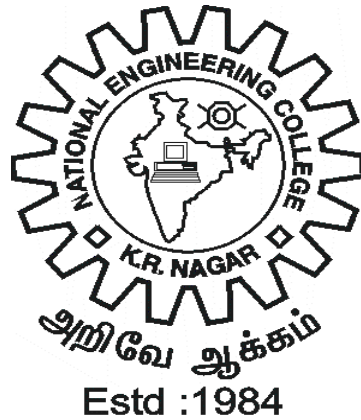


NATIONAL ENGINEERING COLLEGE

(An Autonomous Institution Affiliated to Anna University Chennai)

K.R.NAGAR, KOVILPATTI – 628 503

REGULATIONS - 2011



**DEPARTMENT OF
COMPUTER SCIENCE AND ENGINEERING**

**CURRICULUM AND SYLLABI OF
M.C.A. – MASTER OF COMPUTER APPLICATIONS**

NATIONAL ENGINEERING COLLEGE, K.R.NAGAR, KOVILPATTI
(An Autonomous Institution affiliated to Anna University Chennai)

M.C.A. – Master of Computer Applications

SEMESTER - I

Sl. No.	Course Code	Course Title	L	T	P	C
Theory						
1.	MCA101	Computer Organization	3	0	0	3
2.	MCA102	Problem Solving and Programming	3	0	0	3
3.	MCA103	Database Management Systems	3	0	0	3
4.	MCA104	Data Structures	3	0	0	3
5.	MME102	Accounting and Financial Management	3	1	0	4
Practical						
6.	MCA131	Programming and Data Structures Laboratory	0	0	3	2
7.	MCA132	DBMS Laboratory	0	0	3	2
TOTAL			15	1	6	20

SEMESTER - II

Sl. No.	Course Code	Course Title	L	T	P	C
Theory						
1.	MMA201	Mathematical Foundations of Computer Science	3	1	0	4
2.	MCA201	Object Oriented Programming	3	0	0	3
3.	MCA202	Design and Analysis of Algorithms	3	1	0	4
4.	MCA203	System Software	3	0	0	3
5.	MCA204	Operating Systems	3	0	0	3
Practical						
6.	MCA231	Object Oriented Programming Laboratory	0	0	3	2
7.	MCA232	System Programming Laboratory	0	0	3	2
8.	MCA233	Algorithms Laboratory	0	0	3	2
TOTAL			15	2	9	23

SEMESTER - III

Sl. No.	Course Code	Course Title	L	T	P	C
Theory						
1.	MCA301	Computer Networks	3	0	0	3
2.	MCA302	Object Oriented Analysis and Design	3	0	0	3
3.	MCA303	Software Engineering	3	0	0	3
4.	MCA304	Computer Graphics	3	0	0	3
5.	MCA305	Web Programming	3	0	0	3
Practical						
6.	MCA331	Graphics Laboratory	0	0	3	2
7.	MCA332	Case Tools Laboratory	0	0	3	2
8.	MCA333	Web Programming Laboratory	0	0	3	2
TOTAL			15	0	9	21

SEMESTER - IV

Sl. No.	Course Code	Course Title	L	T	P	C
Theory						
1.	MCA401	Network Programming	3	0	0	3
2.	MME401	Resource Management Techniques	3	0	0	3
3.	MCA402	Visual Programming	3	0	0	3
4.	MCA403	Compiler Design	3	0	0	3
5.	E-1	Elective	3	0	0	3
Practical						
6.	MCA431	Visual Programming Laboratory	0	0	3	2
7.	MCA432	Network Programming Laboratory	0	0	3	2
8.	MCA433	Compiler Design Laboratory	0	0	3	2
TOTAL			15	0	9	21

SEMESTER - V

Sl. No.	Course Code	Course Title	L	T	P	C
Theory						
1.	MCA501	System Administration and Management	3	0	0	3
2.	MCA502	.NET Programming and Scripts	3	0	0	3
3.	MCA503	XML and Web Services	3	0	0	3
4.	E-2	Elective	3	0	0	3
5.	E-3	Elective	3	0	0	3
Practical						
6.	MCA531	XML and Web Services Laboratory	0	0	3	2
7.	MCA532	.NET Programming Laboratory	0	0	3	2
8.	MCA533	Mini Project Work	0	0	3	2
TOTAL			15	0	9	21

SEMESTER - VI

Sl. No.	Course Code	Course Title	L	T	P	C
Practical						
1.	MCA631	Project Work	0	0	24	12
TOTAL			0	0	24	12

TOTAL CREDITS TO BE EARNED FOR THE AWARD OF THE DEGREE - 118

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

Sl. No.	COURSE CODE	COURSE TITLE	L	T	P	C
1.	MMA001	Numerical and Statistical Methods	3	1	0	4
2.	MCA001	Electronic Commerce	3	0	0	3
3.	MCA002	Information Systems	3	0	0	3
4.	MCA003	Web Graphics	3	0	0	3
5.	MME001	Human Resource Management	3	0	0	3
6.	MCA004	Advanced Databases	3	0	0	3
7.	MCA005	Software Quality Management	3	0	0	3
8.	MCA006	TCP/IP Design and Implementation	3	0	0	3
9.	MCA007	Distributed Systems	3	0	0	3
10.	MCA008	Data Mining and Data Warehousing	3	0	0	3
11.	MCA009	Component Based Technology	3	0	0	3
12.	MME002	Managerial Economics	3	0	0	3
13.	MCA010	Mobile Computing	3	0	0	3
14.	MCA011	Digital Imaging	3	0	0	3
15.	MCA012	Enterprise Resource Planning	3	0	0	3
16.	MCA013	Agent Based Intelligent Systems	3	0	0	3
17.	MCA014	Natural Language Processing	3	0	0	3
18.	MCA015	Software Agents	3	0	0	3
19.	MCA016	Supply Chain Management	3	0	0	3
20.	MCA017	Healthcare Systems	3	0	0	3
21.	MME003	Portfolio Management	3	0	0	3
22.	MCA018	Unix Internals	3	0	0	3
23.	MCA019	Artificial Intelligence	3	0	0	3
24.	MCA020	Parallel and Distributed Computing	3	0	0	3
25.	MCA021	Soft Computing	3	0	0	3
26.	MCA022	Software Project Management	3	0	0	3
27.	MCA023	Professional Ethics	3	0	0	3

MCA101 COMPUTER ORGANIZATION**L T P C
3 0 0 3****Objectives:**

1. To study the Digital fundamentals
2. To understand the concepts and issues of Computer Organization and Architecture together

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 / Subtractor – Encoder – Decoder – MUX / DEMUX – Comparators, Flip Flops – Triggering – Master – Slave Flip Flop – StateDiagram 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, Fifth 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”, Third Edition, Tata McGraw Hill, 1998.

MCA102	PROBLEM SOLVING AND PROGRAMMING	L T P C
		3 0 0 3

Objectives:

1. To learn and analyze problems and to formulate algorithms.
2. To introduce computer systems with emphasis on hardware,
3. To learn about numerical methods used to solve engineering problems with the help of computer programs.

UNIT I	INTRODUCTION TO PROGRAMMING	9
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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
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Procedural – functional – recursive – rule-based – structured programming.

UNIT III	PROBLEM SOLVING TECHNIQUES	9
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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
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Structured program development – Data types – operators – expressions – control flow – arrays and pointers – functions – Input – output statements – storage classes.

UNIT V	ADVANCED FEATURES	9
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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”, Second 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.

MCA104 DATA STRUCTURES**L T P C
3 0 0 3****Objectives:**

1. To analyze the usage of different data structures and algorithm design methods which impacts the performance of programs.
2. To teach how to choose the appropriate data structure and algorithm design method for a specified application.
3. Write programs using object oriented design principles.
4. To solve problems using algorithm design methods such as the greedy method, divide and conquer, dynamic programming, backtracking, and branch and bound and writing programs for these solutions.

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

TOTAL = 45**TEXTBOOK:**

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

REFERNCES:

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

MME102	ACCOUNTING AND FINANCIAL MANAGEMENT	L T P C
		3 1 0 4

Objectives:

1. To understand the scope of accounting and its principles
2. To study the various analysis methods in accounting
3. To study the various budgeting and computerized accounting
4. To know about the working capital management

UNIT I	FINANCIAL ACCOUNTING	12
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Meaning and Scope of Accounting-Principles-Concepts-Conventions-Accounting Standards-Final Accounts-Trial Balance-Trading Account-Profit and Loss Account- Balance Sheet-Accounting Ratio Analysis-Funds Flow Analysis-Cash Flow Analysis

UNIT II	ACCOUNTING	12
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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	12
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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	12
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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	12
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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

TUTORIAL = 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

REFERENCE:

1. S.P.Iyengar, "Cost and Management Accounting", Sultan Chand & Co, 2. I.M.Pandey, "Elements of Management Accounting" Vikas Publishing House, 1993

MCA131 PROGRAMMING AND DATA STRUCTURES LABORATORY L T P C
0 0 3 2

Lab Objectives:

1. Learn how to implement some useful concepts of data structures
2. To implement various sorting techniques.
3. To understand the effect of data structures on an algorithm's complexity.

List of Experiments:

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

Required Software: C, C++

MCA132**DBMS LABORATORY****L T P C****0 0 3 2**

Lab Objectives:

To understand the fundamentals as well as advanced concepts of Databases, Oracle, SQL Server and MS-Access.

List of Experiments:

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

Required Software: Oracle 9i, SQL Server and MS-Access

MMA201 MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE**LT 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 - Principles 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.

LECTURE HOUR = 45 TUTORIAL = 15 TOTAL=60**REFERENCES:**

1. Kenneth H.Rosen, “Discrete Mathematics and Its Applications”, Tata McGraw Hill, 4th Edition, 2002 (Units 1,2 & 3).
2. Hopcroft and Ullman, “Introduction to Automata Theory, Languages and Computation”, Narosa Publishing House, Delhi, 2002. (Units 4,5)
3. A.Tamilarasi and 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.

MCA201 OBJECT ORIENTED PROGRAMMING**LT P C
3 0 0 3****UNIT I FUNDAMENTALS****9**

Object oriented programming concepts - objects - classes – methods and messages - abstraction and encapsulation - inheritance - abstract classes - polymorphism. Introduction to C++ - classes – access specifiers – function and data members - default arguments - function overloading - friend functions – const and volatile functions - static members – Objects – pointers and objects – constant objects – nested classes - local classes

UNIT II IMPLEMENTING ADTS AND ENCAPSULATION**9**

Constructors - default constructor - Parameterized constructors - Constructor with dynamic allocation – copy constructor – destructors – operator overloading - overloading through friend functions – overloading the assignment operator – type conversion - explicit constructor

UNIT III POLYMORPHISM**9**

Function and class templates - Exception handling – try-catch-throw paradigm – exception specification – terminate and unexpected functions – Uncaught exception.

UNIT IV TEMPLATES**9**

Inheritance - public, private, and protected derivations – multiple inheritance - virtual base class – abstract class – composite objects Runtime polymorphism – virtual functions – pure virtual functions – RTTI – typeid – dynamic casting – RTTI and templates – cross casting – down casting .

UNIT V INHERITANCE**9**

Streams and formatted I/O – I/O manipulators - file handling – random access – object serialization – namespaces - std namespace – ANSI String Objects – standard template library.

TOTAL = 45**TEXT BOOK:**

1. B. Trivedi, “Programming with ANSI C++”, Oxford University Press, 2007.

REFERENCES:

1. Ira Pohl, “Object Oriented Programming using C++”, Pearson Education, 2nd Edition Reprint 2004.
2. S. B. Lippman, Josee Lajoie, Barbara E. Moo, “C++ Primer”, Pearson Education, 4th Edition, 2005.
3. B. Stroustrup, “The C++ Programming language”, Pearson Education, 3rd Edition, 2004.
4. Herbert Schildt, “C++: The Complete Reference”, McGraw Hill, 4th Edition, 2002.

MCA202 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.

LECTURE HOUR = 45 TUTORIAL = 15 TOTAL=60**TEXT BOOK:**

1. Anany Levitin "Introduction to the Design and Analysis of Algorithms", Pearson Education, 2011.

REFERENCE:

1. Ellis Horowitz, Sartaj Sahni and Sanguthevar Rajasekaran, "Fundamentals of Computer algorithms", Prentice Hall, 2nd Edition, 2008.

MCA203 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 – MacroProcessing within Language Translators - Implementation examples: MASM MacroProcessor – 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 BOOK:**

1. I.A.Dhotre, A.A.Puntambekar, “System Software”, 1st Edition, Technical Publications Pune, 2008.

REFERENCES:

1. Leland L. Beck, “System Software – An Introduction to Systems Programming”, 3rd Edition, Pearson Education, Inc., 1999.
2. D. M. Dhamdhare, "Systems Programming and Operating Systems", Tata McGraw Hill Company, 1999.

MCA204 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**TEXT BOOK:**

1. Abraham Silberschatz Peter, B. Galvin, G. Gagne, “Operating System Concepts”, 7th Edition, J. Wiley & Sons, 2005.

REFERENCES:

1. M. J. Bach, “Design of the Unix Operating System”, Pearson Education, 1996.
2. William Stallings, “Operating systems: internals and design principles”, 6th Edition, Prentice Hall, 2008.

MCA231 OBJECT ORIENTED PROGRAMMING LABORATORY**L T P C
0 0 3 2**

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

MCA232 SYSTEM PROGRAMMING LABORATORY**L T P C**
0 0 3 2

1. Implementation of Assemblers.
2. Implementation of Linkers.
3. Implementation of Loaders.
4. Implementation of text editor's features
5. Implementation of Basic UNIX commands.
6. Implementation of Shell Programming.
7. Implementation of Grep, sed, awk commands
8. Implementation of File system related system calls.
9. Implementation of Process management – Fork, Exec.
10. Implementation of Message queues.
11. Implementation of Pipe, FIFO's.
12. Implementation of Signals.
13. Implementation of Shared memory concept.

MCA233 ALGORITHMS LABORATORY

L T P C
0 0 3 2

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

MCA302 OBJECT ORIENTED ANALYSIS AND DESIGN**LT P C****3 0 0 3****UNIT I INTRODUCTION 9**

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

UNIT II METHODOLOGY AND UML 9

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 9

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

UNIT IV OBJECT ORIENTED DESIGN 9

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

UNIT V SOFTWARE QUALITY 9

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

TOTAL=45**TEXT BOOK:**

1. Ali Bahrami, “Object Oriented System Development”, McGraw Hill International Edition, 2009.

REFERENCES:

1. Craig Larman, “Applying UML and Patterns”, 2nd Edition, Pearson, 2002.
2. Bernd Bruegge, Allen H. Dutoit, “Object Oriented Software Engineering using UML, Patterns and Java”, Pearson Education, 2004

MCA303 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) AND CASE TOOLS 9

Need for SCM – Version Control – SCM process – Software Configuration Items – Taxonomy – Case Repository – Features.

TOTAL = 45**TEXT BOOK:**

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

REFERENCES:

1. Ian Sommerville, “Software Engineering Harlow”, England: Pearson Education”, 8th Edition, 2007
2. Jalote, Pankaj , “An Integrated Approach to Software Engineering”, 3rd Edition , 2005
3. Ghezzi, Carlo, Mehdi Jazayeri, Dino Mandrioli, “Fundamentals of Software Engineering”, Pearson Education / Prentice-Hall, 2nd Edition , 2003
4. Sommerville, “Software Engineering”, 6th Edition, Addison Wesley-Longman, 2004.
5. Pankaj Jalote, “An Integrated approach to Software Engineering”, 2nd Edition, Springer Verlag, 1997.

MCA304 COMPUTER GRAPHICS**LT P C
3 0 0 3****UNIT I INTRODUCTION 9**

I/O devices – I/O primitives –Attributes of output primitives– DDA – Bresenham technique - Circle drawing algorithms – Interactive input methods.

UNIT II 2D GRAPHICS 9

2D Transformations – Clipping – Window – View Port Mapping – Graphical User Interfaces and Interactive Input Methods – Picture Construction Techniques – Virtual Reality Environment.

UNIT III 3D GRAPHICS 9

3D Transformation – 3D Viewing – Visible Surface Detection – Back Face Detection – Depth Buffer Method – Scan Line Method– Color Models.

UNIT IV OVERVIEW OF MULTIMEDIA 9

Multimedia Hardware and Software – Components of multimedia – Text, Image – Graphics – Audio – Video – Animation – Authoring – Multimedia Project development.

UNIT V MULTIMEDIA SYSTEMS AND APPLICATIONS 9

Multimedia Communication Systems – Database Systems – Synchronization issues – Presentation requirements – Applications – Video conferencing – Virtual reality – Interactive Video – Media on Demand.

TOTAL = 45**TEXT BOOK:**

1. Donald Hearn, Pauline Baker, “Computer Graphics – C Version”, 2nd Edition, Pearson Education, 2004.

REFERENCES:

1. Ralf Steinmetz, Klara Steinmetz, “Multimedia Computing, Communications and Applications”, Pearson education, 2004.
2. Tay Vaughan, “Multimedia Making It Work”, McGraw-Hill Osborne Media; 8th Edition, 2010
3. J. D. Foley, A. VanDam, S. K. Feiner, J. F. Hughes, “Computer Graphics Principles and Practice”, Addison and Wesley Publications, 2002.
4. Drew, “Fundamental of Multimedia”, Feurun, 2004.

MCA305 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 = 45**TEXT BOOKS:**

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

REFERENCES:

1. Keyur shah, “Gateway to Java Programmer Sun Certification”, Tata McGraw Hill, 2002.
2. Deitel and Deitel, “Java How to Program”, 6th Edition, Prentice Hall, 2005

MCA331 GRAPHICS LABORATORY**LT P C
0 0 3 2****1. IMPLEMENTATION OF THE FOLLOWING ALGORITHMS**

a) Line b) Circle c) Ellipse.

2. TWO DIMENSIONAL TRANSFORMATIONS:

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

3. 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.

4. VISIBLE SURFACE DETECTION:

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

5. 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 models. Creation of simple gif animated images with textual illustrations.

MCA332 CASE TOOLS LABORATORY**L T P C
0 0 3 2**

1. Practicing the different types of case tools such as Rational Rose and 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. Experiments in CASE Environments
 - a. Toolkits
 - b. Language-centered
 - c. Integrated
 - d. Fourth generation
 - e. Process-centered
7. Implementation of the following using CASE Work benches:
 - 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

MCA333 WEB PROGRAMMING LABORATORY**LT P C
0 0 3 2**

1. Study of internet connection procedures
2. Send and receive 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. Implementation of 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
 - a. Different types of inheritance study
 - b. Uses of 'this' keyword
 - c. Polymorphism
 - d. Creation of user specific packages
 - e. Creation of jar files and using them
 - f. 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. Implementation of reading and writing text files
11. Reading image files and manipulating them with image related classes and methods
12. Implementation of RMI application to access a remote method
13. Implementation of 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

MCA401 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 – shut down function – TCP echo Server (with multiplexing) – poll function – TCP echo Client (with Multiplexing)

UNIT IV SOCKET OPTIONS, ELEMENTARY UDP SOCKETS 9

Socket options – getsockopt and setsockopt 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**TEXT BOOKS:**

1. W. Richard Stevens, Stephen A. Rago , “Advanced Programming in the UNIX Environment”, 2nd Edition, Addison-Wesley Professional, 2005.
2. W. Richard Stevens, Bill Fenner, Andrew M. Rudoff, “Unix Network Programming, Volume 1: The Sockets Networking API”, 3rd Edition, Addison-Wesley Professional, 2003

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.

MME401 RESOURCE MANAGEMENT TECHNIQUES**LT 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 - $(M / M / 1) : (FIFO / \infty / \infty)$, $(M / M / 1) : (FIFO / N / \infty)$, $(M / M / C) : (FIFO / \infty / \infty)$, $(M / M / C) : (FIFO / N / \infty)$ models.

TOTAL = 45**TEXT BOOKS:**

1. Taha H.A., “Operations Research: An Introduction”, 9th Edition, Pearson Education, 2010
2. Frederick Hillier “Introduction to Operations Research”, 8th Edition, Pearson Education, 2009.

REFERENCES:

1. A.M.Natarajan, P.Balasubramani, A.Tamilarasi, “Operations Research”, Pearson Education, Asia, 2005.
2. Aditham B. Rao “Operations Research”, Jaico Publishing House, Mumbai, Edition 2008

MCA402 VISUAL PROGRAMMING**LT 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 – Forms 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 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 – Ctab Control – 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 – Database Management with ODBC – TCP/IP – Winsock and WinInet, – ActiveX control – creation and usage – Container class.

TOTAL =45**TEXT BOOKS:**

1. Charles Petzold, “Windows Programming”, 5th Edition, Microsoft press, 2006
2. Charles Petzold, “Programming Windows phone7”, 5th Edition, Microsoft press, 2010.
3. Ivor Horton's, “Beginning Visual C++ “, John Wiley and Sons, 2010

REFERENCES:

1. Steve Holzner, “Visual C++ 6 programming”, Wiley Dreamtech India Private Ltd., 2003.
2. Neil Smyth “Visual Basic Essentials”, Payload Media; 1st Edition 2010
3. Rod Stephens “Visual Basic 2008 Programmer's Reference (Programmer to Programmer)”, 1st Edition, February 5, 2008

MCA403 COMPILER DESIGN**L T P C
3 0 0 3****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 BOOK:**

1. A.V. Aho, Monica S. Lam, Ravi Sethi, J. D.Ullman, “Compilers - Principles, Techniques and Tools”, Pearson / Addison-Wesley Publishing Company, 2007.

REFERENCES:

1. Keith Cooper and Linda Torczon, “Engineering a Compiler”, 2nd Edition”, Benjamin Cummings, 2011.
2. J.P. Bennet, “Introduction to Compiler Techniques”, Second Edition, Tata McGraw Hill, 2003.

MCA431 VISUAL PROGRAMMING LABORATORY**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 and 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.

MCA432 NETWORK PROGRAMMING LABORATORY

**LT 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. Implementation of RPC
5. Development of applications such as DNS/ HTTP/ E – mail/ Multi - user Chat

MCA433 COMPILER DESIGN LABORATORY**L T P C****0 0 3 2**

- 1 & 2 Implement a lexical analyzer in “C”.
3. Use LEX tool to implement a lexical analyzer.
4. Implement a recursive descent parser for an expression grammar that generates arithmetic expressions with digits, + and *.
5. Use YACC and LEX to implement a parser for the same grammar as given in problem
6. Write semantic rules to the YACC program in problem 5 and implement a calculator that takes an expression with digits, + and * and computes and prints its value.
- 7 & 8. Implement the front end of a compiler that generates the three address code for a simple language with: one data type integer, arithmetic operators, relational operators, variable declaration statement, one conditional construct, one iterative construct and assignment statement.
- 9 &10. Implement the back end of the compiler which takes the three address code generated in problems 7 and 8, and produces the 8086 assembly language instructions that can be assembled and run using a 8086 assembler. The target assembly instructions can be simple move, add, sub, jump. Also simple addressing modes are used.

MCA501 SYSTEM ADMINISTRATION AND MANAGEMENT**L T P C
3 0 0 3****UNIT I SYSTEM ADMINISTRATION AND ETHICS 9**

Introduction – System Components – Host Management – User Management – Ethics in System Administration: The Law and Ethics – The Corporation’s rights versus User’s rights.

UNIT II DATABASE ADMINISTRATION 9

Data as a Corporate Asset – The Need for and Role of a Database in an Organization – Introduction of a Database: Special Considerations – The Evolution of the Database Administration Function – The Database Environment’s Human Component – Security – Database Administration Tools – Developing a Data Administration Strategy – The DBA at work: using Oracle.

UNIT III SYSTEM INFRASTRUCTURE DESIGN 9

Assigning IP Addresses – Naming Network Devices – Installing Wireless NICs – Measuring Wireless Signal Strength – Implementing Bluetooth – Implementing Ad Hoc Wireless Networking - Using an Analog Modem – Using a DSL Modem – Using a Router as a Frame Relay Switch – Simulating T1 CSU/DSUs

UNIT IV NETWORK ADMINISTRATION 9

Creating Local User Accounts - Creating Local User Groups – Managing Access to Resources – Disabling Local User Accounts – Setting Password Restrictions – Mitigating the Ping of Death – Securing Links between Routers – Guarding against SYN Flood Attacks – Implementing File-Level Encryption – Establishing Data Encryption between Routers – Creating Data Backups – Running an Antivirus Scan - Running an Anti- Spyware Scan – Searching for Operating System Updates.

UNIT V LINUX FILE SYSTEM MANAGEMENT 9

File System Organizations and File Types – File System Configuration – Optimizing storage and data access – Logical volume manager.

TOTAL = 45**TEXT BOOKS:**

1. Mark Burgess, “Principles of network and system administration”, John Wiley and Sons, 2004.(For Unit I)
2. Peter Rob, Carlos Coronol, “Database Systems: Design, Implementation and Management”, 8th Edition, Cengage Learning India (P) Ltd., 2009. (For Unit II)
3. Toby S. Kandier, “Network Administrator Street Smarts: A Real World Guide to CompTIA network + Skills”, Wiley Publishing Inc., 4th Edition, 2006.
4. Moshe Bar, “Linux File Systems”, McGraw Hill, 2001. (For Unit V)

REFERENCES:

1. William Von Hagen, “Linux File Systems”, Sams, 2002.
2. Craig S. Mullins, “Database Administration – The Complete Guide to Practices and Procedures”, Addison Wesley Professional, 1st Edition, 2002.
3. Thomas A. Limoncelli, Christina J. Hogan and Strata R. Chalup, “The Practice of System and Network Administration”, Pearson Education Inc., 2007.

MCA502	.NET PROGRAMMING AND SCRIPTS	L T P C
		3 0 0 3
UNIT I	THE CLR AND THE .NET FRAMEWORK	9
Assemblies, Versioning, Attributes, Reflection, Viewing MetaData, Type Discovery, Reflecting on a Type, Marshaling, Remoting, Understanding Server Object Types, Specifying a Server with an Interface, Building a Server, Building the Client, Using SingleCall, Threads.		
UNIT II	ADO .NET	9
Fundamentals – ADO.NET – Connection Oriented Architecture – Data Adapter – Connectionless – Datasets – Typed – Untyped – Transactions and locks – Concurrency – Data source controls – Data binding – Data grid.		
UNIT III	ASP .NET	9
Web Server concepts – ASP. NET Page – Page Directive – Code Behind – ASP.NET Controls – HTML Controls – Validation Controls – Data Binding – Repeater – Data Grid – Web.Configuration File – Request Response Objects – Session Management – Cookies – URL Rewriting		
UNIT IV	JAVA SERVER PAGE	9
J2EE and web services - Introduction to JSP and java servlets – servlets – overview of Java server pages		
UNIT V	ACTIVE SERVER PAGES	9
HTML and VB Script fundamentals – ASP concepts, using request, response, application, session, server objects – using cookies		
		TOTAL = 45

TEXT BOOKS:

1. Andrew Troelsen, “C# with .NET 3.0”, Special Edition, APress, 2007.
2. Matt Telles, Kogent Solutions Inc.Telles, “C# 2005 Programming, Black book”, Dreamtech press, 2007.
3. Deitel and Deitel “Internet and World Wide Web – How to program”, 4th Edition, Prentice Hall, 2007.

REFERENCES:

1. C. Stephen Perry, Stephen Walther, Atul Kahate , Joseph Mayo,” Essentials of .Net Related Technologies: With a focus on C# , XML, ASP .NET and ADO .NET”, 1st Edition, Pearson Education.
2. Achyut S Godbole and Atul Kahate, “Web Technologies – TCP/IP Architectures and Java Programming”, Second Edition, Tata McGraw Hill Education Pvt., Ltd., New Delhi, 2009.
3. Marty Hall and Larry Brown, Yaakov **Chaikin**, “Core Servlets and Java Server Pages Advanced Technologies”, 2nd Edition 2007.
4. Hoan Lam ,Thuan L.Thai ,”.Net Framework Essentials” ,2nd Edition,O ‘Reilly Media 2002.
5. Matt Telles, Kogent Solutions Inc.Telles, “C# 2005 Programming, Black book”, Dreamtech press, 2009.

MCA503 XML AND WEB SERVICES**L T P C**
3 0 0 3**UNIT I INTRODUCTION 9**

IT Architecture – Evolution And Development – Middleware – Remote Procedure Calls – Database Access – Distributed Transaction Processing – Message Queuing – Object Middleware – Internet Applications – Web Services – Middleware Inter Operability.

UNIT II XML TECHNOLOGY 9

Role of XML – XML and The Web – XML Language Basics – SOAP – Web Services – Revolutions of XML – Service Oriented Architecture (SOA). XML – Name Spaces – Structuring With Schemas and DTD – Presentation Techniques – Transformation – XML Infrastructure.

UNIT III SOAP 9

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

UNIT IV WEB SERVICES 9

Overview – Architecture – Key Technologies – UDDI – WSDL – ebXML – SOAP and Web Services in E-Com – Overview of .NET And J2EE.

UNIT V XML SECURITY 9

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

TOTAL = 45**TEXT BOOKS:**

1. Chris Britton, Peter Bye, “IT Architecture And Middleware, A Strategies for Building Large Integrated System”, Addison Wesley, 2004 (For Unit I).
2. Frank. P. Coyle, “XML, Web Services and the Data Revolution”, Pearson Education, 2002 (For Unit II).
3. Ramesh Nagappan, Robert Skoczylas and Rima Patel Sriganesh, “Developing Java Web Services”, Wiley Publishing Inc., 2004 (For Unit III, IV and V).

REFERENCES:

1. Sandeep Chatterjee, James Webber, “Developing Enterprise Web Services”, Pearson Education, 2004.
2. McGovern, et al., “Java Web Services Architecture”, Morgan Kaufmann Publishers, 2005.

MCA531 XML AND WEB SERVICES LABORATORY**L T P C****0 0 3 2**

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

MCA532 .NET PROGRAMMING LABORATORY**L T P C****0 0 3 2**

1. Implement an ASP.NET Application to validate the form using controls.
2. Write a program for Stock Market Exchange Using ASP.NET.
3. Design an application for a library management system using ADO.NET.
4. Implement a VB.NET program to display the Web Controls.
 - A List Box
 - A Button
 - An Image
 - A Label
 - A TextBox
5. Write a program for data Encryption and Decryption using VB.NET.
6. Design an application using VB.NET and connect with database.
7. Design a web application in ASP using IIS server.
8. Design a web application in ASP using ADO.
9. Implementation of online applications using JSP.
10. Write a JSP program using JavaBeans.

MMA001 NUMERICAL AND STATISTICAL METHODS**L T P C****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 and 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 = 60**TEXT BOOKS:**

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

REFERENCES:

1. A.M.Natarajan and 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.

MCA001 ELECTRONIC COMMERCE**LT 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 = 45**TEXT BOOK:**

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

REFERENCES:

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

MCA002 INFORMATION SYSTEMS**LT P C****3 0 0 3****UNIT I INFORMATION SYSTEM AND ORGANIZATION 9**

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 9

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 9

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 9

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 9

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=45**TEXT BOOKS:**

1. K. C. Laudon, J. P. Laudon, M. E. Brabston, “Management Information Systems: Managing the Digital Firm”, 9th Edition, Pearson Education, 2005.
2. K. C. Laudon, J. P. Laudon, “Management Information Systems, Organization and Technology in the Networked Enterprise,” 6th Edition, Prentice Hall, 2000.

REFERENCES:

1. E.F. Turban, R.K., R.E. Potter. “Introduction to Information Technology”, Wiley, 2004.
2. Jeffrey A. Hoffer, Joey F. George, Joseph S. Valachich, “Modern Systems Analysis and Design”, 3rd Edition, Prentice Hall, 2002.

MCA003 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

Website creation – concept – design issues – theme – utilities – Interactive animation – Design and development

TOTAL = 45**TEXT BOOK:**

1. James L. Mohles, “Flash 5.0 Graphics, Animation and Interaction”, Macromedia 2000

REFERENCES:

1. Richard Schrand, “Photoshop 6 Visual Jumpstrat”, 1st Edition, 2001.
2. Carey Bunks, “Grokking the Gimp”, NEW Riders Publishing, 2000.
3. Adobe creative team, “Adobe photoshop elements 7 and Adobe premiere elements 7 classroom in a book collection”, Adobe Press; 1st Edition , 2009.
4. Adobe creative team, “Adobe Flash CS4 professional classroom in a book”, Adobe Press, 2009.
5. Tavmjong Bah, “Inkscape-Guide to Vector Drawing Program”, Prentice Hall, 2nd Edition, 2006.

MME001 HUMAN RESOURCE MANAGEMENT**LT 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. Eugence Mckenna and Nic Beach, “Human Resource Management”, 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”, Tata McGraw Hill, 1998.
5. Ivancevich, “Human Resource Management”, McGraw Hill, 2002

MCA004	ADVANCED DATABASES	LT PC
		3 0 0 3
UNIT I	PARALLEL AND DISTRIBUTED DATABASES	9
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	9
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	9
XML Databases: XML Data Model – DTD - XML Schema - XML Querying – Web Databases – JDBC – Information Retrieval – Data Warehousing – Data Mining		
UNIT IV	MOBILE DATABASES	9
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	9
Multidimensional Data Structures – Image Databases – Text/Document Databases - Video Databases – Audio Databases – Multimedia Database Design.		

TOTAL = 45

TEXT BOOK:

1. R. Elmasri, S.B. Navathe, “Fundamentals of Database Systems”, 5th Edition, Pearson Education/Addison Wesley, 2007.

REFERENCES:

1. Thomas Connolly and Carolyn Begg, “Database Systems, A Practical Approach to Design, Implementation and Management”, 5th Edition, Addison-Wesley, 2009.
2. Henry F Korth, Abraham Silberschatz, S. Sudharshan, “Database System Concepts”, 6th Edition, McGraw Hill, 2010.
3. C.J.Date, A.Kannan and S.Swamynathan, ”An Introduction to Database Systems”, 8th Edition, Pearson Education, 2006.
4. V.S.Subramanian, “Principles of Multimedia Database Systems”, Harcourt India Pvt Ltd., 2001.
5. Vijay Kumar, “Mobile Database Systems”, John Wiley and Sons, 2006.

MCA005 SOFTWARE QUALITY MANAGEMENT**LT P C****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**TEXT BOOK:**

1. Stephen H.Kan, “Metrics and Models in Software Quality Engineering”, Addison Wesley, 2002

REFERENCES:

1. Brian Hambling, “Managing Software Quality”, Tata McGraw Hill, 1992.
2. Juran. J.M.Frank, M.Gyrna, “Quality Planning and Analysis: from product development through use”, Tata McGraw Hill, 1987.
3. Alcon Gillies, “Software Quality: Theory and Management”, International Thomson, Computer Press 1997.
4. Roger S. Pressman, “Software Engineering - A Practitioner’s Approach”, 5th Edition, McGraw Hill, 2001.
5. Humphrey Watts, “Managing the Software Process”, Addison Wesley, 1986.

MCA006 TCP/IP DESIGN AND IMPLEMENTATION**LT P C****3 0 0 3****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, 5th Edition, Pearson Education Asia, 2005.
2. W.Richard Stevens “TCP/IP illustrated”, Volume 1, Pearson Education, 2003.

REFERENCES:

1. Forouzan, “TCP/IP protocol suite”, 4th Edition, Tata McGraw Hill, 2010.
2. W.Richard Stevens “TCP/IP illustrated”, Volume II, Pearson Education 2003.

MCA007 DISTRIBUTED SYSTEMS**LT 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**TEXT BOOK:**

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

REFERENCES:

1. Hagit Attiya and Jennifer Welch, “Distributed Computing: Fundamentals, Simulations and Advanced Topics”, Wiley, 2004.
2. Mukesh Singhal, “Advanced Concepts In Operating Systems”, McGraw Hill Series in Computer Science, 1994.
3. A.S.Tanenbaum, M.Van Steen, “Distributed Systems”, Pearson Education, 2004.
4. M.L.Liu, “Distributed Computing Principles and Applications”, Pearson / Addison Wesley, 2004.

**MCA008 DATA MINING AND DATA WAREHOUSING LTP C
3 0 0 3**

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

TEXT BOOKS:

1. Alex Berson and Stephen J. Smith “Data Warehousing, Data Mining and OLAP”, Tata McGraw Hill Edition, 10th Reprint 2007. [Unit 1]
2. Jiawei Han, Micheline Kamber, and Jian Pei, “Data Mining: Concepts and Techniques”, 3rd Edition, Morgan Kaufmann, 2011. [Unit 2,3 and 4]
3. Jiawei Han and Micheline Kamber “Data Mining Concepts and Techniques”, 2nd Edition, Elsevier, Reprinted 2008. [Unit 5]

REFERENCE:

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

MCA009 COMPONENT BASED TECHNOLOGY**LT P C****3 0 0 3****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 file – 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 – ActiveX 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 BOOK:**

1. Clemens Szyperski, “Component Software: Beyond Object-Oriented Programming”, Pearson Education Publishers, 2003.

REFERENCES:

1. Tom Valesky, “Enterprise Java Beans”, Pearson Education, 2002
2. Jason Pritchard, “COM and CORBA side by side”, Addison Wesley, 2000
3. Mowbray, “Inside CORBA”, Pearson Education, 2002.
4. Jeremy Rosenberger, “Teach yourself CORBA in 14 days”, Tec media, 2000

MME002 MANAGERIAL ECONOMICS**LT P C
3 0 0 3****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 decision – 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 = 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.

MCA010 MOBILE COMPUTING**LT P C
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”, 2nd Edition, Prentice Hall of India / Pearson Education, 2004
2. William Stallings, “Wireless Communications and Networks”, 2nd Edition, Prentice Hall of India / Pearson Education, 2004.
3. Jia-Chin Lin, “Recent Advance in Wireless Communications and Networks”, In Tech publication, 2011

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.Toth, “Adhoc Mobile Wireless Networks”, Prentice Hall, 2002.

MCA011 DIGITAL IMAGING**LT P C
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 – Color Image Processing.

TOTAL= 45**TEXT BOOK:**

1. Rafael C. Gonzalez, Richard E. Woods, Steven L. Eddins, “Digital Image Processing Using MATLAB, 2nd Edition, Gatesmark Publishing, 2009.

REFERENCES:

1. Milan Sonka, Vaclav Hlavac and Roger Boyle, “Image Processing, Analysis and Machine Vision” Publisher: CL-Engineering, 3rd Edition, 2007
2. Anil K.Jain, “Fundamentals of Digital Image Processing”, Pearson Education, 2003.
3. Rafael C.Gonzalez and Richard E.Woods, “Digital Image Processing 3/E”, Pearson Education, 2008.

MCA012 ENTERPRISE RESOURCE PLANNING**LT 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 Maintenance – 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**TEXT BOOK:**

1. Alexis Leon, “ERP Demystified”, Tata McGraw Hill, 2007.

REFERENCES:

1. Hans Van Der Hoeven, “ERP and Business Process “, Llumina Press, 2011
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 Hernandez, Franklin Martinez and James Keogh, “SAP R/3 Handbook”, Third Edition , 2005

MCA013 AGENT BASED INTELLIGENT SYSTEMS**LT 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 UNCERTAINTY 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= 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, Addison Wesley, 1999.
3. Nils.J.Nilsson, “Principles of Artificial Intelligence”, Narosa Publishing House, 1992

MCA014	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.		
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 An Introduction to Natural Language Processing, Computational Linguistics, and Speech Recognition”, 2nd Edition, 2009
2. Ronald Allan Cole; et al, “Survey of the state of the art in human language technology, Cambridge:”, Cambridge University Press, 2010.
3. Steven Bird , Ewan Klein , Edward Loper , “ Natural Language Processing with Python”, 2009
4. Stephen Marsland , “Machine Learning: An Algorithmic Perspective (Chapman and Hall/Crc Machine Learning and Pattern Recognition)”, 2009.

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.

MCA015 SOFTWARE AGENTS**LT 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 and Bigus, “Constructing Intelligent agents with Java”, Wiley, 1997.
2. Bradshaw, “Software Agents”, MIT Press, 2000.
3. Russel, Norvig, “Artificial Intelligence: A Modern Approach”, 2nd 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.

MCA016 SUPPLY CHAIN MANAGEMENT**LT 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 – E-Logistics – Internet Auctions – E-markets –Electronic business process optimization – Business objects in SCM.

UNIT V CASE STUDIES 9

Digital Equipment Case Study – IBM Case Study.

TOTAL = 45**TEXT BOOKS:**

1. Sunil Chopra, Peter Meindl, "Supply Chain Management: Strategy, Planning, and Operation", 2nd Edition, Pearson Education, 2012.
2. Michael H. Hugos, "Essentials of Supply Chain Management", 2nd Edition, July 2011

REFERENCES:

1. Michael H. Hugos, Chris Thomas, "Supply Chain Management in the Retail Industry", 2006.
2. F. Robert Jacobs, Richard B. Chas, "Operations and Supply Chain Management", 13th edition, 2011.

MCA017 HEALTHCARE SYSTEMS**LT 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.

TOTAL = 45**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.

MME003 PORTFOLIO MANAGEMENT**LT 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 market,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 Industry 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 = 45**TEXT BOOK:**

1. V.K.Bhalla, “Investment Management”, S.Chand and Company Ltd, New Delhi, 2003.

REFERENCES:

1. Punithavathy Pandian, “Security Analysis and Portfolio Management”, Vikas Publishing House Pvt. Ltd., 2001.
2. V.A.Avadhani, “Securities Analysis and Portfolio Management”, Himalaya Publishing House, 1997.

MCA018 UNIX INTERNALS**LT 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 BOOK:**

1. Maurice J.bach, "The design of the unix operating system", Prentice Hall of India, 2004

REFERENCE:

1. Vahalia,"Unix Internals: the new frontiers:", Pearson education inc, 2003

MCA019 ARTIFICIAL INTELLIGENCE**L T P C**
3 0 0 3**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 – propositional 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**TEXT BOOK:**

1. Stuart Russell, Peter Norvig, “Artificial Intelligence – A Modern Approach”, 2nd Edition, Pearson Education / Prentice Hall of India, 2004.

REFERENCES:

1. Nils J. Nilsson, “Artificial Intelligence: A new Synthesis”, Harcourt Asia Pvt. Ltd., 2000.
2. Elaine Rich and Kevin Knight, “Artificial Intelligence”, 2nd Edition, Tata McGraw Hill, 2003.
3. George F. Luger, “Artificial Intelligence-Structures and Strategies for Complex Problem Solving”, Pearson Education / PHI, 2002.

MCA020 PARALLEL AND DISTRIBUTED COMPUTING**LT P C**
3 0 0 3**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 system - 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 BOOK:**

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

REFERENCES:

1. Mukesh Singhal, “Advanced Concepts in Operating Systems”, McGraw Hill Series in Computer Science, 1994.
2. A. Grama, V. Kumar, A. Gupta, “An Introduction to Parallel Computing”, 2nd edition, Addison Wesley, 2003.
3. M J Quinn, “Parallel Computing: Theory and Practice”, McGraw Hill, 1996.

MCA021 SOFT COMPUTING**LT P C
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 – Rule based 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. Timothy J. Ross, “Fuzzy Logic with Engineering Applications”, 3rd Edition, Wiley; 3rd Edition, 2010.
3. James A. Freeman and David M. Skapura, “Neural Networks Algorithms, Applications and Programming Techniques”, Pearson Education, 2003.

REFERENCES:

1. David E. Goldberg, “Genetic Algorithms in Search, Optimization and Machine Learning”, Addison Wesley, 1997.
2. S. N. Sivanandam, S. Sumathi and S. N. Deepa, “Introduction to Fuzzy Logic using MATLAB”, Springer; 2nd Edition , 2010
3. S.N.Sivanandam · S.N.Deepa, “Introduction to Genetic Algorithms”, Springer, 1st Edition, 2008

MCA022 SOFTWARE PROJECT MANAGEMENT**LT 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**TEXT BOOK:**

1. Bob Hughes and MikeCotterell “Software Project Management”, 4th Edition, Tata McGraw Hill Edition, 2006.

REFERENCES:

1. Ramesh, Gopaldaswamy, "Managing Global Projects ", Tata McGraw Hill, 2003.
2. P.Jalote “Software Project Management in Practice”, Pearson Education, 2002.

MCA023 PROFESSIONAL ETHICS**L T P C****3 0 0 3****UNIT I ENGINEERING ETHICS 9**

Senses of 'Engineering Ethics' – Variety of moral issues – Types of inquiry – Moral dilemmas – Moral Autonomy – Kohlberg's theory – Gilligan's theory – Consensus and Controversy – Professions and Professionalism – Professional Ideals and Virtues – Uses of Ethical Theories.

UNIT II ENGINEERING AS SOCIAL EXPERIMENTATION 9

Engineering as Experimentation – Engineers as responsible Experimenters – Research Ethics - Codes of Ethics – Industrial Standards - A Balanced Outlook on Law – The Challenger Case Study.

UNIT III ENGINEER'S RESPONSIBILITY FOR SAFETY 9

Safety and Risk – Assessment of Safety and Risk – Risk Benefit Analysis – Reducing Risk – The Government Regulator's Approach to Risk - Chernobyl and Bhopal Case Studies.

UNIT IV RESPONSIBILITIES AND RIGHTS 9

Collegiality and Loyalty – Respect for Authority – Collective Bargaining – on confidentiality – Conflicts of Interest – Occupational Crime – Professional Rights – Employee Rights – Intellectual Property Rights (IPR) – Discrimination.

UNIT V GLOBAL ISSUES 9

Multinational Corporations – Business Ethics - Environmental Ethics – Computer Ethics -Role in Technological Development – Weapons Development – Engineers as Managers – Consulting engineers – Engineers as Expert Witnesses and Advisors – Honesty – Moral Leadership –Sample Code of Conduct

TOTAL = 45**TEXT BOOKS:**

1. Mike Martin and Roland Schinzinger, "Ethics in Engineering", McGraw Hill, New York, 2005.
2. Charles E Harris, Michael S Pritchard and Michael J Rabins, "Engineering Ethics – Concepts and Cases", Thompson Learning, 2000.

REFERENCES:

1. Charles D Fleddermann, "Engineering Ethics", Prentice Hall, New Mexico, 1999.
2. John R Boatright, "Ethics and the Conduct of Business", Pearson Education, 2003
3. Edmund G Seebauer and Robert L Barry, "Fundamentals of Ethics for Scientists and Engineers", Oxford University Press, 2001.
4. Prof. (Col) P S Bajaj and Dr. Raj Agrawal, "Business Ethics – An Indian Perspective", Biztantra, New Delhi, 2004.
5. David Ermann and Michele S Shauf, "Computers, Ethics and Society", Oxford University Press, 2003