selection – Pointer Operators – Visitation – Iterators – containers – List – List Iterators.

UNIT IV   TEMPLATES   9
Template Class – Function Templates – Class Templates – Parameterizing – STL – Algorithms – Function Adaptors.

UNIT V   INHERITANCE   9
Derived Class – Typing Conversions and Visibility – Code Reuse – Virtual Functions – Templates and Inheritance – Run–Time Type Identifications – Exceptions – Handlers – Standard Exceptions.

                                                            TOTAL = 45

REFERENCES:

1.   Ira Pohl, "Object–Oriented Programming Using C++", Pearson Education, Second Edition, 2003.
2.   Stanley B.Lippman, Josee Lajoie, "C++ Primer", Pearson Education, Third Edition, 2004.
3.   Kamthane," Object Oriented Programming with ANSI and Turbo C++", Person Education, 2002.
4.   Bhave , " Object Oriented Programming With C++", Pearson Education , 2004.

MC9223   DESIGN AND ANALYSIS OF ALGORITHMS

L T P C
3 1 0 4

UNIT I   INTRODUCTION   10

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.

UNIT II   DIVIDE AND CONQUER METHOD AND GREEDY METHOD   12

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.

UNIT III   DYNAMIC PROGRAMMING   12

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

UNIT IV   BACKTRACKING AND BRANCH AND BOUND   14

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

UNIT V   NP-HARD AND NP-COMPLETE PROBLEMS   12

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

L 45 T 15 Total : 60 Hours

REFERENCES:

1.   Anany Levitin "Introduction to the Design and Analysis of Algorithms" Pearson Education 2003.
2.   Thomas H.Cormen, Charles E.Leiserson, Ronald L.Rivest, "Introduction to algorithms" Prentice Hall 1990.

MC9224   SYSTEM SOFTWARE

L T P C
3 0 0 3

UNIT I   INTRODUCTION   9
Introduction – System software and machine architecture – The Simplified Instructional Computer (SIC) – Machine Architectures (SIC and SIC/XE) – Data and Instruction Formats – Addressing Modes –Instruction sets – I/O Programming.

UNIT II   ASSEMBLERS   9
Basic assembler functions – A simple SIC assembler – Assembler algorithms and data structures – Machine dependent assembler features, Instruction formats and addressing modes – Program relocation – Machine independent assembler features – Literals – Symbol-defining statements – Expressions – Program Blocks – Control Sections and Program Linking – One Pass Assembler and Multipass Assemblers - Implementation examples MASM assembler.

UNIT III   LOADERS AND LINKERS   9
Basic loader functions: Design of an Absolute Loader – A Simple Bootstrap Loader Machine dependent loader features Relocation – Program Linking – Algorithm and Data Structures for Linking Loader. Machine-independent loader features – Automatic Library Search – Loader Options Loader design options – Linkage Editors – Dynamic Linking – Bootstrap Loaders. Implementation examples: MSDOS linker.

UNIT IV   MACRO PROCESSORS   9
Basic macro processor functions – Macro Definition and Expansion – Macro Processor Algorithm and data structures – Machine – independent macro processor features – Concatenation of Macro Parameters – Generation of Unique Labels – Conditional Macro Expansion – Keyword Macro Parameters – Macro Processor Design Options – Recursive Macro Expansion – Algorithm – General Purpose macro Processors – Macro Processing within Language Translators - Implementation examples: MASM Macro Processor – ANSI C macro language.

UNIT V   OTHER SYSTEM SOFTWARE   9
Text editors – Overview of Editing Process - User Interface – Editor Structure – Interactive Debugging Systems – Debugging functions and capabilities – Relationships with Other parts of the system – User Interface Criteria.

TOTAL = 45

TEXT BOOKS:

1.   Leland Beck - "System Software – An Introduction to Systems Programming", Third Edition, Pearson Education, Inc., 1999.

REFERENCES:

1.   D. M. Dhamdhere, " Systems Programming and Operating Systems", Tata McGraw Hill Company, 1999.
2.   John J. Donovan, "Systems Programming", Tata McGraw Hill Company, 1991.

MC9225   OPERATING SYSTEMS

                                                         L T P C
                                                         3 0 0 3

UNIT I   INTRODUCTION   9
Introduction – Operating Systems and services – Processes – CPU Scheduling approaches

UNIT II   PROCESS SYNCHRONIZATION   9
Process synchronization – Semaphores – Deadlocks – Handling deadlocks – Multithreading

UNIT III   MEMORY MANAGEMENT   9
Memory management – Paging – Segmentation – Virtual Memory – Demand paging – Replacement Algorithms

UNIT IV   DISK SCHEDULING   9
Disk Scheduling approaches – File systems – Design issues – User interfaces to file systems – I/O device management.

UNIT V   CASE STUDIES   9
Case study – Design and implementation of the UNIX OS, Process model and structure – Memory management – File system – UNIX I/O management and device drivers – Windows – System components – Process Management – Memory management – File Systems – Networking

                                                         TOTAL = 45

REFERENCES:

1.   Abraham Silberschatz Peter B. Galvin, G. Gagne, "Operating System Concepts", Sixth Edition, Addison Wesley Publishing Co., 2003.
2.   M. J. Bach, "Design Of The Unix Operating System", Pearson Education.
3.   Willam-Stalling " Operating System" Fourth Edition, Pearson Education, 2003.

MC9227   OBJECT ORIENTED PROGRAMMING LAB

L T P C
0 0 3 2

1. Write a C++ Program to illustrate Enumeration and Function Overloading
2. Write a C++ Program to illustrate Scope and Storage class
3. Implementation of ADT such as Stack and Queues
4. Write a C++ Program to illustrate the use of Constructors and Destructors and Constructor Overloading
5. Write a Program to illustrate Static member and methods
6. Write a Program to illustrate Bit fields
7. Write a Program to overload as binary operator, friend and member function
8. Write a Program to overload unary operator in Postfix and Prefix form as member and friend function
9. Write a Program to illustrate Iterators and Containers
10. Write a C++ Program to illustrate function templates
11. Write a C++ Program to illustrate template class
12. Write C++ Programs and incorporating various forms of Inheritance
13. Write a C++ Program to illustrate Virtual functions
14. Exception Handling

MC9228   SYSTEM SOFTWARE LAB

L T P C
0 0 3 2

1. Assemblers.

2. Linkers.

3. Loaders.

4. Features of text editors.

5. Basic UNIX commands.

6. Shell Programming.

7. Grep, sed, awk.

8. File system related system calls.

9. Process management – Fork, Exec.

10. Message queues.

11. Pipe, FIFO's.

12. Signals.

13. Shared memory.

TOTAL = 45

MC9229   ALGORITHMS LAB

L T P C
0 0 3 2

1. Quick Sort
2. Binary Search
3. Binary Tree Traversal
4. Warshall's Algorithm
5. Dijkstra's Algorithm
6. Prim's Algorithm
7. Knapsack Problem – Dynamic Programming
8. Subset Sum Problem – Backtracking
9. Travelling salesperson problem – Branch and Bound
10. Strassen's matrix multiplication

MC9231   COMPUTER NETWORKS

L T P C
3 0 0 3

UNIT I   INTRODUCTION   9
Communication model – Data communications networking – Data transmission concepts and terminology – Transmission media – Data encoding – Data link control.

UNIT II   NETWORK FUNDAMENTALS   9
Protocol architecture – Protocols – OSI – TCP/IP – LAN architecture – Topologies – MAC – Ethernet, Fast ethernet, Token ring, FDDI, Wireless LANS – Bridges.

UNIT III   NETWORK LAYER   9
Network layer – Switching concepts – Circuit switching networks – Packet switching – Routing – Congestion control – X.25 – Internetworking concepts and X.25 architectural models – IP – Unreliable connectionless delivery – Datagrams – Routing IP datagrams – ICMP.

UNIT IV   TRANSPORT LAYER   9
Transport layer – Reliable delivery service – Congestion control – Connection establishment – Flow control – Transmission control protocol – User datagram protocol.

UNIT V   APPLICATIONS   9
Applications – Sessions and presentation aspects – DNS, Telnet – rlogin, – FTP – SMTP – WWW – Security – SNMP.

TOTAL = 45

REFERENCES:

4. Larry L. Peterson & Bruce S. Davie, "Computer Networks – A systems Approach", Second Edition, Harcourt Asia / Morgan Kaufmann, 2000.
5. William Stallings, "Data and Computer Communications", Fifth Edition, PHI, 1997.

MC9232   MICROPROCESSORS AND ITS APPLICATIONS

L T P C
3 0 0 3

UNIT I   THE 8086 PROCESSOR - SOFTWARE ASPECTS   11

Evolution of Microprocessors - 8086 architecture – Addressing modes- Instruction set and assembler directives – Assembly language programming – Interrupts and interrupt service routines.

UNIT II   8086 SYSTEM DESIGN   10

8086 signals description – Basic configurations - System bus timing –System design using 8086 – Minimum mode /Maximum modes 8086 system and timings.

UNIT III   INTERFACING CONCEPTS   10

Memory Interfacing and I/O interfacing - Parallel communication interface – Serial communication interface – Timer – Keyboard /display controller – Interrupt controller – DMA controller – Programming and applications.

UNIT IV   ADVANCED PROCESSORS   7

Intel 80286 – Internal Architectural – Register Organization – Internal Block Diagram – Modes of operation – Real Address Mode – Protected Virtual Address mode – Privilege – Protection - Architectural features and Register Organization of i386, i486 and Pentium processors.

UNIT V   BUILDING SYSTEMS   7

Bus Concepts – Bus Standards –The Peripheral Component Interconnect (PCI) Bus – Universal Serial Bus (USB) – Platform Architectures.

REFERENCES:

1. A. K. Ray & K. M. Bhurchandi, "Advanced Microprocessors and peripherals-Architectures, Programming and Interfacing", TMH, 2002 reprint.
2. Barry B. Brey, "The Intel Microprocessors, 8086/8088, 80186/80188, 80286, 80386, 80486, Pentium, PentiumPro Processor, PentiumII, PentiumIII, PentiumIV, Architecture, Programming & Interfacing", 6th Edition, Pearson Education/PHI, 2002.
3. Yu-cheng Liu, Glenn A. Gibson, "Microcomputer systems: The 8086/8088 Family architecture, Programming and Design", PHI 2003.
4. Peter Abel, "IBM PC Assembly language and programming", Prentice Hall of India Pvt. Ltd.
5. Websites of latest processors.

MC9233   SOFTWARE ENGINEERING

L T P C
3 0 0 3

UNIT I   INTRODUCTION   9
Software Engineering paradigms – Waterfall Life cycle model – Spiral Model – Prototype Model – fourth Generation Techniques – Planning – Cost Estimation – Organization Structure – Software Project Scheduling, – Risk analysis and management – Requirements and Specification – Rapid Prototyping.

UNIT II   SOFTWARE DESIGN   9
Abstraction – Modularity – Software Architecture – Cohesion – Coupling – Various Design Concepts and notations – Real time and Distributed System Design – Documentation – Dataflow Oriented design – Jackson System development – Designing for reuse – Programming standards.

UNIT III   SOFTWARE METRICS   9
Scope – Classification of metrics – Measuring Process and Product attributes – Direct and Indirect measures – Reliability – Software Quality Assurance – Standards.

UNIT IV   SOFTWARE TESTING AND MAINTENANCE   9
Software Testing Fundamentals – Software testing strategies – Black Box Testing – White Box Testing – System Testing – Testing Tools – Test Case Management – Software Maintenance Organization – Maintenance Report – Types of Maintenance.

**UNIT V   SOFTWARE CONFIGURATION MANAGEMENT (SCM) & CASE
                TOOLS   9**
Need for SCM – Version Control – SCM process – Software Configuration Items – Taxonomy – Case Repository – Features.

TOTAL = 45

REFERENCES:

1. Roger S. Pressman, "Software Engineering: A Practitioner Approach", Sixth edition, McGrawHill, 2005.
2. I. Sommerville, "Software Engineering", Sixth Edition, Addison Wesley-Longman, 2004.
3. Pankaj Jalote, "An Integrated approach to Software Engineering", Second Edition, Springer Verlag, 1997.

MC9234   COMPUTER GRAPHICS

L T P C
3 0 0 3

UNIT I   BASIC CONCEPTS   9
2D Transformations – Clipping – Window – View Prot Mapping – Graphical User Interfaces and Interactive Input Methods – Picture Construction Techniques – Virtual Reality Environment.

UNIT II   3D GRAPHICS   9
3D Transformation – 3D Viewing – Visible Surface Detection – Back Face Detection – Depth Buffer Method – Scan Line Method.

UNIT III   VISUAL COMMUNICATION   9
Creative Process – Digital Imaging Technology – Still Image – Digital Imaging – Using Images in Multimedia – Images on Web – Color Models.

UNIT IV   PRESENTATION   9
General Design Issues – Architectural Issues – Information Characteristics for Presentation – Presentation function – Presentation Design Knowledge – Effective Human Computer Interaction.

UNIT V   INTERACTIVE 3D ILLUSTRATED WITH IMAGES AND TEXT   9
Generating Illustrated Documents – Consistency of Rendered Images and their Textual Labels – Architecture – Zoom Techniques for Illustration Purpose – Interactive handling of Images and Text – Figure Captions for Anatomical Illustrations.

TOTAL = 45

REFERENCES:

1.   Donald Hearn and M. Pauline Baker, "Computer Graphics in C Version", Second Edition, Pearson Education.
2.   Raf Steinmetz and Klara Nahrstedt, "Multimedia: Computing, Communication and applications", Pearson Education.
3.   John Villamil Casanova and Leony Fernandez-Elias, " Multimedia Graphics", Prentice Hall India.
4.   Thomas Strothotte, "Computer Visualization-Graphics Abstraction and Interactivity", Springer Verlag, Berlin Heiderberg, 1998.

MC9235   WEB PROGRAMMING

L T P C
3 0 0 3

UNIT I   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.

UNIT II   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.

UNIT III   JAVA FUNDAMENTALS   8
Java features – Java Platform – Java Fundamentals – Expressions, Operators, and Control Structures – Classes, Packages and Interfaces – Exception Handling.

UNIT IV   PACKAGES   12
AWT package – Layouts – Containers – Event Package – Event Model – Painting – Garbage Collection - Multithreading – Language Packages.

UNIT V   ADVANCED JAVA PROGRAMMING   9
Utility Packages – Input Output Packages – Inner Classes – Java Database Connectivity - Servlets - RMI – Java Beans.

                                                            Total No. of Periods : 45

TEXT BOOK
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.

MC9237   GRAPHICS LAB

L T P C
0 0 3 2

1. TWO DIMENSIONAL TRANSFORMATIONS:

Creation of two dimensional objects and applying simple transformations like Translation, Scaling, Rotation and applying Composite transformations.

2. THREE DIMENSIONAL TRANSFORMATIONS:

Creation of simple three dimensional objects like cube, cone and cylinder and applying simple transformations like Translation, Scaling, Rotation and applying Composite transformations.

3. VISIBLE SURFACE DETECTION:

Finding out visible surfaces and removal of hidden surfaces in simple objects using object space and image space algorithms.

4. IMAGE EDITING:
Image enhancement, Image transformation from color to gray scale and vice versa, Image manipulation and Image optimization for web - Usage of editing tools, layers, filters, special effects and color modes. Creation of simple Gif animated images with textual illustrations.

MC9238   MICROPROCESSOR LAB

L T P C
0 0 3 2

1. Study of BIOS and DOS function calls for keyboard & Display interfacing

2. Assembly Language Programming with 8086 to perform the following operation
    a. Arithmetic & Logical Operation
    b. String Manipulation Operation
    c. File Manipulation Operation
    d. Terminate and Stay Resident (TSR) Program

3. Using Assembly Language with C/C++

4. Perform the following interfacing concepts with a microprocessor chip
    a. Traffic signal controller using 8255 PPI
    b. Stepper Motor controller using 8255 PPI
    c. ADC/DAC interface
    d. Waveform generation using 8253/8254 Timers

e. DC Motor Speed Controller
f. Keyboard/Display Controller using 8279

REFERENCES:

1. IBM PC Assembly Language and Programming by peter Abel, fifth edition
2. Advanced Microprocessors & peripherals A K Ray & K M Bhurchandi, Second Edition, Tata McGraw-Hill

MC9238   WEB PROGRAMMING LAB

             L T P C
             0 0 3 2

1. Studying internet connection procedures
2. Sending and receiving mails from one or more email clients
3. Video Conferencing demonstration
4. Downloading and installing softwares (Example: Java) and setting up path and class path
5. Using FTP
6. Creation of web site with forms, frames, links, tables etc with any web page editors and using images and audio files as part of web pages
7. Writing Java programs by making use of class, interface, package, etc for the following
   # Different types of inheritance study
   # Uses of 'this' keyword
   # Polymorphism
   # Creation of user specific packages
   # Creation of jar files and using them
   # User specific exception handling
8. Writing window based GUI applications using frames and applets such as Calculator application, Fahrenheit to Centigrade conversion etc
9. Application of threads examples
10. Reading and writing text files
11. Reading image files and manipulating them with image related classes and methods
12. writing an RMI application to access a remote method
13. Writing a Servlet program with database connectivity for a web based application such as students result status checking, PNR number enquiry etc
14. Creation and usage of Java bean

MC9241   NETWORK PROGRAMMING

             L T P C
             3 0 0 3

UNIT I   INTRODUCTION   9
Introduction – Overview of UNIX OS - Environment of a UNIX process - Process control - Process relationships Signals – Interprocess Communication- overview of tcp/ip protocols

UNIT II   ELEMENTARY TCP SOCKETS 9

Introduction to Socket Programming –Introduction to Sockets – Socket address Structures – Byte ordering functions – address conversion functions – Elementary TCP Sockets – socket, connect, bind, listen, accept, read, write , close functions – Iterative Server – Concurrent Server.

UNIT III APPLICATION DEVELOPMENT 9

TCP Echo Server – TCP Echo Client – Posix Signal handling – Server with multiple clients – boundary conditions: Server process Crashes, Server host Crashes, Server Crashes and reboots, Server Shutdown – I/O multiplexing – I/O Models – select function – shutdown function – TCP echo Server (with multiplexing) – poll function – TCP echo Client (with Multiplexing)

UNIT IV SOCKET OPTIONS, ELEMENTARY UDP SOCKETS 9

Socket options – getsocket and setsocket functions – generic socket options – IP socket options – ICMP socket options – TCP socket options – Elementary UDP sockets – UDP echo Server – UDP echo Client – Multiplexing TCP and UDP sockets – Domain name system – gethostbyname function – Ipv6 support in DNS – gethostbyadr function – getservbyname and getservbyport functions.

UNIT V   ADVANCED SOCKETS 9

Ipv4 and Ipv6 interoperability – threaded servers – thread creation and termination – TCP echo server using threads – Mutexes – condition variables – raw sockets – raw socket creation – raw socket output – raw socket input – ping program – trace route program.

TOTAL = 45

REFERENCES:

1. W. Richard Stevens, "Advanced Programming in The UNIX Environment", Addison Wesley, 1999.

2. W. Richard Stevens, "UNIX Network Programming - Volume 1", Prentice Hall

International, 1998.

MC9242   RESOURCE MANAGEMENT TECHNIQUES

L T P C
3 0 0 3

UNIT I   LINEAR PROGRAMMING MODELS 9

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

UNIT II   TRANSPORTATION AND ASSIGNMENT MODELS 9

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

UNIT III   INTEGER PROGRAMMING MODELS 9

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

UNIT IV   SCHEDULING BY PERT AND CPM   9
Network Construction – Critical Path Method – Project Evaluation and Review Technique – Resource Analysis in Network Scheduling

UNIT V   QUEUEING MODELS   9
Characteristics of Queuing Models – Poisson Queues - (M / M / 1) : (FIFO / ∞ /∞),   (M / M / 1) : (FIFO / N / ∞), (M / M / C) : (FIFO / ∞ / ∞), (M / M / C) : (FIFO / N / ∞) models.

Total No. of Periods : 45

TEXT BOOKS

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.

MC9243   VISUAL PROGRAMMING

                                                                    L T P C
                                                                    3 0 0 3
UNIT I   WINDOWS PROGRAMMING   8
The windows programming Model – Event driven programming – GUI concepts – Overview of Windows programming – Creating and displaying the window – Message Loop – windows procedure – WM_PAINT message – WM_DESTROY message – Data types – Resources – An Introduction to GDI – Device context – Text output – Scroll Bars – Keyboard – Mouse – Menus.

UNIT II   VISUAL BASIC PROGRAMMING   10
Visual Basic Applications – Form and properties – Variables and Constants – Variant type – Procedure scope – Main – Control statements – control arrays – Creating and using Controls – Menus and Dialogs – Programming fundamentals – Objects and instances – Debugging – Responding to mouse events – Drag and Drag drop events Responding to keyboard events – keypress, keyup, keydown events – Using grid control – Graphics controls – shape and line control – File system controls   – Common dialog controls – Processing files – Accessing databases with the data controls.

UNIT III   VISUAL C++ PROGRAMMING   9
Visual C++ components – Introduction to Microsoft Foundation Classes Library – Getting started with AppWizard – Class Wizard – Event handling – Keyboard and Mouse events - WM_SIZE, WM_CHAR messages - Graphics Device Interface - Pen, Brush, Colors,

Fonts - Single and Multiple document interface - Reading and Writing documents - Resources – Bitmaps creation, usage of BMP and displaying a file existing as a BMP.

UNIT IV   CONTROLS   9
Dialog Based Applications, controls – Animate control, image list, CRect tracker – Tree control – CtabControl – Dynamic controls – slider control – progress control – Inheriting CTreeView – CRicheditView – Modal Dialog, – Modeless Dialog – CColorDialog – CfileDialog.

UNIT V   ADVANCED CONCEPTS   9
Domain Name System – Email – World Wide Web (HTTP) – Simple Status bars – Splitter windows and multiple views – Dynamic Link Library – Data base Management with ODBC – TCP/IP – Winsock and WinInet, – ActiveX control – creation and usage – Container class.

TOTAL = 45

TEXT BOOKS:

1. Charles Petzold, "Windows Programming", Microsoft press, 1996.
2. J. David Kruglirski, "Programming Microsoft Visual C++", Fifth Edition, Microsoft press, 1998.
3. Marion Cottingham "Visual Basic", Peachpit Press, 1999.

REFERENCES:

1. Steve Holzner, "Visual C++ 6 programming", Wiley Dreamtech India Private Ltd., 2003.
2. Kate Gregory "Using Visual C++", Prentice Hall of India Pvt., Ltd., 1999.
3. Herbert Sheildt, "MFC from the Ground Up".
4. Deitel , " Visual Basic 6.0 How To Program", Pearson Education, 1999.

MC9244   OBJECT ORIENTED ANALYSIS AND DESIGN

L T P C
3 1 0 4

UNIT I   INTRODUCTION   12
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.

UNIT II   METHODOLOGY AND UML   12
Introduction – Survey – Rumbugh, 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.

UNIT III   OBJECT ORIENTED ANALYSIS   12

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

UNIT IV OBJECT ORIENTED DESIGN 12

Design process – Axions – 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

UNIT V SOFTWARE QUALITY 12

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

L : 45 T : 15 Total No. of periods : 60

TEXT BOOKS

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

MC9246 VISUAL PROGRAMMING LAB

L T P C
0 0 3 2

VB
1. Form Design – Keyboard & Mouse events
2. Programs on usage of data types - variant, Control arrays
3. Simple applications using file system controls
4. Database applications using data control.

VC++
1. SDK type programs for creating simple windows with different window styles
2. SDK type programs code for keyboard and mouse events, GDI objects.
3. Simple Dialog Based application – eg. Calculator, interest computation, money conversions, etc.
4. Creating SDI & MDI applications, Modal and Modeless dialog.
5. Programming for reading and writing into documents.
6. Coding Dynamic controls – slider control, progress control, inheriting CtreeView and CricheditView.
7. Creating static and dynamic splitter windows
8. Creating DLLs and using them.
9. Winsock and WinInet & Internet Explorer common controls.
10. Data access through ODBC – Cdatabase, Crecordset.
11. Creating ActiveX control and using it.

TOTAL = 45

MC9247   NETWORK PROGRAMMING LAB

**L T P C
0 0 3 2**

1. Socket Programming
       a.   TCP Sockets
       b.   UDP Sockets
       c.   Applications using Sockets
2.   Simulation of Sliding Window Protocol
3.   Simulation of Routing Protocols
4.   RPC
5.   Development of applications such as DNS/ HTTP/ E – mail/ Multi - user Chat

MC9248   CASE TOOLS LAB

**L T P C
0 0 3 2**

1.   Practicing the different types of case tools such as (Rational Rose & other Open
     Source) used for all the phases of Software development life cycle.
2.   Data modeling
3.   Semantic data modeling
4.   Source code generators
5.   Re-engineering
6.   Experimenting CASE Environments

           a.   Toolkits
           b.   Language-centered
           c.   Integrated
           d.   Fourth generation
           e.   Process-centered

7. Implementation of the following using CASE Workbenches:

           a.   Business planning and modeling

           b.   Analysis and design
           c.   User-interface development
           d.   Programming
           e.   Verification and validation
           f.   Maintenance and reverse engineering
           g.   Configuration management
           h.   Project management

MC9251   MIDDLEWARE TECHNOLOGIES

L T P C
3 0 0 3

UNIT I   IT ARCHITECTURE AND EMERGENCE OF MIDDLEWARE   9
IT Architecture – Evolution And Development – Middleware – Remote Procedure Calls –
Data Base Access – Distributed Transaction Processing – Message Queuing – Object
Middleware – Internet Applications – Web Services – Middleware Inter Operability.

UNIT II   DISTRIBUTED APPLICATION   9
Support For Business Process – Information Retrieval – Multi – Tier Functionalities –
Architecture – Middleware Bus Architecture – Hub And Web Services Architecture –
Resiliency – Performance And Scalability – Design Issues.

UNIT III   SYSTEM MANAGEMENT & SECURITY   9
Functions & Users – Functional Categories – Interrelationships And Organization –
System Management Technology – Distributed System Security – Web Service Security.

UNIT IV   APPLICATION DESIGN AND IT ARCHITECTURE   9
Existing Systems – Reuse – Architecture & Levels Of Design – Reconciling Design
Approaches – Implementing Business Process – Architecture Process Pattern –
Classification And Analysis Error– Handling – Timing Migrations – Flexibility –
Integration Design – Issues.

UNIT V   INFORMATION ACCESSES AND INFORMATION ACCURACY   9
Process Information – Process Management & Improvement – Requirements Of
Information Access – Information Accuracy – Shared Data Or Controlled Duplication –
Consistency In Existing In Databases – Data Migration – Tuning Existing Applications To
Services – Building A Middle Tier – Changing Middleware Between Transaction Services
– Case Study – Service – Orientation Architecture.

TOTAL = 45

TEXT BOOKS:

1.   Chris Britton, Peter Bye, "IT Architecture And Middleware, A Staligies For
        Building Large Integrated System", Addition Wesley, 2004.
2.   T. J. Mowbray, "Inside CORBA: Distributed Object Standards and Applications",
        Addison Wesley, 1997.
3.   N. Wallace, :COM/DCOM Blue Book", Dreamtech Press, 2000.

MC9252   SOFTWARE PROJECT MANAGEMENT

L T P C
3 0 0 3

UNIT I   INTRODUCTION TO SOFTWARE PROJECT MANAGEMENT   9

Project Definition – Contract Management – Activities Covered By Software Project Management – Overview Of Project Planning – Stepwise Project Planning.

UNIT II   PROJECT EVALUATION   9

Strategic Assessment – Technical Assessment – Cost Benefit Analysis – Cash Flow Forecasting – Cost Benefit Evaluation Techniques – Risk Evaluation.

UNIT III   ACTIVITY PLANNING   9

Objectives – Project Schedule – Sequencing And Scheduling Activities – Network Planning Models – Forward Pass – Backward Pass – Activity Float – Shortening Project Duration – Activity On Arrow Networks – Risk Management – Nature Of Risk – Types Of Risk – Managing Risk – Hazard Identification – Hazard Analysis – Risk Planning And Control.

UNIT IV   MONITORING AND CONTROL   9

Creating Framework – Collecting The Data – Visualizing Progress – Cost Monitoring – Earned Value – Prioritizing Monitoring – Getting Project Back To Target – Change Control – Managing Contracts – Introduction – Types Of Contract – Stages In Contract Placement – Typical Terms Of A Contract – Contract Management – Acceptance.

UNIT V   MANAGING PEOPLE AND ORGANIZING TEAMS   9

Introduction – Understanding Behavior – Organizational Behaviour: A Background – Selecting The Right Person For The Job – Instruction In The Best Methods – Motivation – The Oldman–Hackman Job Characteristics Model – Working In Groups – Becoming A Team – Decision Making – Leadership – Organizational Structures – Stress – Health And Safety – Case Studies.

TOTAL = 45

REFERENCES:

1. Bob Hughes and MikeCotterell "Software Project Management", Third Edition, TATA McGraw Hill Edition 2004.
2. Ramesh, Gopalaswamy: "Managing Global Projects ", Tata McGraw Hill, 2001.
3. Royce." Software Project Theory", Pearson Education, 1999.
4. P.Jalote "Software Project Management In Practice", Pearson Education, 2000.

L T P C
0 0 3 2

Apply the following to typical application problems:

1. Java rmi
2. CORBA
3. COM
4. C# and .NET

A possible set of applications may be the following:

1. Typical experiment to investigate client-server communication
2. Typical experiment to investigate the workings of RMI
3. Typical experiment to investigate the use of CORBA technology with Java.
4. Chat Room
5. Designing of e-business
6. Online games

MC9255   SOFTWARE DEVELOPMENT LAB

LTPC
0 0 3 2

Apply the following to typical application problems:

1. Project Planning
2. Software Requirement Analysis
3. Software Estimation
4. Software Design
5. Data Modelling & Implementation
6. Software Testing
7. Software Debugging

A possible set of applications may be the following:

a. Library System

b. Student Marks Analyzing System

c. Text Editor.

d. Create a dictionary.

e. Telephone dictionary.

f. Simulator Software for Parallel Processing Operation.

g. Inventory System.

MA9227   NUMERICAL AND STATISTICAL METHODS

LTPC
3 1 0 4

UNIT I   LINEAR SYSTEM OF EQUATIONS   12
Solution of Systems of equations – Solution of Simultaneous linear equations – Gauss elimination methods – Gauss Jordan methods, Jacobi and Gauss Seidal iterative methods

UNIT II   NUMERICAL DIFFERENTIATION AND INTEGRATION   12
Interpolation, Differentiation and integration – difference table – Newton's forward and backward interpolation –Lagrangian interpolation –Differentiation formulae– Trapezoidal and Simpson rule Gaussian – Quadrature

UNIT III   DIFFERENTIAL EQUATIONS   12
Ordinary Differential equations–Taylor Series and Euler methods, Runge– Kutta methods – Predictor-corrector method – Milne and Adam – Bashforth methods – Error Analysis

UNIT IV   PROBABILITY DISTRIBUTIONS   12
Probability axioms- Bayes Theorem- Discrete random variables and Continuous random variables – Density & Distribution functions - Joint and marginal distributions –

Conditional distributions - Characteristic function- moment generating function-expectation.

UNIT V   SAMPLING DISTRIBUTIONS   12
Small sample, t-test, F-test, χ^2 –test, ANOVA one way classification and two way classification

Total No of periods: 60

TEXT BOOKS

1. Grewal B.S, " Numerical methods in Engineering and Science", Khanna Publishers, 1994. (Unit 1,2 & 3)
2. John.E..Freund, Irwin Miller, Marylees Miller "Mathematical Statistics with Applications ", Seventh Edition, Prentice Hall of India, 2004. (Unit 4 & 5)

REFERENCES

1. A.M.Natarajan & A.Tamilarasi, "Probability Random Processes and Queuing theory", New Age International Publishers, 2nd Edition, 2005.

2. S.K. Gupta, " Numerical Methods for Engineers ", New age International Publishers , 1995.

MC9271   ELECTRONIC COMMERCE

                                                                L T P C
                                                                3 0 0 3
UNIT I   INTRODUCTION   6
Networks and Commercial Transactions - Internet and Other Novelties - Electronic Transactions Today - Commercial Transactions   - Establishing Trust - Internet Environment - Internet Advantage - World Wide Web.

UNIT II   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.

UNIT III   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.

UNIT IV   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.

UNIT V   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 No of periods: 45

TEXT BOOKS

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.

MC9272   INFORMATION SYSTEMS

L T P C
3 0 0 3

UNIT I   INFORMATION SYSTEM AND ORGANIZATION   12
Matching the Information System Plan to the Organizational Strategic Plan – Identifying Key Organizational Objective and Processes and Developing an Information System Development – User role in Systems Development Process – Maintainability and Recoverability in System Design.

UNIT II   REPRESENTATION AND ANALYSIS OF SYSTEM STRUCTURE   12
Models for Representing Systems: Mathematical, Graphical and Hierarchical (Organization Chart, Tree Diagram) – Information Flow – Process Flow – Methods and Heuristics – Decomposition and Aggregation – Information Architecture - Application of System Representation to Case Studies

UNIT III   SYSTEMS, INFORMATION AND DECISION THEORY   12

Information Theory – Information Content and Redundancy – Classification and Compression – Summarizing and Filtering – Inferences and Uncertainty – Identifying Information needed to Support Decision Making – Human Factors – Problem characteristics and Information System Capabilities in Decision Making.

UNIT IV   INFORMATION SYSTEM APPLICATION   12
Transaction Processing Applications – Basic Accounting Application – Applications for Budgeting and Planning – Other use of Information Technology: Automation – Word Processing – Electronic Mail – Evaluation Remote Conferencing and Graphics – System and Selection – Cost Benefit – Centralized versus Decentralized Allocation Mechanism.

UNIT V   DEVELOPMENT AND MAINTENANCE OF INFORMATION SYSTEMS
12

Systems analysis and design – System development life cycle – Limitation – End User Development – Managing End Users – off-the Shelf Software Packages – Outsourcing – Comparison of Different Methodologies.

TOTAL = 60

TEXT BOOKS:

1.   K. C. Laudon, J. P. Laudon, M. E. Brabston, "Management Information Systems: Managing the Digital Firm", Pearson Education 2002.
2.   K. C. Laudon, J. P. Laudon, "Management Information Systems, Organization and Technology in the Networked Enterprise," Sixth Edition, Prentice Hall, 2000.

REFERENCES:

1.   E.F. Turban, R.K., R.E. Potter. "Introduction to Information Technology", Wiley, 2004.
2.   M. E. Brabston, "Management Information Systems: Managing the Digital Firm", Pearson Education, 2002.
3.   Jeffrey A. Hoffer, Joey F. George, Joseph S. Valachich, "Modern Systems Analysis and Design", Third Edition, Prentice Hall, 2002.

MC9273   WEB GRAPHICS
L T P C
3 0 0 3
UNIT I   INTRODUCTION   9
HTML coding - Basic web graphics - Web page design and site building - Image maps - Adding multimedia to the web- Vector and Raster graphics.

UNIT II   RASTER IMAGE EDITING SOFTWARE   9
Introduction - Image Basics - File Formats - GIF - JPEG - Color Palette – Color models- Layers - Creating new Images - Brushes – Grids and Guides- Gradients - Scaling

Images - Moving and Merging Layers - Tool Palette - Dialogs - Masking – Filters – Adding text to images – Designing icons and background images.

UNIT III   VECTOR IMAGE HANDLING   9
Introduction – Creating Simple Vector graphics – Creating banners -Images - Working with layers – Tweening - Motion guide – Masking – Frame by Frame animation – Onion Skin Effect – Creating special effects - Text effects and animation – Action scripts.

UNIT IV   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.

UNIT V   APPLICATIONS   9
Creating web site with a particular theme using all the utilities - Graphics - Animations and   Interaction.

REFERENCES:

1.   Richard   Schrand,   Photoshop   6   Visual   Jumpstrat,   Adobe   Press   2000.
2. James L. Mohles, Flash 5.0 Graphics, Animation & Interaction, Macromedia 2000.
3. Carey Bunks, Grokking the Gimp, NEW Riders Publishing, 2000.
4. Adobe creative team, Adobe photoshop elements 7 and Adobe premiere elements 7 classroom in a book collection, Adobe Press, 2009.
5. Adobe creative team, Adobe Flash CS4 professional classroom in a book, Adobe Press, 2009.
6. Tavmjong Bah, Inkscape-Guide to Vector Drawing Program, 2nd Edition, 2006.

MC9274   HUMAN RESOURCE MANAGEMENT

L T P C
3 0 0 3
UNIT I   PERSPECTIVES IN HUMAN RESOURCE MANAGEMENT   9
Evolution of human resource management – the importance of the human factor – objectives of human resource management – role of human resource manager – human resource policies – computer applications in human resource management.

UNIT II   THE CONCEPT OF BEST FIT EMPLOYEE   9
Importance of human resource planning – forecasting human resource requirement – internal and external sources. Selection process-screening – tests - validation – interview - medical examination – recruitment introduction – importance – practices – socialization benefits.

UNIT III   TRAINING AND EXECUTIVE DEVELOPMENT   9
Types of training, methods, purpose, benefits and resistance. Executive development programmes – common practices - benefits – self development – knowledge management.

UNIT IV   SUSTAINING EMPLOYEE INTEREST   9

Compensation plan – reward – motivation – theories of motivation – career management – development, mentor – protégé relationships.

UNIT V   PERFORMANCE EVALUATION AND CONTROL PROCESS   9
Method of performance evaluation – feedback – industry practices. Promotion, demotion, transfer and separation – implication of job change. The control process – importance – methods – requirement of effective control systems grievances – causes – implications – redressal methods.

TOTAL = 45

TEXT BOOKS:

1. Decenzo and Robbins, Human Resource Management, Wilsey, 6th edition, 2001.
2. Biswajeet Pattanayak, Human Resource Management, Prentice Hall of India, 2001.

REFERENCES:
1. Human Resource Management, Eugence Mckenna and Nic Beach, Pearson Education Limited, 2002.
2. Dessler Human Resource Management, Pearson Education Limited, 2002.
3. Mamoria C.B. and Mamoria S.Personnel Management, Himalaya Publishing Company, 1997.
4. Wayne Cascio, Managing Human Resource, McGraw Hill, 1998.
5. Ivancevich, Human Resource Management, McGraw Hill 2002.

MC9276   ADVANCED DATABASES

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UNIT I   PARALLEL AND DISTRIBUTED DATABASES
Database System Architectures: Centralized and Client-Server Architectures – Server System Architectures – Parallel Systems- Distributed Systems – Parallel Databases: I/O Parallelism – Inter and Intra Query Parallelism – Inter and Intra operation Parallelism – Distributed Database Concepts - Distributed Data Storage – Distributed Transactions – Commit Protocols – Concurrency Control – Distributed Query Processing – Three Tier Client Server Architecture- Case Studies**.**

UNIT II   OBJECT AND OBJECT RELATIONAL DATABASES
Concepts for Object Databases: Object Identity – Object structure – Type Constructors – Encapsulation of Operations – Methods – Persistence – Type and Class Hierarchies – Inheritance – Complex Objects – Object Database Standards, Languages and Design:

ODMG Model – ODL – OQL – Object Relational and Extended – Relational Systems : Object Relational feature sin SQL/Oracle – Case Studies.

UNIT III   XML DATABASES

XML Databases: XML Data Model – DTD - XML Schema - XML Querying – Web Databases – JDBC – Information Retrieval – Data Warehousing – Data Mining

UNIT IV   MOBILE DATABASES

Mobile Databases: Location and Handoff Management - Effect of Mobility on Data Management - Location Dependent Data Distribution - Mobile Transaction Models - Concurrency Control - Transaction Commit Protocols- Mobile Database Recovery Schemes

UNIT V   MULTIMEDIA DATABASES

Multidimensional Data Structures – Image Databases – Text/Document Databases- Video Databases – Audio Databases – Multimedia Database Design.

TOTAL = 45

REFERENCES

1.   R. Elmasri, S.B. Navathe, "Fundamentals of Database Systems", Fifth Edition, Pearson Education/Addison Wesley, 2007.

2.   Thomas Cannolly and Carolyn Begg, " Database Systems, A Practical Approach to Design, Implementation and Management", Third Edition, Pearson Education, 2007.

3.   Henry F Korth, Abraham Silberschatz, S. Sudharshan, "Database System Concepts", Fifth Edition, McGraw Hill, 2006.

4.   C.J.Date, A.Kannan and S.Swamynathan,"An Introduction to Database Systems", Eighth Edition, Pearson Education, 2006.

5.   V.S.Subramanian, "Principles of Multimedia Database Systems", Harcourt India Pvt Ltd., 2001.

6.   Vijay Kumar, " Mobile Database Systems", John Wiley & Sons, 2006.

MC9277   SOFTWARE QUALITY MANAGEMENT

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3 0 0 3

UNIT I   FUNDAMENTALS OF SOFTWARE QUALITY ENGINEERING   9

Concepts Of Quality – Hierarchical Modeling – Quality Models – Quality Criteria And Its Interrelation – Fundamentals Of Software Quality Improvement – Concepts Of Quality Improvement – Concepts Of Process Maturity – Improving Process Maturity.

UNIT II   DEVELOPMENTS IN MEASURING QUALITY   9

Selecting Quality Goals And Measures – Principles Of Measurement – Measures And Metrics –   Quality Function Deployment – Goal/Question/Measure Paradigm –

Quality Characteristics Tree – The FURPS Model And FURPS+ – Gilb Approach – Quality Prompts.

UNIT III QUALITY MANAGEMENT SYSTEM 9
Elements Of A Quality Engineering Program – Quality Control, Assurance And Engineering – Reliability, Maintainability, Verifiability, Testability, Safety And Supportability – Historical Perspective Elements Of QMS – Human Factors – Time Management – QMS For Software–Quality Assurance – ISO9000 Series–A Generic Quality Management Standard – Tools For Quality.

UNIT IV PRINCIPLES AND PRACTICES IN QMS 9
Process–Product–Project–People In Software Development And Management Spectrum – Principle And Critical Practices In QMS – ISO 9001 And Capability Maturity Models – Six Sigma, Zero Defects And Statistical Quality Control.

UNIT V MEASURES AND METRICS IN PROCESS AND PROJECT DOMAINS 9
Key Measures For Software Engineers – Defects – Productivity And Quality – Measuring And Improving The Development Process – Assigning Measures To Process Elements And Events – Isikawa Diagrams – Metrics For Software Quality – Integrating Metrics Within Software Engineering Process – Metrics For Small Organizations.

TOTAL = 45

REFERENCES:

1. Brian Hambling, "Managing Software Quality", Tata McGraw Hill.
2. Juran. J.M.Frank, M.Gyrna, "Quality Planning and Analysis (from product developmement through use)", Tata McGraw Hill.
3. Alcon Gillies, "Software Quality: Theory and Management", International Thomson, Computer Press 1997.
4. Stephen H.Kan, "Metrics and Models in Software Quality Engineering", Addison Wesley, 1955.
5. Roger S. Pressman, "Software Engineering - A Practitioner's Approach", Fifth Edition, McGraw Hill, 2001.
6. Humphrey Watts, "Managing the Software Process", Addison Wesley, 1986.

MC9278 TCP/IP DESIGN AND IMPLEMENTATION

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UNIT I INTRODUCTION 9
Internetworking concepts and architectural model– classful Internet address – CIDR–Subnetting and Supernetting –ARP– RARP– IP – IP Routing –ICMP – Ipv6.

UNIT II TCP 9
Services – header – connection establishment and termination– interactive data flow–bulk data flow– timeout and retransmission – persist timer – keep alive timer– futures and performance.

UNIT III IP IMPLEMENTATION 9
IP global software organization – routing table– routing algorithms–fragmentation and reassembly– error processing (ICMP) –Multicast Processing (IGMP).

UNIT IV TCP IMPLEMENTATION I 9

Data structure and input processing – transmission control blocks– segment format– comparison–finite state machine implementation–Output processing– mutual exclusion– computing the TCP data length.

UNIT V   TCP IMPLEMENTATION II   9

Timers–events and messages– timer process– deleting and inserting timer event– flow control and adaptive retransmission–congestion avoidance and control – urgent data processing and push function.

TOTAL = 45

TEXT BOOKS:

1. Douglas E.Comer, "Internetworking with TCP/IP Principles, Protocols and Architecture", Vol 1 & 2, fourth edition, Pearson Education Asia, 2003.
2. W.Richard Stevens "TCP/IP illustrated" Volume 1 Pearson Education, 2003.

REFERENCES:

1. Forouzan, "TCP/IP protocol suite" Second edition, Tata McGraw Hill, 2003.
2. W.Richard Stevens "TCP/IP illustrated" Volume 2, Pearson Education 2003.

MC9279   DISTRIBUTED SYSTEMS

L T P C
3 0 0 3

UNIT I   COMMUNICATION IN DISTRIBUTED ENVIRONMENT   8

Introduction – Various Paradigms in Distributed Applications – Remote Procedure Call – Remote Object Invocation – Message-Oriented Communication – Unicasting, Multicasting and Broadcasting – Group Communication.

UNIT II   DISTRIBUTED OPERATING SYSTEMS   12

Issues in Distributed Operating System – Threads in Distributed Systems – Clock Synchronization – Causal Ordering – Global States – Election Algorithms –Distributed Mutual Exclusion – Distributed Transactions – Distributed Deadlock – Agreement Protocols .

UNIT III   DISTRIBUTED RESOURCE MANAGEMENT   10

Distributed Shared Memory – Data-Centric Consistency Models – Client-Centric Consistency Models – Ivy – Munin – Distributed Scheduling – Distributed File Systems – Sun NFS.

UNIT IV   FAULT TOLERANCE AND CONSENSUS   7

Introduction to Fault Tolerance – Distributed Commit Protocols – Byzantine Fault Tolerance – Impossibilities in Fault Tolerance.

UNIT V   CASE STUDIES   8

Distributed Object-Based System – CORBA – COM+ – Distributed Coordination-Based System – JINI.

Total= 45

REFERENCES:
1. George Coulouris, Jean Dollimore, Tim Kindberg, "Distributed Systems Concepts and Design", Third Edition, Pearson Education Asia, 2002.
2. Hagit Attiya and Jennifer Welch, "Distributed Computing: Fundamentals, Simulations and Advanced Topics", Wiley, 2004.
3. Mukesh Singhal, "Advanced Concepts In Operating Systems", McGrawHill Series in Computer Science, 1994.
4. A.S.Tanenbaum, M.Van Steen, "Distributed Systems", Pearson Education, 2004.
5. M.L.Liu, "Distributed Computing Principles and Applications", Pearson Addison Wesley, 2004.

MC9280   DATA MINING AND DATA WAREHOUSING

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UNIT I   9

Data Warehousing and Business Analysis: - Data warehousing Components –Building a Data warehouse – Mapping the Data Warehouse to a Multiprocessor Architecture – DBMS Schemas for Decision Support – Data Extraction, Cleanup, and Transformation Tools –Metadata – reporting – Query tools and Applications – Online Analytical Processing (OLAP) – OLAP and Multidimensional Data Analysis.

UNIT II   9

Data Mining: - Data Mining Functionalities – Data Preprocessing – Data Cleaning – Data Integration and Transformation – Data Reduction – Data Discretization and Concept Hierarchy Generation.

Association Rule Mining: - Efficient and Scalable Frequent Item set Mining Methods –

Mining Various Kinds of Association Rules – Association Mining to Correlation Analysis – Constraint-Based Association Mining.

UNIT III   9

Classification and Prediction: - Issues Regarding Classification and Prediction – Classification by Decision Tree Introduction – Bayesian Classification – Rule Based Classification – Classification by Back propagation – Support Vector Machines – Associative Classification – Lazy Learners – Other Classification Methods – Prediction – Accuracy and Error Measures – Evaluating the Accuracy of a Classifier or Predictor – Ensemble Methods – Model Section.

UNIT IV   9

Cluster Analysis: - Types of Data in Cluster Analysis – A Categorization of Major Clustering Methods – Partitioning Methods – Hierarchical methods – Density-Based Methods – Grid-Based Methods – Model-Based Clustering Methods – Clustering High-Dimensional Data – Constraint-Based Cluster Analysis – Outlier Analysis.

UNIT V   9

Mining Object, Spatial, Multimedia, Text and Web Data:

Multidimensional Analysis and Descriptive Mining of Complex Data Objects – Spatial Data Mining – Multimedia Data Mining – Text Mining – Mining the World Wide Web.

Total = 45

REFERENCES

1. Jiawei Han and Micheline Kamber "Data Mining Concepts and Techniques" Second Edition,

2. Elsevier, Reprinted 2008.

3. Alex Berson and Stephen J. Smith "Data Warehousing, Data Mining & OLAP", Tata McGraw – Hill Edition, Tenth Reprint 2007.

4. K.P. Soman, Shyam Diwakar and V. Ajay "Insight into Data mining Theory and Practice", Easter Economy Edition, Prentice Hall of India, 2006.

5. G. K. Gupta "Introduction to Data Mining with Case Studies", Easter Economy Edition, Prentice Hall of India, 2006.

6. Pang-Ning Tan, Michael Steinbach and Vipin Kumar "Introduction to Data Mining", Pearson Education, 2007.

MC9281   COMPONENT BASED TECHNOLOGY

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UNIT I   INTRODUCTION   9
Software Components – objects – fundamental properties of Component technology – modules – interfaces – callbacks – directory services – component architecture – components and middleware.

UNIT II   JAVA COMPONENT TECHNOLOGIES   9
Threads – Java Beans – Events and connections – properties – introspection – JAR files – reflection – object serialization – Enterprise Java Beans – Distributed Object models – RMI and RMI-IIOP.

UNIT III   CORBA TECHNOLOGIES   9
Java and CORBA – Interface Definition language – Object Request Broker – system object model – portable object adapter – CORBA services – CORBA component model – containers – application server – model driven architecture.

UNIT IV   COM AND .NET TECHNOLOGIES   9
COM – Distributed COM – object reuse – interfaces and versioning – dispatch interfaces – connectable objects – OLE containers and servers – Active X controls – .NET components - assemblies – appdomains – contexts – reflection – remoting.

UNIT V   COMPONENT FRAMEWORKS AND DEVELOPMENT   9
Connectors – contexts – EJB containers – CLR contexts and channels – Black Box component framework – directory objects – cross-development environment – component-oriented programming – Component design and implementation tools – testing tools - assembly tools.

                                                TOTAL = 45
TEXT BOOKS:

1.   "Component Software: Beyond Object-Oriented Programming", Pearson Education publishers, 2003.

REFERENCES:

1.   Ed Roman, "Enterprise Java Beans", Third Edition , Wiley , 2004.

MC9282   MANAGERIAL ECONOMICS

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UNIT I   INTRODUCTION TO MANAGERIAL ECONOMICS   9
 Managerial Economics – meaning, nature and scope – Managerial Economics and business decision making – Role of Managerial Economist – Fundamental concepts of Managerial Economics. Demand Analysis – meaning, determinants and types of

demand – Elasticity of demand – Demand function – Demand curve – Estimation of the Demand Function.

UNIT II   SUPPLY, PRODUCTION AND COST ANALYSIS   9
Supply – meaning and determinants – Supply Function-Meaning of production – Production analysis: long run and short run – production functions – Isoquants - Expansion path – Cobb-Douglas function. Cost concepts – cost – output relationship: long run and short run – Economies and diseconomies of scale – cost functions – estimation of cost function.

UNIT III   MARKET STRUCTURE AND PRICE DETERMINATION   9
Market structure – Perfect Competition – Monopoly – Monopolistic Competition – Oligopoly - characteristics – Pricing of Goods and Services- Pricing and output decisions – Price Discrimination – Price Determinants – Profit Maximization and free pricing-methods of pricing – differential pricing – Government intervention and pricing.

UNIT IV   PROFIT AND INVESTMENT ANALYSIS   9
Profit - Meaning and nature – Profit policies – profit planning and forecasting –Cost volume profit analysis – Investment analysis – Meaning and Significance – Time Value of money – cash flow and measures of investment worth –payback period criterion – average rate of return criterion – net present value criterion – internal rate of return criterion – profitability – index criterion.

UNIT V   MACROECONOMIC ISSUE   9
National Income –concepts –determination of national income - Business cycle – Inflation and Deflation –types of inflation – causes of inflation- Balance of payments – account- assessing the balance of payments figures – Monetary and Fiscal Policies – attitudes towards monetary policy – problems of monetary policies – nature of fiscal policy- effectiveness of fiscal policy.

Total No of periods: 45

TEXT BOOK:

1. G.S. Gupta , " Managerial Economics", Tata McGrawhill, 1990.

REFERENCES:

1. Joel Dean, " Managerial Economics", Prentice Hall India. 1987
2. Evan J. Douglas, "Managerial Economics", Prentice Hall International, 1987.

MC9283   MOBILE COMPUTING

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3 0 0 3

UNIT I   WIRELESS COMMUNICATION FUNDAMENTALS   9
Introduction – Wireless transmission – Frequencies for radio transmission – Signals – Antennas – Signal Propagation – Multiplexing – Modulations – Spread spectrum – MAC – SDMA – FDMA – TDMA – CDMA – Cellular Wireless Networks.

UNIT II   TELECOMMUNICATION SYSTEMS   11
GSM – System Architecture – Protocols – Connection Establishment – Frequency Allocation – Routing – Handover – Security - GPRS

UNIT III   WIRELESS NETWORKS   9
Wireless LAN – IEEE 802.11 Standards – Architecture – services – HIPERLAN – AdHoc Network – Blue Tooth.

UNIT IV   NETWORK LAYER   9
Mobile IP – Dynamic Host Configuration Protocol – Routing – DSDV – DSR – AODV – ZRP – ODMR.

UNIT V   TRANSPORT AND APPLICATION LAYERS   7
TCP over Wireless Networks – Indirect TCP – Snooping TCP – Mobile TCP – Fast Retransmit / Fast Recovery – Transmission/Timeout Freezing – Selective Retransmission – Transaction Oriented TCP – WAP – WAP Architecture – WDP – WTLS – WTP – WSP – WML – WML Script – WAE – WTA.

TOTAL = 45

TEXT BOOKS:

1.   Jochen Schiller, "Mobile Communications", Second Edition, Prentice Hall of India
         / Pearson Education, 2003.
2.   William Stallings, "Wireless Communications and Networks", Second Edition,
          Prentice Hall of India / Pearson Education, 2004.

REFERENCES:

1.   Kaveh Pahlavan, Prasanth Krishnamoorthy, "Principles of Wireless Networks",
         Pearson Education, 2003.
2.   Uwe Hansmann, Lothar Merk, Martin S. Nicklons and Thomas Stober, "Principles
         of Mobile Computing", Springer, New York, 2003.
3.   C.K.Toh, "AdHoc Mobile Wireless Networks", Prentice Hall Inc., 2002.

MC9284   DIGITAL IMAGING

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3 0 0 3

UNIT I   FUNDAMENTALS OF IMAGE PROCESSING   9

Introduction – Steps in Image Processing Systems – Image Acquisition – Sampling and Quantization – Pixel Relationships – Colour Fundamentals and Models, File Formats, Image operations – Arithmetic, Geometric and Morphological.

.

UNIT II   IMAGE ENHANCEMENT   9

Spatial Domain Gray level Transformations Histogram Processing Spatial Filtering – Smoothing and Sharpening.Frequency Domain : Filtering in Frequency Domain – DFT, FFT, DCT – Smoothing and Sharpening filters – Homomorphic Filtering.

.

UNIT III   IMAGE SEGMENTATION AND FEATURE ANALYSIS   9

Detection of Discontinuities – Edge Operators – Edge Linking and Boundary Detection – Thresholding – Region Based Segmentation – Morphological WaterSheds – Motion Segmentation, Feature Analysis and Extraction.

UNIT IV   MULTI RESOLUTION ANALYSIS AND COMPRESSIONS   9

Multi Resolution Analysis : Image Pyramids – Multi resolution expansion – Wavelet Transforms.
Image Compression : Fundamentals – Models – Elements of Information Theory – Error Free Compression – Lossy Compression – Compression Standards.

UNIT V   APPLICATIONS OF IMAGE PROCESSING   9

Image Classification – Image Recognition – Image Understanding – Video Motion Analysis – Image Fusion – Steganography – Digital Compositing – Mosaics – Colour Image Processing..

TOTAL = 45

REFERENCES:

1.   Rafael C.Gonzalez and Richard E.Woods, "Digital Image Processing" Second Edition, Pearson Education, 2003.
2.   Milan Sonka, Vaclav Hlavac and Roger Boyle, "Image Processing, Analysis and Machine Vision", Second Edition, Thomson Learning, 2001
3.   Anil K.Jain, "Fundamentals of Digital Image Processing", Person Educaiton, 2003.

MC9285   ENTERPRISE RESOURCE PLANNING

L T P C
3 0 0 3

UNIT I   INTRODUCTION TO ERP   9

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   9
Implementation Life Cycle – Implementation Methodology – Hidden Costs – Organizing Implementation – Vendors, Consultants and Users – Contracts – Project Management and Monitoring.

UNIT III   BUSINESS MODULES   9
Business Modules in an ERP Package – Finance – Manufacturing – Human Resource – Plant Maintanance – Materials Management – Quality Management – Sales and Distribution.

UNIT IV   ERP MARKET   9
ERP Market Place – SAP AG – PeopleSoft – Baan Company – JD Edwards World Solutions Company – Oracle Corporation – QAD – System Software Associates.

UNIT V   ERP – PRESENT AND FUTURE   9
Turbo Charge the ERP System – EIA – ERP and E–Commerce – ERP and Internet – Future Directions in ERP.

TOTAL = 45

REFERENCES:

1.   Alexis Leon, "ERP Demystified", Tata McGraw Hill, 1999.
2.   Joseph A. Brady, Ellen F. Monk, Bret J. Wangner, "Concepts in Enterprise Resource Planning" , Thomson Learning, 2001.
3.   Vinod Kumar Garg and N.K .Venkata Krishnan, "Enterprise Resource Planning – concepts and Planning", Prentice Hall, 1998.
4.   Jose Antonio Fernandz, " The SAP R /3 Hand book", Tata McGraw Hill

MC9286   AGENT BASED INTELLIGENT SYSTEMS

L T P C
3 0 0 3

UNIT I   INTRODUCTION   9
Definitions - Foundations - History - Intelligent Agents-Problem Solving-Searching - Heuristics -Constraint Satisfaction Problems - Game playing.

UNIT II   KNOWLEDGE REPRESENTATION AND REASONING   9
Logical Agents-First order logic-First Order Inference-Unification-Chaining- Resolution Strategies-Knowledge Representation-Objects-Actions-Events

UNIT III   PLANNING AGENTS   9
Planning Problem-State Space Search-Partial Order Planning-Graphs-Nondeterministic Domains-Conditional Planning-Continuous Planning-Multi Agent Planning.

UNIT IV   AGENTS AND UNCERTAINITY   9
Acting under uncertainty – Probability Notation-Bayes Rule and use - Bayesian Networks-Other Approaches-Time and Uncertainty-Temporal Models- Utility Theory - Decision Network – Complex Decisions.

UNIT V   HIGHER LEVEL AGENTS   9
Knowledge in Learning-Relevance Information-Statistical Learning Methods-Reinforcement Learning-Communication-Formal Grammar-Augmented Grammars-Future of AI.

Total No of periods: 45

TEXT BOOK:
1. Stuart Russell and Peter Norvig, "Artificial Intelligence - A Modern Approach",2nd Edition, Prentice Hall, 2002

REFERENCES:
1. Michael Wooldridge, "An Introduction to Multi Agent System", John Wiley, 2002.
2. Patrick Henry Winston, Artificial Intelligence, 3rd Edition, AW, 1999.
3. Nils.J.Nilsson, Principles of Artificial Intelligence, Narosa Publishing House, 1992

MC9287   NATURAL LANGUAGE PROCESSING

L T P C
3 0 0 3

UNIT I   INTRODUCTION   9
Natural Language Processing – Linguistic Background- Spoken language input and output Technologies – Written language Input - Mathematical Methods - Statistical Modeling and Classification Finite State methods Grammar for Natural Language Processing – Parsing – Semantic and Logic Form – Ambiguity Resolution – Semantic Interpretation.

UNIT II   INFORMATION RETRIEVAL   9
Information Retrieval architecture - Indexing- Storage – Compression Techniques – Retrieval Approaches – Evaluation   - Search engines- commercial search engine features- comparison- performance measures – Document Processing - NLP based Information Retrieval – Information Extraction.

UNIT III   TEXT MINING   9
Categorization – Extraction based Categorization- Clustering- Hierarchical Clustering- Document Classification and routing- finding and organizing answers from Text search – use of categories and clusters for organising retrieval results – Text Categorization and efficient Summarization using Lexical Chains – Pattern Extraction.

UNIT IV   GENERIC ISSUES   9
Multilinguality – Multilingual Information Retrieval and Speech processing - Multimodality – Text and Images – Modality Integration - Transmission and Storage – Speech coding- Evaluation of systems – Human Factors and user Acceptability.

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UNIT V   APPLICATIONS   9
Machine Translation – Transfer Metaphor - Interlingua and Statistical Approaches - Discourse Processing – Dialog and Conversational Agents – Natural Language Generation – Surface Realization and Discourse Planning.

TOTAL = 45

TEXT BOOKS:

1.   Daniel Jurafsky and James H. martin, " Speech and Language Processing" , 2000.
2.   Ron Cole, J.Mariani, et.al "Survey of the State of the Art in Human Language Technology", Cambridge University Press, 1997.
3.   Michael W. Berry " Survey of Text Mining: Culstering, Classification and Retrieval", Springer Verlag, 2003.
4.   Christopher D.Manning and Hinrich Schutze, " Foundations of Statistical Natural Language Processing ", MIT Press, 1999.

REFERENCES:

1. James Allen " Natural Language Understanding ", Benjamin/ Cummings Publishing Co. 1995.
2. Gerald J. Kowalski and Mark.T. Maybury, "Information Storage and Retrieval systems", Kluwer academic Publishers, 2000.
3. Tomek Strzalkowski " Natural Language Information Retrieval ", Kluwer academic Publishers, 1999.
4. Christopher D.Manning and Hinrich Schutze, " Foundations of Statistical Natural Language Processing ", MIT Press, 1999.

MC9288   SOFTWARE AGENTS

L T P C
3 0 0 3

UNIT I   AGENTS – OVERVIEW   9
Agent Definition – Agent Programming Paradigms – Agent Vs Object – Aglet – Mobile Agents – Agent Frameworks – Agent Reasoning.

UNIT II   JAVA AGENTS   9
Processes – Threads – Daemons – Components – Java Beans – ActiveX – Sockets – RPCs – Distributed Computing – Aglets Programming – Jini Architecture – Actors and Agents – Typed and proactive messages.

UNIT III   MULTIAGENT SYSTEMS   9
Interaction between agents – Reactive Agents – Cognitive Agents – Interaction protocols – Agent coordination – Agent negotiation – Agent Cooperation – Agent Organization – Self-Interested agents in Electronic Commerce Applications.

UNIT IV   INTELLIGENT SOFTWARE AGENTS   9
Interface Agents – Agent Communication Languages – Agent Knowledge Representation – Agent Adaptability – Belief Desire Intension – Mobile Agent Applications.

UNIT V   AGENTS AND SECURITY   9
Agent Security Issues – Mobile Agents Security – Protecting Agents against Malicious Hosts – Untrusted Agent – Black Box Security – Authentication for agents – Security issues for Aglets.

TOTAL = 45

REFERENCES:

1. Bigus & Bigus, " Constructing Intelligent agents with Java ", Wiley, 1997.
2. Bradshaw, " Software Agents ", MIT Press, 2000.
3. Russel, Norvig, "Artificial Intelligence: A Modern Approach", Second Edition, Pearson Education, 2003.
4. Richard Murch, Tony Johnson, "Intelligent Software Agents", Prentice Hall, 2000.
5. Gerhard Weiss, "Multi Agent Systems – A Modern Approach to Distributed Artificial Intelligence", MIT Press, 2000.

MC9289   SUPPLY CHAIN MANAGEMENT

L T P C
3 0 0 3

UNIT I   BUILDING BLOCKS, PERFORMANCE MEASURES, DECISIONS   9
Building Blocks of a Supply Chain Network – Performance Measures – Decisions in the Supply Chain World – Models for Supply Chain Decision – Making.

UNIT II   SUPPLY CHAIN INVENTORY MANAGEMENT   9
Economic Order Quantity Models – Reorder Point Models – Multichelon Inventory Systems.

UNIT III   MATHEMATICAL FOUNDATIONS OF SUPPLY CHAIN SOLUTIONS 9
Use of Stochastic Models and Combinatorial Optimization in Supply Chain Planning – Supply Chain Facilities Layout – Capacity Planning – Inventory Optimization – Dynamic Routing and Scheduling – Understanding the "*internals"* of industry best practice solutions.

 UNIT IV   INTERNET TECHNOLOGIES AND ELECTRONIC COMMERCE IN SCM
9
Relation to ERP – Eprocurement – ELogistics – Internet Auctions – Emarkets – Electronic business process optimization – Business objects in SCM.

UNIT V   CASE STUDIES   9
Digital Equipment Case Study – IBM Case Study.

TOTAL = 45

REFERENCES:

1.   R.B. Handfield, E.L. Nochols Jr., "Introduction to Supply Chain Management", Pearson Education, 1999.
2.   Sunil Chopra, Peter Meindel, "Supply Chain Management: Strategy, P Planning, and Operation", Second Edition, Pearson Education, 2003.
3.   Jeremy F. Shapiro, "Modeling the Supply Chain", Duxbury Thomson Learning, 2001.
4.   David Simchi Levi, Philip kaminsky, Edith Simchi Levi, "Designing and Managing the Supply Chain: Concepts, Strategies, and Case Studies", Irwin McGraw Hill, 2000.
5.   W.J. Hopp, M.L. Spearman, "Factory Physics: Foundations of Manufacturing Management", Irwin McGraw–Hill, 1996.
6.   N. Viswanadham, "Analysis of Manufacturing Enterprises", Kluwer Academic Publishers, 2000.
7.   Sridhar Tayur, Ram Ganeshan, Michael Magazine, "Quantitative Models for Supply Chain Management", Kluwer Academic Publishers, 1999.
8.   N. Viswanadham, Y. Narahari, "Performance Modeling of Automated Manufacturing Systems", Prentice Hall of India, 1998.

MC9290   HEALTHCARE SYSTEMS

L T P C
3 0 0 3

UNIT I   INTRODUCTION   9
Introduction to health care information – Health care data quality – Health care information regulations, laws and standards.

UNIT II   HEALTH CARE INFORMATION SYSTEMS   9
History and evolution of health care information systems – Current and emerging use of clinical information systems – system acquisition – System implementation and support.

UNIT III   INFORMATION TECHNOLOGY   9
Information architecture and technologies that support health care information systems – Health care information system standards – Security of health care information systems.

UNIT IV   MANAGEMENT OF IT CHALLENGES   9
Organizing information technology services – IT alignment and strategic planning – IT governance and management.

UNIT V   IT INITIATIVES   9
Management's role in major IT initiatives – Assessing and achieving value in health care information systems.

TEXT BOOK:

1. Karen A Wager, Frances Wickham Lee, John P Glaser, " Managing Health Care Information Systems: A Practical Approach for Health Care Executives", Jossey-Bass/Wiley, 2005.

REFERENCE:

1. Rudi Van De Velde and Patrice Degoulet, "Clinical Information Sytems: A Componenet based approach", Springer 2005.

MC9291   PORTFOLIO MANAGEMENT

L T P C
3 0 0 3

UNIT I   MONEY AND CAPITAL MARKETS   8
Trends of savings and financial flow, the Indian Money market , introduction, characteristics of money market , need for money market, major segments of money market, money market instruments and Capital market, introduction, primary market and secondary market, recent capital market reforms, new capital issue, instruments and market participant

UNIT II   STOCK EXCHANGES   10
Nature and functions of stock exchange in India,organizational structure of the secondary marlet,stock exchanges and financial development in India, listing of securities in stock exchange-OTCEI market-New Issue Market- concepts and function, underwriting, role of new issue market ,mechanics of trading in stock exchanges.

UNIT III   FUNDAMENTAL ANALYSIS   8
Economic Analysis - Economic forecasting and stock Investment Decisions - Forecasting techniques. Industry Analysis - Industry classifications. Economy and Indus   try Analysis. Industry life cycle - Evaluating Industry relevant factors - External industry information sources. Company Analysis : Measuring Earnings - Forecasting Earnings - Applied valuation techniques - Graham and Dodds investor ratios.

UNIT IV   TECHNICAL ANALYSIS   10
Technical Analysis: Fundamental Analysis Vs Technical Analysis - Charting methods - Market Indicators. Trend - Trend reversals -   Patterns - Moving Average - Exponential moving Average - Oscillators - ROC - Momentum - MACD - RSI - Stoastics.Factors influencing share prices, forecasting stock prices - Efficient Market Theory - Risk and Returns.

UNIT V   PORTFOLIO ANALYSIS   9
Portfolio theory- Markowitz theory, Sharpe index model,CAPM.Portfolio investment model- basic principles, planning, implementation, portfolio objective and types. Portfolio evaluation – measures of return, formula plans,types of formula plans.Risk adjusted measure of performance – Sharpe's measure, Treynor's measure and Jensen's measure

Total No. of periods: 45

TEXT BOOKS:

1. V.K.Bhalla, "Investment Management", S.Chand & Company Ltd, New Delhi 2003.

REFERENCES:

1. Punithavathy Pandian, Security Analysis & Portfolio Management – Vikas Publishing House Pvt. Ltd., 2001.

2. V.A.Avadhani – Securities Analysis & Portfolio Management – Himalaya Publishing House, 1997.

MC9292   UNIX INTERNALS

L T P C
3 0 0 3

UNIT I   OVERVIEW   8
General Overview of the System : History – System structure – User perspective –
Operating system services – Assumptions about hardware. Introduction to the Kernel :
Architecture of the UNIX operating system – Introduction to system concepts. The Buffer
Cache: Buffer headers – Structure of the buffer pool – Scenarios for retrieval of a buffer
– Reading and writing disk blocks – Advantages and disadvantages of the buffer cache.

UNIT II   FILE SUBSYSTEM   8
Internal representation of files: Inodes – Structure of a regular file – Directories –
Conversion of a path name to an Inode – Super block – Inode assignment to a new file –
Allocation of disk blocks.

UNIT III   SYSTEM CALLS FOR THE FILE SYSTEM   10
 Open – Read – Write – File and record locking – Adjusting the position of file I/O –
Lseek – Close – File creation – Creation of special files – Changing directory, root,
owner, mode – stat and fstat – Pipes – Dup – Mounting and unmounting file systems –
link – unlink.

UNIT IV   PROCESSES   10
Process states and transitions – Layout of system memory – The context of a process –
Saving the context of a process – Manipulation of the process address space - Sleep.
Process Control : Process creation – Signals – Process termination – Awaiting process
termination – Invoking other programs – user id of a process – Changing the size of a
process - Shell – System boot and the INIT process– Process Scheduling.

UNIT V   MEMORY MANAGEMENT AND I/O   9
Memory Management Policies : Swapping – Demand paging. The I/O Subsystem :
Driver Interface – Disk Drivers –   Terminal Drivers– Streams –   Inter process
communication.

TOTAL = 45

TEXT BOOKS:
1.   Maurice J. Bach, "The Design of the Unix Operating System", First Edition,
       Pearson Education, 1999.

REFERENCES:

1.   B. Goodheart, J. Cox, "The Magic Garden Explained", Prentice Hall of
       India, 1986.
2.   S. J. Leffler, M. K. Mckusick, M. J. .Karels and J. S. Quarterman., "The
       Design and Implementation of the 4.3 BSD Unix Operating System",
       Addison Wesley, 1998.

MC9293   COMPILER DESIGN

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UNIT I   LEXICAL ANALYSIS   9
Compilers – Analysis of Source Program - Phases of Compiler – Compiler Construction Tools – Role of a Lexical Analyzer – Specification and Recognition of Tokens – Finite Automata – Regular Expression to Finite Automation.

UNIT II   SYNTAX ANALYSIS   9
Role of a Parser – Context Free Grammars – Top-Down Parsing – Bottom-Up Parsing – LEX and YACC.

UNIT III   INTERMEDIATE CODE GENERATION   9
Intermediate Languages – Declaration – Assignment Statements – Boolean Expressions – Flow Control Statements – Back Patching.

UNIT IV   CODE OPTIMIZATION   9
Introduction to Code Optimization – Principal Sources of Optimization – Basic Blocks and Flow Graphs – Optimization of Basic Blocks – Code Improving Transformations.

UNIT V   CODE GENERATION   9
Issues in the Design of a Code Generator – Run-Time Storage Management – Next Use Information – A Simple Code Generator – DAG Representation of Basic Blocks – Peephole Optimization – Code Generation from DAG.

TOTAL = 45

TEXT BOOKS:

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

REFERENCES:

1. Allen I. Holub, "Compiler Design in C", Prentice Hall of India, 1993.
2. Fischer Leblanc, "Crafting Compiler", Benjamin Cummings, Menlo Park, 1988.

MC9294   **ARTIFICIAL INTELLIGENCE**

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UNIT I   **INTRODUCTION**   **8**

Intelligent Agents – Agents and environments – Good behavior – The nature of environments – structure of agents – Problem Solving – problem solving agents – example problems – searching for solutions – uniformed search strategies – avoiding repeated states – searching with partial information.

UNIT II   **SEARCHING TECHNIQUES**   **10**

Informed search strategies – heuristic function – local search algorithms and optimistic problems – local search in continuous spaces – online search agents and unknown environments – Constraint satisfaction problems (CSP) – Backtracking search and Local search – Structure of problems – Adversarial Search – Games – Optimal decisions in games – Alpha – Beta Pruning – imperfect real-time decision – games that include an element of chance.

UNIT III   **KNOWLEDGE REPRESENTATION**   **10**

First order logic - syntax and semantics – Using first order logic – Knowledge engineering – Inference – prepositional versus first order logic – unification and lifting – forward chaining – backward chaining – Resolution – Knowledge representation – Ontological Engineering – Categories and objects – Actions – Simulation and events – Mental events and mental objects.

UNIT IV   **LEARNING**   **9**

Learning from observations – forms of learning – Inductive learning - Learning decision trees – Ensemble learning – Knowledge in learning – Logical formulation of learning – Explanation based learning – Learning using relevant information – Inductive logic programming - Statistical learning methods – Learning with complete data – Learning with hidden variable – EM algorithm – Instance based learning – Neural networks – Reinforcement learning – Passive reinforcement learning – Active reinforcement learning – Generalization in reinforcement learning.

UNIT V   **APPLICATIONS**   **8**

Communication – Communication as action – Formal grammar for a fragment of English – Syntactic analysis – Augmented grammars – Semantic interpretation – Ambiguity and disambiguation – Discourse understanding – Grammar induction **–** Probabilistic language processing **–** Probabilistic language models – Information retrieval – Information Extraction – Machine translation.

                                                                    Total = 45
REFERENCES

1. Stuart Russell, Peter Norvig, "Artificial Intelligence – A Modern Approach", Second Edition, Pearson Education / Prentice Hall of India, 2004.

2. Nils J. Nilsson, "Artificial Intelligence: A new Synthesis", Harcourt Asia Pvt. Ltd., 2000.

3. Elaine Rich and Kevin Knight, "Artificial Intelligence", Second Edition, Tata McGraw Hill, 2003.

4. George F. Luger, "Artificial Intelligence-Structures And Strategies For Complex Problem Solving", Pearson Education / PHI, 2002.

MC9295   PARALLEL AND DISTRIBUTED COMPUTING

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UNIT I   INTRODUCTION TO DISTRIBUTED ENVIRONMENT   8
Introduction – Client–Server Paradigm – Threads in Distributed Systems – Remote Procedure Call – Remote Object Invocation – Message-Oriented Communication - Unicasting – Group Communication – Reliable and Unreliable Multicasting.

UNIT II   INTRODUCTION TO PARALLEL COMPUTERS AND COMPUTATION 8
Introduction to Parallelism and computing; Parallel machine model; Parallel programming model; HPC/HTC models.

UNIT III   DESIGNING PARALLEL ALGORITHMS   10
Methodical design; Partitioning; Communication; Agglomeration; Mapping. Design and development of parallel processing systems. Unix workstation clusters. Master slave programming. Multi-threaded programming. Scheduling. Concurrency

UNIT IV   FAULT TOLERANCE AND DISTRIBUTED FILE SYSTEMS   10
Introduction to Fault Tolerance – Distributed Commit Protocol – Distributed File System Architecture – Issues in Distributed File Systems – Sun NFS.

UNIT V   CASE STUDIES   9
Distributed Object-Based System – CORBA – COM – Distributed Coordination Based System – JINI – Matrix Vector Multiplication – Combinatorial Search.

                                                    TOTAL= 45

TEXT BOOKS:
1. George Coulouris, Jean Dollimore, Tim Kindberg, "Distributed Systems
Concepts and Design", Third Edition, Pearson Education Asia, 2002.
2. Mukesh Singhal, "Advanced Concepts In Operating Systems", McGraw
Hill Series in Computer Science, 1994.
3. An Introduction to Parallel Computing, Design and Analysis of Algorithms, 2nd edition, A. Grama, V. Kumar, A. Gupta, Addison Wesley, 2003
4. Parallel Computing: Theory and Practice, M J Quinn, McGraw Hill, 1996.

MC9296   SOFT COMPUTING

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3 0 0 3

UNIT I   INTRODUCTION TO SOFT COMPUTING AND NEURAL NETWORKS 9
Evolution of Computing - Soft Computing Constituents – From Conventional AI to Computational Intelligence - Machine Learning Basics

UNIT II   GENETIC ALGORITHMS   9
Introduction to Genetic Algorithms (GA) – Applications of GA in Machine Learning - Machine Learning Approach to Knowledge Acquisition.

UNIT III   NEURAL NETWORKS   9
Machine Learning Using Neural Network, Adaptive Networks – Feed forward Networks – Supervised Learning Neural Networks – Radial Basis Function Networks - Reinforcement Learning – Unsupervised Learning Neural Networks – Adaptive Resonance architectures – Advances in Neural networks.

UNIT IV   FUZZY LOGIC   9
Fuzzy Sets – Operations on Fuzzy Sets – Fuzzy Relations – Membership Functions- Fuzzy Rules and Fuzzy Reasoning – Fuzzy Inference Systems – Fuzzy Expert Systems – Fuzzy Decision Making.

UNIT V   NEURO-FUZZY MODELING   9
Adaptive Neuro-Fuzzy Inference Systems – Coactive Neuro-Fuzzy Modeling – Classification and Regression Trees – Data Clustering Algorithms – Rulebase Structure Identification – Neuro-Fuzzy Control – Case studies.

TOTAL = 45

TEXT BOOKS:

1. Jyh-Shing Roger Jang, Chuen-Tsai Sun, Eiji Mizutani, "Neuro-Fuzzy and Soft Computing", Prentice-Hall of India, 2003.
2. George J. Klir and Bo Yuan, "Fuzzy Sets and Fuzzy Logic-Theory and Applications", Prentice Hall, 1995.
3. James A. Freeman and David M. Skapura, "Neural Networks Algorithms, Applications, and Programming Techniques", Pearson Edn., 2003.

REFERENCES:

1. Mitchell Melanie, "An Introduction to Genetic Algorithm", Prentice Hall, 1998.
2. David E. Goldberg, "Genetic Algorithms in Search, Optimization and Machine Learning", Addison Wesley, 1997.
3. S. N. Sivanandam, S. Sumathi and S. N. Deepa, "Introduction to Fuzzy Logic using MATLAB", Springer, 2007.
4. S.N.Sivanandam · S.N.Deepa, " Introduction to Genetic Algorithms", Springer, 2007.
5. Jacek M. Zurada, "Introduction to Artificial Neural Systems", PWS Publishers, 1992.