



# **ANNAMALAI UNIVERSITY**

**ANNAMALAINAGAR**

**FACULTY OF ENGINEERING AND TECHNOLOGY**

**DEPARTMENT OF COMPUTER SCIENCE AND  
ENGINEERING**

**MASTER OF COMPUTER APPLICATIONS**

**Choice Based Credit System**

**HAND BOOK**

**2011 – 2012 ONWARDS**

**DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING**  
**MASTER OF COMPUTER APPLICATIONS**  
**CHOICE BASED CREDIT SYSTEM**  
**(ON CAMPUS PROGRAMME)**  
**REGULATIONS AND SYLLABI**  
**REGULATIONS**

**CREDITS**

# MCA full-time programme will have a duration of six semesters. In the programme, the final semester is devoted to Project work only.

# Each course is normally assigned one credit per lecture/tutorial per week and one credit for two periods or part thereof for laboratory or practical.

# The number of credits per semester for the full time programme shall be as follows:

First to fifth semesters : An average of 19 credits per semester

Sixth semester : 15 credits

The total credits for the programme will be 110. For the award of the degree, the student has to earn a minimum of 110 credits.

**DURATION OF THE PROGRAMME**

# A student is normally expected to complete the fulltime programme in six semesters but in any case not more than six years from the time of admission.

**REGISTRATION FOR COURSES**

# A newly admitted student will automatically be registered for all the courses prescribed for the first semester, without any option.

# Every other student shall submit a completed registration form indicating the list of courses intended to be credited during the next semester. This registration will be done a week before the last working day of the current semester. Late registration with the approval of the Dean on the recommendation of the Head of the Department along with a late fee will be done up to the last working day.

# Registration for the project work shall be done only in the final semester.

**ASSESSMENT**

# The subjects of study, scheme of assessment and syllabi are enclosed in APPENDIX - P  
# The break-up of assessment and examination marks for theory courses is as follows.

First assessment (I Mid term test)	: 10 marks
Second assessment (II Mid term test)	: 10 marks
Third assessment	: 5 marks
Examination	: 75 marks

# The break-up of assessment and examination marks for practical courses is as follows.

First assessment (test)	: 15 marks
Second assessment (test)	: 15 marks
Maintenance of record book	: 10 marks
Examination	: 60 marks

# The Project work will be assessed for 40 marks by a committee consisting of the Head of the Department, the guide and a minimum of two members nominated by the Head of the Department. The Head of the Department will be the chairman. 60 marks are allotted for the project work and viva-voce examination at the end of the semester.

### **STUDENT COUNSELLOR**

# To help the students in planning their course of study and for general advice on the academic programme, the Head of the Department will attach a certain number of students to a member of the faculty who shall function as student counsellor for those students throughout their period of study. Such student counsellors shall advise the students, give preliminary approval for the courses to be taken by the students during each semester and obtain the final approval of the Head of the Department.

### **CLASS COMMITTEE**

# For each semester, separate class committees will be constituted by the respective Head of Department.

# The composition of the class committees for each semester except the final semester shall be as follows:

Teachers of the individual courses.

A project co-ordinator (in the final semester committee only) who shall be appointed by the Head of the Department from among the project supervisors.

One Professor or Reader, preferably not teaching the concerned class, appointed as chairman by the Head of the Department.

The Head of the Department may opt to be a member or the chairman. All student counsellors of the class, and the Head of the Department (if not already a member) or any staff member nominated by the Head of the Department may opt to be special invitees.

# The class committee shall meet four times during the semester.

The first meeting will be held within two weeks from the date of class commencement in which the type of assessment like test, assignment etc for the first and third assessments and the dates of completion of the assessments will be decided.

The second meeting will be held within a week after the completion of the first assessment to review the performance and for follow-up action.

The second assessment will be the mid-semester test.

The third meeting will be held within a week after the second assessment is completed to review the performance and for follow-up action.

The fourth meeting will be held after all the assessments except the examination are completed for all the courses, and at least one week before the commencement of the examinations. During this meeting the assessment on a maximum of 25 marks for theory and 40 marks for practical will be finalised for every student and tabulated and submitted to the Head of the Department for approval and transmission to the controller of examinations.

### **WITHDRAWAL FROM A COURSE**

# A student can withdraw from a course at any time before a date fixed by the Head of the Department prior to the second assessment, with the approval of the Dean of the Faculty on the recommendation of the Head of the Department.

### **TEMPORARY BREAK OF STUDY**

# A student can take a one-time temporary break of study covering the current semester and/or the next semester with the approval of the Dean on the recommendation of the Head of the Department, not later than seven days after the completion of the midsemester test. However, the student must complete the entire programme within the maximum period of six years for full time.

### **SUBSTITUTE ASSESSMENTS**

# A student who has missed, for genuine reasons accepted by the Head of the Department, one or more of the assessments of a course other than the end-of-semester examination, may take a substitute assessment for any one of the missed assessments. The substitute assessment must be completed before the date of the fourth meeting of the respective class committees.

# A student who wishes to have a substitute assessment for a missed assessment must apply to the Head of the Department within a week from the date of the missed assessment.

### **ATTENDANCE REQUIREMENTS**

# To be eligible to appear for the examination in a particular course, a student must put in a minimum of 80% of attendance in that course. However, if the attendance is 75% or above but less than 80% in any course, the authorities can permit the student to appear for the examination in that course on payment of the prescribed condonation fee.

# A student who withdraws from or does not meet the minimum attendance requirement in a course must re-register for and repeat the course.

### **PASSING AND DECLARATION OF EXAMINATION RESULTS**

# All assessments of all the courses on an absolute marks basis will be considered and passed by the respective results passing boards in accordance with the rules of the University. Thereafter, the controller of examinations shall convert the marks for each course to the corresponding letter grade as follows, compute the grade point average (GPA) and cumulative grade point average (CGPA) and prepare the grade cards.

90 to 100 marks	: Grade 'S'
80 to 89 marks	: Grade 'A'
70 to 79 marks	: Grade 'B'
60 to 69 marks	: Grade 'C'
55 to 59 marks	: Grade 'D'
50 to 54 marks	: Grade 'E'
Less than 50 marks	: Grade 'RA'
Insufficient attendance	: Grade 'I'
Withdrawn from the course	: Grade 'W'

A student who obtains less than 30 marks out of 75 for theory and 24 marks out of 60 for practical in the examination or is absent for the examination will be awarded grade 'F'. A student who earns a grade of S,A,B,C,D or E for a course is declared to have successfully completed that course and earned the credits for that course. Such a course cannot be repeated by the student.

A student who obtains letter grade F in a course has to reappear for the examination in that course.

A student who obtains letter grades I or W in a course must reregister for and repeat the course.

The following grade points are associated with each letter grade for calculating the grade point average and cumulative grade point average.

S - 10; A - 9; B - 8; C - 7; D - 6; E - 5; F - 0;

Courses with grades I and W are not considered for calculation of grade point average or cumulative grade point average. F grade will be considered for computing GPA and CGPA.

# A student can apply for retotalling of one or more of his examination answer papers within a week from the date of issue of grade sheet to the student on payment of the prescribed fee per paper. The application must be made to the controller of examinations with the recommendation of the Head of the Department.

# After results are declared, grade cards will be issued to the students. The grade card will contain the list of courses registered during the semester, the grades scored and the grade point average (GPA) for the semester. GPA is the sum of the products of the number of credits of a course with the grade point scored in that course, taken over all the courses for the semester, divided by the sum of the number of credits for all courses taken in that semester. CGPA is similarly calculated considering all the courses taken from the time of admission.

# The results of the final semester will be withheld until the student obtains passing grades in all the subjects of all the earlier semesters.

# After successful completion of the programme, the degree will be awarded with the following classifications based on CGPA.

For First Class with Distinction the student must earn a minimum of 110 credits within six semesters for fulltime from the time of admission, pass all the courses in the first attempt and obtain a CGPA of 8.25 or above.

For First Class the student must earn a minimum of 110 credits within seven semester for full-time from the time of admission and obtain a CGPA of 6.75 or above.

For second Class the student must earn a minimum of 110 credits within six years for full-time from the time of admission.

### **ELECTIVES**

# Apart from the various elective courses offered in the curriculum of the branch of specialisation, a student can choose a maximum of two electives from any specialisation under the faculty during the entire period of study, with the approval of the Head of the Department and the Head of the Department offering the course

APPENDIX-P

MASTER OF COMPUTER APPLICATIONS

FULL TIME ON CAMPUS PROGRAMME

Subjects of Study and Scheme of Assessment

(Effective from 2010-2011 onwards)

**SEMESTER I**

Code No	Course Name	L	T	Lb	D	Sessional marks	Exam marks	Total marks	Credits
MCA1110	Mathematical foundation for Computer Science	3	1	-	3	25	75	100	3
MCA1210	Data Structures	3	1	-	3	25	75	100	3
MCA1310	Data Base Management Systems	3	1	-	3	25	75	100	3
MCA1410	Microprocessor and applications	3	1	-	3	25	75	100	3
MCA1510	Problem Solving Techniques and C	3	1	-	3	25	75	100	3
MCA1610	Programming Lab - I (Office Automation Tools)		-	6	3	40	60	100	2
MCA1710	Programming Lab - II (Data Structures Using C)	-	-	6	3	40	60	100	2
	<b>TOTAL</b>	<b>15</b>	<b>5</b>	<b>12</b>	<b>21</b>	<b>205</b>	<b>495</b>	<b>700</b>	<b>19</b>

## SEMESTER II

Code No	Course Name	L	T	Lb	D	Sessional marks	Exam marks	Total marks	Credits
MCA2110	Accounting and Financial management	3	1	-	3	25	75	100	3
MCA2210	Computer Architecture	3	1	-	3	25	75	100	3
MCA2310	Visual Programming	3	1	-	3	25	75	100	3
MCA2410	Operating Systems	3	1	-	3	25	75	100	3
MCA2510	Object Oriented programming and C++	3	1	-	3	25	75	100	3
MCA2610	Programming Lab - III (OOPS and C++)	-	-	6	3	40	60	100	2
MCA2710	Programming Lab - IV (RDBMS and Operating system)	-	-	6	3	40	60	100	2
	TOTAL	15	5	12	21	205	495	700	19

L – LECTURE    T-Tutorial    Lb- Lab    D- Duration of Exam



**SEMESTER III**

Code No	Course Name	L	T	L b	D	Sessional marks	Exam marks	Total marks	Credits
MCA3110	Resource Management Techniques	3	1	-	3	25	75	100	3
MCA3210	Computer Networks	3	1	-	3	25	75	100	3
MCA3310	Software Engineering	3	1	-	3	25	75	100	3
MCA3410	Compiler Design	3	1	-	3	25	75	100	3
MCA3510	Unix and Windows Programming	3	1	-	3	25	75	100	3
MCA3610	Programming Lab - V (Visual Programming )	-	-	6	3	40	60	100	2
MCA3710	Programming Lab - VI (Unix and Windows)	-	-	6	3	40	60	100	2
	<b>TOTAL</b>	<b>15</b>	<b>5</b>	<b>12</b>	<b>21</b>	<b>205</b>	<b>495</b>	<b>700</b>	<b>19</b>

**SEMESTER IV**

Code No	Course Name	L	T	L b	D	Sessional marks	Exam marks	Total marks	Credits
MCA4110	Software Project Management and Quality Assurance	3	1	-	3	25	75	100	3
MCA4210	Internet and Java programming	3	1	-	3	25	75	100	3
MCA4310	Elective – I	3	1	-	3	25	75	100	3
MCA4410	Elective – II	3	1	-	3	25	75	100	3
MCA4510	Elective – III	3	1	-	3	25	75	100	3
MCA4610	Programming Lab - VII (Internet and Java )	-	-	6	3	40	60	100	2
MCA4710	Programming Lab -VIII (Compiler and Network)	-	-	6	3	40	60	100	2
	<b>TOTAL</b>	<b>15</b>	<b>5</b>	<b>12</b>	<b>21</b>	<b>205</b>	<b>495</b>	<b>700</b>	<b>19</b>

L – LECTURE    T-Tutorial    Lb- Lab    D- Duration of Exam

**SEMESTER V**

Code No	Course Name	L	T	Lb	D	Sessional marks	Exam marks	Total marks	Credits
MCA5110	Data Warehousing and Mining	3	1	-	3	25	75	100	3
MCA5210	Computer Graphics and Multimedia	3	1	-	3	25	75	100	3
MCA5310	Elective – IV	3	1	-	3	25	75	100	3
MCA5410	Elective – V	3	1	-	3	25	75	100	3
MCA5510	Elective – VI	3	1	-	3	25	75	100	3
MCA5610	Programming Lab - IX (Software Development Lab)	-	-	6	3	40	60	100	2
MCA5610	Soft skill Development	2	2	-	3	40	60	100	2
	<b>TOTAL</b>	<b>17</b>	<b>7</b>	<b>6</b>	<b>21</b>	<b>205</b>	<b>495</b>	<b>700</b>	<b>19</b>

L – LECTURE    T-Tutorial    Lb- Lab    D- Duration of Exam

**SEMESTER VI**

Code No	Course Name	L	T	Lb	D	Sessional marks	Exam marks	Total marks	Credits
MCA6110	Project work and Viva-Voce	-	-	-	-	40	60	100	15

## **LIST OF ELECTIVES:**

MCAXX10A	TCP/IP Network components
MCAXX10B	Neural Networks and Fuzzy Systems
MCAXX10C	Simulation and Modelling
MCAXX10D	Enterprise Resources Planning
MCAXX10E	Client / Server Computing
MCAXX10F	Natural Language Processing
MCAXX10G	Artificial Intelligence
MCAXX10H	Network Security
MCAXX10I	Mainframe Software
MCAXX10J	Managerial Economics
MCAXX10K	Fault Tolerant Computing
MCAXX10L	C# and .Net Frame work
MCAXX10M	Software testing
MCAXX10N	Web design and Management
MCAXX10O	Digital Imaging
MCAXX10P	Object Oriented Analysis and Design
MCAXX10Q	Distributed Objects COM/DCOM
MCAXX10R	Bio Informatics
MCAXX10S	Software Reuse
MCAXX10T	Grid Computing
MCAXX10U	Storage Management
MCAXX10V	Pervasive Computing
MCAXX10W	E-Commerce
MCAXX10X	Advanced Data Structures and Algorithms
MCAXX10Y	Service Oriented Architecture
MCAXX10Z	Open Source Resources
MCAXX10AA	Pattern Recognition
MCAXX10AB	Intellectual Property Rights
MCAXX10AC	Open CL Programming
MCAXX10AD	Windows Phone 7 Programming

## **MCA1110 MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE**

**AIM : To understand the Mathematical Foundations of Computer Science like Basic principles of set theory, logic, Formal languages and Automata.**

### **MATRIX ALGEBRA**

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

### **BASIC SET THEORY**

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

### **MATHEMATICAL LOGIC**

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.

### **FORMAL LANGUAGES**

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

### **FINITE STATE AUTOMATA**

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.

### **TEXTBOOKS:**

1. Kenneth H.Rosen, “ Discrete Mathematics and Its Applications”, Tata McGraw Hill,Fourth Edition, 2002
2. Hopcroft and Ullman, “Introduction to Automata Theory, Languages and Computation”, Narosa Publishing House, Delhi, 2002.

### **REFERENCES :**

1. A.Tamilarasi & A.M.Natarajan, “Discrete Mathematics and its Application”, Khanna Publishers, 2<sup>nd</sup> Edition 2005.
- 2 M.K.Venkataraman “Engineering Mathematics”, Volume II, National Publishing Company, 2<sup>nd</sup> Edition,1989.

## MCA1210 DATA STRUCTURES

AIM: To Understand the concepts of Various Fundamental data structures and algorithms

Arrays: Representation of arrays. Stacks and Queues: Fundamentals – Evaluation of expression Infix to Postfix Conversion – Multiple Stacks and Queues – Analysis of the algorithms

Linked List: Singly Linked List – Linked Stacks and Queues – Polynomial Addition – More on Linked List – Sparse Matrices - Doubly Linked List and Dynamic – Storage Management – Garbage Collection and Compaction

Binary Trees : Trees- Binary Tree- Binary search Trees- Implementation of Binary Trees- Searching a Binary search Tree- Tree Traversal – Insertion – Deletion – Balancing a Tree – Self – Adjusting Trees – Heaps – Polish notation and Expression Trees

Graphs: Terminology and Algorithms. Hashing - Hashing Functions- collision Resolution Techniques. Sorting and Searching algorithms: Bubble sort- Selection Sort- Insertion Sort- Quick sort- Merge Sort- Heap sort- Radix Sort- Binary search and Sequential search.

Case study: Recursion – Towers of Hanoi – Simulation of an Airport – Pattern Matching in strings – Game Trees.

### TEXT BOOKS:

1. Tremblay Sorenson, “An Introductions to Data Structures with Applications”, 2<sup>nd</sup> edition, Tata McGraw Hill Pub, Company Ltd.
2. Aho Alfred V., Hopperoft John E., Ullman Jeffrey D., “Data Structures and Algorithms”, Addison Wesley

### REFERENCES :

1. Yedidyah Langsam, Moshe J.Augenstein, Aaron M. Tenenbaum, ”Data Structures Using C”, Prentice,Hall,1996.

## MCA1310 DATA BASE MANAGEMENT SYSTEMS

AIM: To study in detail about the Fundamentals of Database Management Systems, Various models of Database and its related application

File System vs. DBMS – Views of data – Data Models – Database Languages – Database Management System Services – Overall System Architecture – Data Dictionary – Entity – Relationship (E-R) – Enhanced Entity – Relationship Model.

Relational Model – Relational Data Structure – Relational Data Integrity – Domain Constraints – Entity Integrity – Referential Integrity – Operational Constraints – keys – Relational Algebra – Fundamental operations – Additional Operations – SQL – Basic Structure – Set operations – Aggregate Functions – Null values – Nested Sub queries – Derived Relations – Views – Modification of the database – Joined Relations – Data Definition Language –Triggers.

Functional Dependencies – Pitfalls in Relational Database Design –Decomposition – Normalization using Functional Dependencies – Normalization using Multi-valued Dependencies – Normalization using Join Dependencies – Domain-Key Normal form.

Overview of Physical Storage Media – Magnetic Disks – RAID – Tertiary storage – File Organization – Organization of Records in Files – Indexing and Hashing –Ordered Indices – B+ tree Index Files – B tree Index Files – Static Hashing – Dynamic Hashing – Query Processing Overview – Estimation of Query Processing Cost- Join strategies – Transaction Processing – Concepts and States – Implementation of Atomicity and Durability – Concurrent Executions – Serializability – Implementation of Isolation – Testing for Serializability – Concurrency control – Lock Based Protocols – Timestamp Based Protocols

Distributed Databases – Data Storage – Network Transparency – Query processing – Transaction Model – Commit Protocols – Coordinator selection – Object Oriented Databases – Object Oriented Data Model – Object Oriented Languages – Persistent Programming languages – Persistent C++ Systems – Object relational Databases – Nested Relations – Complex types and Object Orientation – Querying with complex types – Creation of complex values and objects

### TEXT BOOK:

1. Abraham Silberschatz, Henry F. Korth, S. Sudharshan, “Database System Concepts”, Fourth Edition, Tata McGraw Hill, 2002.

### REFERENCES:

1. Ramez Elmasri, Shamkant B. Navathe, “Fundamentals of Database Systems”, FourthEdition ,Addision Wesley, 2002.
2. Raghu Ramakrishnan, “Database Management Systems”, Third Edition, McGraw Hill, 2002.
3. Jeffrey D.Ullman, “ Principles of Database systems”, Galgodia Publishers, 1988.

## **MCA1410 MICROPROCESSOR AND APPLICATIONS**

AIM: To understand about Microprocessor and Microcontroller and design methods and Interfacing Techniques to digital systems.

### **8-BIT MICROPROCESSOR**

Introduction-Evolution of Microprocessor 8085 Architecture and Memory interfacing I/O devices- Instruction set-Addressing Modes-Assembly language programming- Counters and time delays- Interrupts- Timing diagrams- Microprocessor applications.

### **MICROCONTROLLER**

Intel 8031/8051 Architecture- Special Function Registers (SFR)- I/O pins- ports and circuits- Instruction set-Addressing Modes-Assembly language programming- Timer and counter programming- Serial Communication- Connection to RS 232- Interrupts Programming- External Memory Interfacing- Introduction to 16 bit Microcontroller.

### **80X86 PROCESSORS**

8086 Architecture- Pin Configuration- 8086 Minimum and Maximum mode configurations- Addressing modes- Basic Instructions- 8086 Interrupts- Assembly levels programming- Introduction to 80186- 80286- 80386- 80486 and Pentium processors.

### **PERIPHERALS AND INTERFACING**

Serial and parallel I/O (8251 and 8255) – Programmable DMA Controller (8257)- Programmable interrupt controller (8259)- Keyboard display ADC/DAC interfacing- Inter integrated circuits interfacing (I2C standard).

### **MICROPROCESSOR BASED SYSTEMS DESIGN-DIGITAL INTERFACING**

Interfacing to alpha numeric displays- Interfacing to liquid crystal display (LCD 16x2 line) – High power Devices and Optical motor shaft encoders- Stepper motor interfacing – Analog interfacing and Industrial control –Microcomputer based small scale – Industrial process control system – Robotics and Embedded control – DSP and Digital Filters.

### **TEXT BOOKS:**

1. Ramesh S. Gaonkar, “Microprocessor Architecture Programming and Applications with 8085”, Fourth Edition, Penram International Publishing 2000.
2. Muhammad Ali Mazidi, Janice Gillespie Mazidi, “The 8051 Microcontroller”, Prentice Hall 2000.
3. Douglas V. Hall, “Microprocessor and interfacing, Programming and Hardware”, Tata McGraw Hill, Second Edition, 1999.

### **REFERENCES:**

1. Kenneth J. Ayala., “The 8051 Microcontroller Architecture Programming and Applications”, Penram International Publishing (India). 1996.
2. Kenneth J. Ayala., “The 8086 Microprocessor, Programming and Interfacing the PC”, Penram International Publishing. 1995.
3. Barry. B. Brey. “The Intel Microprocessor 8086/8088. 80186, 80286, 80386 and 80486 Architecture Programming and Interfacing”. Prentice Hall of India Pvt. Ltd. 1995.
4. Ray A.K. Bhurchandi. K.M, “ Advanced Microprocessor and Peripherals”, Tata McGraw, Hill, 2002.

## **MCA1510 PROBLEM SOLVING TECHNIQUES AND C**

**AIM :** To Study about the methods of analyzing Algorithms and to learn the C Language features.

### **INTRODUCTION TO COMPUTER PROBLEM SOLVING**

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

### **FUNDAMENTAL ALGORITHMS**

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

### **INTRODUCTION TO C LANGUAGE**

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

### **ARRAYS, FUNCTIONS, STRUCTURES AND UNIONS**

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

### **POINTERS AND FILE MANAGEMENT**

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

### **TEXTBOOK**

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

### **REFERNCES**

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



## MCA2110 ACCOUNTING AND FINANCIAL MANAGEMENT

**AIM:** To study the basic Accounting and Financial Management Practices

**Principles of Accounting:** Accounting Records - Systems - Double entry Book keeping - journal - Rules of journalising - Sub division of journal - Ledger-subdivision of ledger-Trial balance - Rectification of errors - Bank Reconciliation statement-Final Accounts -Trading & Profit & Loss A/c - Balance sheet.

**Analysis and Interpretation of Financial Statements:** Need for Analysis - Limitations of financial statements - comparative statements - Trend analysis - Ratio analysis -Balance Sheet Revenue Statement,Liquidity,Profitability and stability ratios.Fund flow analysis - Concept of funds-Techniques of Preparing fund flow statement-cash flow statement.

**Cost Control:** Introduction to costing - Advantages of cost accounting - methods of Costing - Elements of cost absorption of overheads-cost sheet. Marginal costing - Advantages - BEP - P/V Ratio and its uses.

**Fixed Assets and Working Capital Management:** Fixed assets - Nature - Capital budgeting - Methods of ranking investment decision - Discounted cash flow,Pay-back Period and Accounting Rate of Return.Working capital - Concept.

**Budgeting:** Budgeting and Budgetary control-meaning-objectives.Classification of budgets.Techniques of Preparing flexible Budgets.

### TEXT BOOKS:

- 1.M.C.Shukla & T.S.Grewal,"ADVANCED ACCOUNTS I",S.Chand & Co., 1992.
- 2.R.L.Gupta & M.Radhaswamy,"ADVANCED ACCOUNTANCY" Sultan Chand & Sons, 1989.
- 3.S.C.Kuchal,"FINANCIAL MANAGEMENT",Chitanya Publishing House, 1990.
- 4.N.L.Hingorani & A.R.Ramanathan,"MANAGEMENT ACCOUNTING",Sultan Chand & Sons, 1989.
- 5.S.N.Maheswari"PRINCIPLES OF COST ACCOUNTING",Sultan Chand & Sons, 1990.

### REFERENCES :

- 1.S.P.Jain & K.L.Narang,"ADVANCED ACCOUNTANCY",Kalyani Publishers, 1991.
- 2.Charles T.Horngreen,"INTRODUCTION TO MANAGEMENT",PHI, 1984.
- 3.Weston J.F. and Copeland,"MANAGERIAL FINANCE",Chitanya Publishing House, 1990.
- 4.Bhabtosu Bannerjee,"COST ACCOUNTING"World Press Pvt.Ltd., 1986.

## **MCA2210 COMPUTER ARCHITECTURE**

**AIM:** To study about design of instruction set, pipelining, memory system and multiprocessors and multicomputer

**OVERVIEW AND HISTORY** -The Cost Factor-Performance Metrics and Evaluating Computer Design- Memory Hierarchy-System Buses-Bus Inter Connection –PCI- Future bus.

### **INSTRUCTION SET DESIGN**

Assembly/Machine Language –Von Neumann Machine Cycle-Microprogramming – Firmware-Memory Addressing – Classifying Instruction Set Architectures – RISC VS CISC..

### **PIPELINING**

Comparison of Pipelined and non Pipelined Computers – Instruction and Arithmetic Pipelines – Structural Hazards and Data Dependencies – Branch Delay and multicycle instructions – Superscalar Computers.

### **MEMORY SYSTEM DESIGN**

Cache Memory – Basic Cache structure and Design – Fully associative- Direct and Set Associative Mapping – Analyzing Cache Effectiveness – Replacement Policies – Main Memory – Virtual Memory Structure and Design – Paging- Replacement Strategies- Secondary Memory.

### **MULTIPROCESSORS AND MULTICOMPUTERS**

SISD- SIMD and MIMD architectures- Centralized and Distributed Shared Memory- Architectures-Cache Coherence.

### **TEXTBOOK:**

1. J.Hennessy and D.Patterson- Morgan and Kafumann "Computer Architecture-A Quantitative approach"- Second Edition, 1996.

### **REFERNCES:**

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

## **MCA2310 VISUAL PROGRAMMING**

AIM: To Provide the Knowledge of Windows Programming Using Visual Basic and Visual C++

**WINDOWS PROGRAMMING:** Conceptual Comparison of Traditional Programming Paradigms - Overview of Windows Programming – Event driven programming - Data Types – Windows Messages – An introduction to GDI - Dynamic Linking Libraries.

**VISUAL BASIC PROGRAMMING:** Introduction – VB environment – Customizing a Form – Data Types – Variables – Scope of Variables – Arrays – Statements in VB - Functions and Procedures – Properties – Methods and Events – Modules.

Toolbox Controls – Control arrays – Flex Grid Control – Dialog Boxes – Common Dialog Control – Menus – MDI Forms – Accessing database with data control – Communicating with other Windows applications – VB and the Internet.

**VISUAL C++ PROGRAMMING:** VC++ Components – Microsoft foundation Classes – Event Handling – Document View` architecture – Menus – Dialog Boxes – Using VBX Controls – Using ActiveX Controls – Reading and Writing documents – SDI and MDI environments.

Splitter windows and Multiple views - MFC File Handling – Exception Handling – Debugging – Object Linking and Embedding – DLL – Database Management with ODBC.

### **TEXT BOOKS:**

1. Charles Petzold, “Windows Programming”, Microsoft Press, 1999.
2. Garry Cornell, “Visual Basic 6 from the Ground Up”, TMH, 1999.
3. Steven Holzner, “Visual C++ Programming”, Second Edition, PHI Publishers, 1997.

### **REFERENCES:**

1. Robert Lafore, “Windows Programming made easy”, Galgotia Publishers 1997.
2. David Krunglinski j., “Inside Visual C++”, Microsoft press, 1993.

## MCA2410 OPERATING SYSTEMS

**AIM : To Study about the basic principles of operating systems**

**Basics of OS:** Introduction – Fundamental Concepts – Overview of Operating Systems – Classes of operating systems – Batch processing systems- Multiprogramming systems- Real time operating systems- Distributed operating systems.

**Concurrency Issues:** Processes and threads – Scheduling – Preemptive and non preemptive scheduling – Real time scheduling – Disk scheduling – Disk scheduling Algorithm – Scheduling in Unix- OS/2 and windows NT- Deadlock – Prevention- Detection Avoidance and Recovery.

**Memory management:** Memory Management – Levels of Management Static and Dynamic memory allocation - contiguous and non contiguous memory allocation – Paging and segmentation – Fragmentation and compaction – swapping – overlays – virtual memory – Demand paging – Page Replacement Algorithm – Shared pages – memory mapped files.

**File management- Mutual exclusion and synchronization:** File systems – File system and IOCS – File operation – File Protection – Interface between file system and IOCS – Allocation – File access – File sharing – Security and Protection – File system of MSDOS and window NT – Mutual Exclusion and synchronization – Principles of concurrency – Mutual exclusion – Software Approaches – Hardware Support – Semaphore – Monitors – Message Passing.

**Implementation Issues:** I/O and resource management – I/O System Software – Disk Device Driver access Strategies – Modeling of disks – Unification of files and I/O devices – Generalized Disk drives – Disk caching – SCSI Device drivers – Resources in OS – Protection of resources – User authentication – Mechanism for protecting Hardware and software resources – External security.

### TEXT BOOKS:

1. D.M. Dhamdhere, “Operating Systems,A Concept Based Approach”, Tata McGraw Hill, 2<sup>nd</sup> edition, 2006.
2. Sibarshat z, Peterson and Galvin, “Operating system concepts”, Addison Wesley, third edition 1991.
3. William Stallings, “Operating systems – Internals and Design principles”, Prentice Hall, Third edition 1998.

### REFERENCES:

1. Andrew S. Tenenbaum, “Modern operating systems”, PHI, 2<sup>nd</sup> Edition 2001.
2. Achut S. Godbole and Kahata Atul, “Operating Systems and Systems programming”, Tata McGraw Hill 2003.
3. Charles Crowley, “Operating systems – A Design oriented approach”, Tata McGraw Hill, 1999.

## MCA2510 OBJECT ORIENTED PROGRAMMING AND C++

AIM : To study the concept and principles of object oriented programming

**PRINCIPLES OF OOP:** Software Crisis- Software Evolution-Programming Paradigms- Object Oriented Technology – Basic concepts and benefits of OOP- Application of OOP- OOP languages.

**INTRODUCTION TO C++:** History of C++ - Structure of C++-Applications of C++- Tokens- Keywords- Identifiers-Basic data types- Derived data types- Symbolic constants- Dynamic initialization -Reference variables- Scope resolution operator-Type modifiers- Type casting- Operators and control statements- Input and output statements- Function Prototyping-Function components- Passing parameters - call by reference, return by reference- Inline function- Default arguments - Overloaded function- Introduction to friend function.

**CLASSES AND OBJECTS:** Class specification- Member function definition- Nested member function- Access qualifiers- Static data members and member functions - Instance creation- Array of objects- Dynamic objects-Static Objects- Objects as arguments- Returning objects.

**CONSTRUCTORS AND DESTRUCTORS:** Constructors – Parameterized constructors- Overloaded Constructors- Constructors with default arguments-Copy constructors- Dynamic constructors-Dynamic initialization using constructors- Destructors. Operator overloading -Operator function – Overloading unary and binary operator-Overloading the operator using friend function-Stream operator overloading- Data Conversion.

**INHERITANCE:** Defining Derived classes- Single Inheritance- Protected Data with private inheritance- Multiple Inheritance- Multi level inheritance- Hierarchical Inheritance- Hybrid Inheritance-Multipath inheritance- Constructors in derived and base class- Template in inheritance-Abstract classes- Virtual function and dynamic polymorphism-Virtual Destructor- Nested Classes.

**FUNCTIONS IN C++:** Virtual Functions- Need for virtual function- Pointer to derived class objects- Definition of virtual functions- Array of pointer to base class objects- Pure virtual functions- Abstract classes- Virtual destructors- Generic Programming with Templates: Introduction, Function templates, overloaded function templates, user defined template arguments, class templates, Inheritance of class template.

**STREAMS:** Streams in C++- Stream classes- Formatted and unformatted data-Manipulators- User defined manipulators- File streams-File pointer and manipulation- File open and close- Sequential and random access. Exception Handling - Principle of exception handling-Exception handling mechanism, multiple catch, nested try, rethrowing the exception.

### TEXT BOOKS:

1. Herbert Schildt, "C++: The Complete Reference", Tata McGraw Hill Publishing Company, New Delhi, 2003.
2. Ashok N Kamthane, "Object Oriented programming with ANSI & Turbo C++", Pearson Education, New Delhi, 2003.

**REFERENCES:**

1. Venugopal K R , Rajkumar Buyya and Ravishankar T, “ Mastering C++”, Tata McGrawHill Publishing Company, NewDelhi, 2006.
2. Bjarne Stroustrup, ”C++ Programming Language”, Pearson Education, New Delhi, 2001.
3. Stanley B Lippman and Josee Lajoie, “C++ Primer”, Pearson Education, New Delhi, 2001.
4. E.Balagurusamy, "Object Oriented Programming in C++", TMH, Delhi, 1997.

## **MCA3110 RESOURCE MANAGEMENT TECHNIQUES**

AIM : To understand the underlying concepts of linear programming, Classical optimization theory and project scheduling.

Linear programming (LP) LP formulation and graphical solution - the simplex method - revised simplex method.

Duality and networks - definition of the dual problem - primal - Dual relationships - Dual simplex method - transportation and assignment models - transshipment models - network minimization - shortest route problems .

Integer programming - cutting plane algorithms, Branch and bound Algorithm - Multistage (dynamic) programming solution of LP by dynamic programming.

Classical optimization theory: unconstrained problem - Jacobian method - Lagrangean method - khun tucker conditions - simple problems.

Project scheduling. network diagram representation - critical path Computation - time charts and resources levelling – PERT Networks

### **TEXT BOOK:**

1.Taha A.H.,operations research an introduction , macmillan publishing company, New york,1997.

### **REFERENCES:**

1.Billey E. gillet, Introduction To Operations Research A Computer OrientedAlgorithmic Approach,Tata McGraw Hill,New Delhi, 1979.

## **MCA3210 COMPUTER NETWORKS**

**AIM:** To study the various models protocols, Networks services based on the Computer Networks

**Introduction:** The uses of computer networks - Network hardware - Network software - Reference models - Example of networks- Network standardization.

**The physical layer:** The theoretical basis for data communication – Guided Transmission media - Wireless transmission – PSTN - Mobile telephone - Communication satellite.

**The Data Link Layer:** Data link layer design issues - Error detection and correction - Elementary data link protocols - Sliding window protocols - Example of data link protocols- ETHERNET – 802.11- 802.16- Bluetooth- Data link layer Switching.

**The network layer:** Network layer design issues - Routing algorithms - Congestion control algorithms - Internetworking- Network layer in Internet. Network Services BOOTP and DHCP-Domain Name Service-WINS-Web Serving and Surfing Web servers -Web clients (browsers).

**The transport layer:** Transport layer design issues - Transport protocols - Simple transport protocol - Internet transport protocols UDP- TCP.

**The application layer:** Domain name system - Electronic mail - World wide web – Multimedia – Cryptography- Digital signature- Communication Security.

### **TEXT BOOK:**

1. Andrew S. Tanenbaum- “ Computer networks “ PHI- 4th edition 2002.

### **REFERENCES:**

1. William Stallings-” Data and computer communications”- PHI- 2001Douglas E. Comer-” Internetworking with TCP/IP-Volume-I”- PHI- 1997



## **MCA3310 SOFTWARE ENGINEERING**

**AIM** : To create software based on a set of procedures so that it can comply with some predefined standards.

### **INTRODUCTION**

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

### **REQUIREMENT ANALYSIS**

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

### **SOFTWARE DESIGN**

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

### **SOFTWARE TESTING**

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

### **SCM AND QUALITY ASSURANCE**

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

### **TEXT BOOK**

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

### **REFERENCES**

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

## MCA3410 COMPILER DESIGN

**AIM :** To study the basic principles involved in compiler Design

**INTRODUCTION TO COMPILERS:** Translators - Compilation and Interpretation- The phases of Compiler-Errors encountered in different phases-The grouping of phases- Compiler construction tools - A simple one-pass compiler-Language design- Programming language grammars-Derivation-Reduction and Ambiguity.

**LEXICAL ANALYSIS:** Need and role of lexical analyzer-Input Buffering-Lexical errors-Expressing tokens by Regular Expression - Finite Automata-Converting regular expression to NFA - Converting NFA to DFA-Minimization of DFA - Language for specifying lexical analyzers-LEX - Design of lexical analyzer for a sample language.

**SYNTAX ANALYSIS:** Need and role of the parser- Context Free Grammars -Top Down parsing-Recursive Parsing- Problems- Recursive Descent parser- Predictive Parser – LL(1) Parser -Bottom up parsers- shift reduce parser-operator precedence parsers- LR parser – LR (0) item – Construction of SLR Parsing table – CLR parser – LALR Parser. Error handling and recovery in syntax analyzer - YACC- Design of a syntax analyzer for a sample language.

**SYNTAX DIRECTED TRANSLATION:** Syntax-directed definitions-Construction of syntax trees-Bottom-up evaluation, L-attributed definitions-Top down translation, Recursive Evaluator Method, Comparison of Translation Methods. Syntax directed translation for declaration statements, assignment statements, Boolean expression, control flow statements, procedure calls.

**RUN-TIME ENVIRONMENT:** Source language issues-Storage organization-Storage allocation-access to non local names - parameter passing-Symbol tables.

**CODE OPTIMIZATION AND CODE GENERATION:** Principal sources of Optimization -Optimization of basic blocks-Global Optimization- Global data flow analysis-Efficient data flow algorithms-Issues in design of a code generator-A simple code generator algorithm.

### TEXT BOOK:

1. Alfred V Aho, Ravi Sethi and Jeffrey D Ullman, "Compilers – Principles, Techniques and Tools", Pearson Education, New Delhi, 2004.

### REFERENCES:

1. Sudha Sadasivam G, "Compiler Design", Scitech Publications (India) Private Limited, Chennai, 2008.
2. Dick Grone, Henri E Bal, Cerial J H Jacobs and Koen G Langendoen, "Modern Compiler Design", John Wiley & Sons, USA, 2000.
3. Dhamdhare D M, "Compiler Construction Principles & Practice", Macmillan India Limited, New Delhi, Second Edition, 1997.
4. Jean Paul Tremblay and Paul G Serenson, "The Theory & Practice of Compiler Writing", McGraw Hill Publishing Company, New Delhi, 1985.

## MCA3510 UNIX AND WINDOWS PROGRAMMING

AIM : To study the basic principles of Unix operating system shell programming and windows programming

Unix operating System : Unix Philosophy–login & Password –Commands : date,who,user,list,cat,wc,exit–The file system – General purpose utilities – the Bourne shell – The vi editor.

Programming with the shell – Advanced features of the shell – Simple filters – advanced filters– Line editing with Examples–System administration

Building a program – Types and names – Creating a main window – Event driven programming – Window messages – Displaying text Resources and projects – Menus

File common dialogue– Disk files –Text : Stock fonts – Text size – Text position – Scroll bars – Text input –Character strokes-Noncharecterstrokes

The resource workshop – Invoking dialog boxes – Radio button and check boxes – List boxes and combo boxes – Displaying menu items –Menu accelerator – Icons and cursors, Graphics, Debugging.

### TEXT BOOKS :

1. Sumithabha Das “UNIX system v.4 Concepts and Applications”,Tata McGrawhill Publications, Third edition, 1994 [units 1 and 2]
2. Robert Lafort “Windows programming made easy”, The Waite group, Galgoita Publications (p) ltd, First edition, 1993.[units 3-5]

### REFERENCES:

1. W.Richard Stevens “Advanced Programming in the Unix Environment” Addison Westley Publications, First Reprint , 1998.
2. Charles Petzold, “Programming Windows”,MicrosoftPress,Fifth Edition,1999.
3. Yashavant Kanetkar, “Unix Shell Programming”, BPB publications, 1996.
4. Brian.W.Kernighan, “The Unix Programming Environment”, Fourteenth IndianReprint, 1999.
5. Marc. J. Rozhkind, “Advanced Unix Programming”, Prentice Hall Software Series, 1985.
6. R.S.Tare, “Unix Utilities”, McGraw Hill, First Edition, 1988.

## **MCA4110 SOFTWARE PROJECT MANAGEMENT AND QUALITY ASSURANCE**

AIM: To study the software management framework and concepts of software quality control

Conventional Software Management – Evolution of Software Economics – Improving Software Economics – Conventional Versus Modern Software Project.

Software Management Process Framework – Lifecycle phases – Artifacts of the Process – Model Based Software Architectures – workflows of the Process – Checkpoints of the Process.

Software Management Disciplines – Iterative Process Planning – Organization and Responsibilities – Process Automation – Process Control and Process Instrumentation – Tailoring the Process.

Data Gathering and Analysis: Principles of Data Gathering- Data Gathering process- Software Measures- Data Analysis – Managing Software Quality – Defect Prevention.

Concepts of Quality Control- Quality Assurance and Quality Management – Total Quality Management – Cost of Quality – QC Tools – 7 QC Tools and Modern Tools.

Models for Quality Assurance – ISO 9000 Series – CMM- SPICE.

### **TEXT BOOKS**

1. Walker Royce- “Software Project Management – A Unified Framework”- Pearson Education- 2004.
2. Watts Humphrey- “Managing Software Process”- Addison-Wesley- 1998.

### **REFERENCES**

1. Ramesh Gopaldaswamy- “Managing Global Projects”- Tata McGrawHill- 2001.
2. Bob Hughes- Mikecatterell- “Software Project Management”- 3<sup>rd</sup> Edition- Tata McGraw Hill- 2004.
3. Philip B. Crosby- “Quality is Free: The Art of Making Quality Certain”- Mass Market- 1992.

## MCA4210 INTERNET AND JAVA PROGRAMMING

AIM: To Study about Internet, Core java. Java swing, JDBC, Java Beans and Servlets

Internet: Internet- Connecting to Internet: Telephone- Cable- Satellite connection- Choosing an ISP- Introduction to Internet Services- E-mail Concepts- Sending and Receiving secure E-mail- Voice and Video Conferencing.

Core Java: Introduction- Operators- Data types- Variables- Arrays- Control Statements- Methods & Classes- Inheritance- package and interface- Exception handling- Multithread programming- I/O- Java Applet- String handling- Networking- Event Handling- Introduction to AWT- AWT controls- Layout managers- Menus- Images- Graphics.

Java swing: Creating a swing Applet and Application- Programming using Panes- Pluggable Look and feel- Labels- Text fields- Buttons- Toggle Buttons- Checkboxes- Radio Buttons- View Ports- Scroll Panes- Scroll Bars- List- Combo Box- Progress bars- Menus and Toolbars- Layered Panes- Tabbed Panes- Split Panes- Layouts- Windows- Dialog Boxes- Inner frame.

JDBC: The connectivity Model- JDBC/ODBC Bridge- Java.sql package- connectivity to remote database- navigating through multiple rows retrieved from a database.

Java Beans: Application Builder tools- The bean developer kit(BDK)- JAR files- Introduction- Developing a simple bean- using bound properties- The java Beans API- Session Beans- Entity Beans- Introduction to Enterprise Java Beans(EJB)- Introduction to RMI(Remote Method Invocation): A simple client-server application using RMI.

Java Servlets: Servlet basic- Servlet API basic- Life cycle of a Servlet- Running Servlet- Debugging Servlet- Thread-safe Servlet- HTTP Redirects- Cookies- Introduction to Java server pages(JSP).

### TEXT BOOKS

1. Margaret Levine Young, "The Complete Reference Internet", TataMc-Graw Hill 1999
2. Herbert Schidt, "The Complete Reference JAVA2", TataMc-Graw Hill 5<sup>th</sup> edition, 2002

### REFERENCES

- 1 Balagurusamy E., "Programming with A Perimer 3e Java", TataMc-Graw Hill, 2007.
- 2 Dustin R. Callway, "Inside Servlets", Addison Wesley., 1999
3. Mark Watka "Using Java 2 Enterprise Edition", Que, 1<sup>st</sup> edition, 2001
4. Setven Holzner, "Java2 Black Book"-Coriolis Group Books, 2001

## MCA5110 DATA WAREHOUSING AND MINING

**AIM :** To study the basic principles of data mining and data warehousing architecture

**DATA MINING:** Introduction – Information and production factor – Data mining Vs Query tools – Data and machine learning- Machine learning and statistics-Data Mining in marketing – Data Mining and ethics- Nuggets and data mining- Database Mining – A performance and database Perspective- Self learning computer systems – Concept learning – Data mining and the Data Warehousing-

**KNOWLEDGE DISCOVERY PROCESS :** Knowledge discovery process – Data selection – Cleaning – Enrichment – Coding – Preliminary analysis of the data set using traditional query tools – Visualization techniques – Knowledge representation- Decision trees – Classification rules- Association rules –Rules with exceptions- rules involving relations- Trees for numeric - Instance-based representation- Neural Networks – Genetic Algorithms – Clustering - KDD (Knowledge Discovery in Databases) Environment.

**DATAWARE HOUSE – ARCHITECTURE:** Data warehouse Architecture – System Process – Process Architecture – Design – Database Schema – Partitioning Strategy – Aggregations – Data Marting – Meta Data – System and Data Warehouse Process Managers.

**HARDWARE AND OPERATIONAL DESIGN:** Hardware and operational design of Data Warehouse – Hardware Architecture – Physical Layout – Security – Backup and Recovery – Service – Level Agreement – Operating the Warehouse.

**PLANNING- TUNING AND TESTING:** Capacity planning – Tuning the Data Warehouse – Testing Warehouses – Data Warehouse Features.

### TEXT BOOKS :

1. Pieter Adriaans, Dolf zantinge, “Data Mining”, Pearson Education, 2007.
2. Sam Anahory, Dennis Murray, “Data Warehousing in the real world – A Practical Guide for Building Decision Support Systems”, Pearson Education, 2006.

### REFERENCES:

1. Ian.H.Witten & Eibe Frank, “Data Mining – Practical Machine Learning Tools and Techniques, Morgan Kaufmann Publishers, 2006
2. Jiawei Han, Micheline Kamber, “Data Mining: Concepts and Techniques” Morgan Kaufmann Publishers, 2000

## **MCA5210 COMPUTER GRAPHICS AND MULTIMEDIA**

AIM: To Understand the Computer Graphics Concept in detail and Multimedia System application.

### **INTRODUCTION**

Overview of Graphics System - Bresenham technique – Line Drawing and Circle Drawing Algorithms - DDA – 2D Clipping.

### **2D TRANSFORMATIONS**

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

### **3D TRANSFORMATIONS**

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

### **OVERVIEW OF MULTIMEDIA**

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

### **MULTIMEDIA SYSTEMS AND APPLICATIONS**

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

### **TEXT BOOKS:**

1. Hearn D and Baker M.P, "Computer Graphics – C Version", 2nd Edition, Pearson Education, 2004(Unit 1, 2 & 3)
2. Ralf Steinmetz, Klara Steinmetz, "Multimedia Computing, Communications and Applications", Pearson Education, 2004 (Unit 4 & 5)

### **REFERENCES**

1. Siamon J. Gibbs and Dionysios C. Tschritzis, "Multimedia programming", Addison Wesley, 1995.
2. John Villamil, Casanova and Leony Fernanadez, Eliar, "Multimedia Graphics", PHI, 1998.
3. William M. Newman, Robert F.Sproull, "Principles of interactive computer graphics", II Edition, McGraw Hill, 1989.
4. Steven Harrington, "Computer Graphics A programming Approach", McGraw Hill,1987

## **MCAXX10A TCP/IP Network Components**

**AIM** – To know about practical implementation of ISO-OSI model as TCP/IP Protocol suite and its Component protocols

### **STANDARDS, STANDARD ORGANISATIONS AND OSI Model**

ISO-ITU(T) – ANSI – IEEE – EIA

Internet standards – Maturity Levels – Requirement Levels

Internet Administration – ISOC – IAB – IETF – IRTF - IANA – ICANN – NIC

Layers in the OSI Model – Physical Layer – Data link Layer – Network Layer – Transport Layer – Session Layer – Presentation Layer – Application Layer.

TCP/IP Protocol suite – Physical and Data Link Layer – Network Layer – Transport Layer – Application Layer.

### **ADDRESSING, CONNECTING DEVICES AND ROUTING**

Addressing – Physical Address – Logical Address – Port Address.

IP Address – Address Space – Classful Addressing – Sub netting – Subnet Mask – Super netting.

Types of Address – Unicast, Multicast, Broadcast, Loopback address and anycast Address.

Connecting devices – Repeaters – Hubs / Concentrators – Bridges – Routers – Gateways.

Routing – Forwarding Techniques – Routing Techniques – Structure of a router.

### **Network Layer Components**

IP4 Header Format – IPV4 Options Field – IPV4 Flags – IPV4 Fragmentation.

IPV6 Header Format – IPV6 Extension Headers.

ICMP Message Format – Types of Messages – query – Checksum Calculation.

IGMP Message Format – IGMP Operation – Grap Management – Encapsulation.



## **Transport Layer Components**

Process to Process communication – User Datagram Protocol Format – Checksum – UDP Operation.

TCP Services – TCP format – TCP features – TCP Connection – State transition diagram – Flow control – Error control – Congestion control – TCP timers – TCP options.

## **DNS and Network Management SNMP**

DNS – Name space – Domain name space – Distribution of name space – DNS in the Internet – Resolution – DNS message Headers – Types of Records.

Network Management – SNMP – Managers and agents – Role of SNMP – Role of SMI – Role of MIB – SMI – MIB – SNMP PDU'S – SNMP Format

## **TEXT BOOKS :**

1. Benrouz. A. Forouzan, “TCP/IP Protocol Suite”, TMT, Third Edition 2006.

## **REFERENCE BOOK :**

1. W.Richard Sterens and G.Gabrani, “TCP/IP Illustrated, Volume 1, The Protocols”, Pearson Education, 2006

## **MCAXX10B NEURAL NETWORKS AND FUZZY SYSTEMS**

AIM: To learn basic concepts of neuron, model of neuron and Fuzzy logic and its operation

Introduction - Neural Networks Characteristics - History of development in neural networks - artificial neural net terminology - Model of a neuron - Types of learning. Supervised - Unsupervised learning - Perceptrons - Architecture of a Perceptron - Perceptron convergence algorithm - Generalized delta rule for weight adjustment - Theory of Backpropagation Training Algorithm - Rate of Learning- Training Considerations - Characteristics of BP Learning Algorithm - Limitations of BP Learning - Accelerated convergence of BP through learning-rate adaptation.

Learning - Unsupervised Learning - Hebbian Learning - Competitive Learning - Boltzmann Learning - Supervised Learning - Error-Correction learning - Reinforcement Learning - Recurrent Network - Basic Concepts - Hopfield Network - Operation Features of Hopfield Network - Error Performance of Hopfield Network - Storage Capacity of Hopfield Network.

Radial basis function neural networks - Basic learning laws in Radial basis function nets - Counter propagation networks - Adaptive resonance theory networks - Applications of neural nets such as pattern recognition – Optimization - Associative memories - speech and decision-making.

Fuzzy Logic - Basic concepts of Fuzzy Logic – Fuzzy set versus Crisp Set - Linguistic variables - membership functions - operations of fuzzy sets - Fuzzy IF-THEN rules - fuzzy relations - fuzzy conditional statements - fuzzy rules - fuzzy learning algorithms - applications of fuzzy logic.

Neuro-fuzzy and fuzzy-neural control systems - Adaptive fuzzy systems - optimizing the membership functions and the rule base of fuzzy logic controllers using neural networks - fuzzy transfer functions in neural networks.

### **TEXT BOOKS:**

1. S. Haykin, “Neural Networks: A Comprehensive Foundation”, 2<sup>nd</sup> Ed, Prentice-Hall (1999)
2. Timothy J.Ross, “Fuzzy Logic Engineering Applications”, McGraw Hill, New York, 1997.

### **REFERENCE BOOKS:**

1. Wasserman P.D, “Neural Computing Theory and Practice,” Van Nostrand Reinhold, New York, 1997.
2. Riza C Berkin and Trubatch, “Fuzzy systems Design Principles”, Building a Fuzzy IF, THEN Rule Bases, IEEE Press ISBN 0-7803-1151-.5.
3. Kosko, B, “Neural Networks and Fuzzy Systems : A Dynamical Approach to Machine Intelligence”, Prentice Hall, New Delhi , 1991.

## **MCAXX10C SIMULATION AND MODELING**

AIM: To study the concept of simulation systems, software, queuing models and their verification and validation.

Simulation systems – Nature of simulation systems- Models- Advantages and disadvantages-types of models-Discrete and continuous systems-simulation examples and principles-simulation of queuing systems and inventory systems-concepts in discrete-event simulation.

Simulation software- History of simulation s/w 96-General purpose simulation packages-classification of simulation packages-case study:Simulation in C++ or Java-comparison of simulation packages with programming languages.

Queueing Models-Characteristics of Queueing models-queueing notation long-run& steady -state Behavior of Infinite-Population Markovian Models and Finite-Population Models (M/M/c/K/K)- Networks of Queues 239

Random-Number Generation-Techniques for Generating Random Numbers- Tests for Random Numbers .Random-Variate Generation-Inverse-Transform Technique-Acceptance-Rejection Technique.Input Modeling-Data Collection- Identifying the Distribution with Data and Goodness-of-Fit Tests-Selecting Input Models without Data

Verification and Validation of Simulation Models-Model-Building- Verification-and Validation- Verification of Simulation Models- Calibration and Validation of Models- Optimization Simulation of Manufacturing Systems.

### **TEXT BOOK**

1.Banks-Carson-Nelson-Nicol-”Discrete Event System Simulation”-Prentice Hall-Fourth Edition-2005.

### **REFERENCES**

1. Banks- J.- Editor- Handbook of Simulation- Wiley- 1998.
2. Law- A. M. and Kelton- W. D. Simulation Modeling and Analysis- 3rd Ed.- McGraw-Hill- 2000.
3. Shriber- An Introduction to Simulation Using GPSS/H- Wiley- 1991.

## **MCAXX10D ENTERPRISE RESOURCE PLANNING**

**AIM : To study the basic concepts of Enterprise Resource planning**

### **INTRODUCTION TO ERP**

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

### **BUSINESS MODELLING FOR ERP**

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

### **ERP AND THE COMPETITIVE ADVANTAGE**

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

### **COMMERCIAL ERP PACKAGE**

Description – Multi-Tier Client/Server Solutions – Open Technology – User Interface-Application Integration.

### **ARCHITECTURE**

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

### **TEXT BOOK:**

1. Vinod Kumar Garg and N.K.Venkita Krishnan, “Enterprise Resource Planning – Concepts and Practice”, PHI, 2003.
2. Jose Antonio Fernandez, The SAP R/3 Handbook, TMH, 2006.

## **MCAXX10E CLIENT / SERVER COMPUTING**

AIM : To study about Client/Server Computing and its Characteristics Role of the Client- and server Components Type of server Network Characteristics, and application development tools

### **INTRODUCTION**

Client Server computing and its Characteristics-Client Server Architecture-Benefits of Client Server Computing-Hardware Trends-Software Trends-Components of Client Server Applications-Classes of Client Server Applications-Categories of Client Server Applications.

### **THE CLIENT**

Role of the Client-Client Components-Client Services-Client Operating Systems-GUI-GUI Environments-GUI Design Standards-Open GUI Standards-Database Access and Tools- Interface Independence-Testing Interfaces-Development Aids.

### **THE SERVER**

Role of the Server-Server Functionality in Detail-Features of Server Machines-Classes of Server Machines-Layers of Software-Network Management Environment-Network Computing Environment- Server Operating System-Transaction Processing-Connectivity-Intelligent Database-Stored Procedures-Triggers-Load Leveling-Optimizer-Testing and Diagnostic Tools-Reliability-Backup and Recovery Mechanisms-Data Management Software.

### **THE NETWORK**

Layers- Interfaces and Protocols –Standard Architectures- Network Characteristics - Network Management Standards - LAN Characteristics - LAN Hardware-Network Operating Systems.

### **DEVELOPMENT METHODOLOGY AND TOOLS**

Convert Existing Screen Interfaces-Re\_Engineering Existing Applications-Business Re\_Engineering-MethodologyTools-EASELWorkbench-Ellipse-SQLWindowPowerBuilder-SQLToolset-Future of Client Server Computing.

### **TEXT BOOK:**

1. Dawna Travis Dewire ,” Client/ Server Computing”, Tata McGraw Hill, 2003.

### **REFERENCES:**

1. Patric Smith and Steve Guengerich,” Client /Server Computing”,Second Edition,PHI,1997.
2. Robert Orfali, Dan Harkey, Jeri Edwards,” The Essential Client/ Server survival Guide”, Second Edition,Galgotia 1999.

## **MCAXX10F NATURAL LANGUAGE PROCESSING**

AIM: To inculcate the concepts of natural language Processing : Language related algorithms and techniques, Computational morphology and Phonology, parsing and semantic interpretation

### **INTRODUCTION**

Speech and Language Processing – Ambiguity – Models and algorithms – Language – Thought – Understanding – Brief history – Regular Expressions – Automata – Morphology and Finite State Transducers – Computational Phonology and Text-to-Speech

### **PROBABILISTIC MODELS AND SPEECH RECOGNITION**

Spelling – Bayesian method – Weighted Automata – N-grams – Smoothing – Entropy – HMMs and Speech Recognition – Speech Recognition Architecture – Hidden Markov models – Decoding – Acoustic processing – Speech recognizer – Speech synthesis

### **SYNTAX**

Word classes and Part-of-Speech Tagging – Tagsets – Transformation based tagging – Context free rules and trees – The noun Phrase – Co-ordination – Verb phrase – Finite state and context free grammars – Parsing with context free grammars

### **UNIFICATION AND PROBALISTIC PARSING**

Features – Implementing unification – Unification constraints – Probabilistic context free grammars – Problems – Lexicalized context free grammars – Dependency grammars – Human parsing – Language and Complexity

### **SEMANTICS**

Representing meaning – First order predicate calculus – Semantic analysis – Attachments – Idioms – Compositionality – Robust semantic analysis – Lexical semantics – Selectional restrictions – Machine learning approaches – Dictionary based approaches – Information retrieval

### **TEXT BOOK**

1. Daniel Jurafsky and James H. Martin, “ Speech and Language Processing”, Pearson Education, 2002

### **REFERENCES**

1. Michael W. Berry, “Survey of Text Mining: Clustering, Classification and Retrieval Systems”, Springer Verlag, 2003
2. James Allen, “Natural Language Understanding”, Benjamin Cummings Publishing Co. 1995

## **MCAXX10G ARTIFICIAL INTELLIGENCE**

**AIM : To understand the concept of artificial Intelligence, Reasoning, Fuzzy sets and applications**

### **Introduction**

Introduction - AI. AI Problems and techniques - Problem spaces and searches -Search algorithms: Blind search- heuristic search- algorithmic search. State space representation of problems- Game playing : Two player games.

### **Knowledge Representation Issues**

Procedural Knowledge- Declarative Knowledge- Logic: Using FOL - Unification-Resolution. Semantic nets- Frames: Inheritance- Scripts. Representing knowledge using rules- Rule based deduction systems.

**Reasoning** Uncertainty : Introduction to uncertain knowledge- review of probability theory – Bayes’s Theorem- Non monotonic reasoning.

Planning and Learning: Planning-Introduction- Partial order planning algorithm-Learning from examples- Discovery as learning – Learning by analogy – Explanation based learning.

### **Fuzzy Sets**

Definitions- Basic set-theoretic operations for fuzzy sets. Fuzzy measures and measures of fuzziness- fuzzy relations on sets and fuzzy sets- fuzzy functions on fuzzy sets- Fuzzy logic.

### **Applications**

Principles of Natural Language Processing- Expert systems- Knowledge acquisition concepts- Introduction to Agents.

### **TEXT BOOKS.**

1. Elain Rich and Kevin Knight, "Artificial Intelligence", Tata McGraw – Hill Publishing Company Limited, New Delhi, 1995.
2. Stuart Russel and Peter Norvig, "Artificial Intelligence – A Modern Approach", Prentice Hall, 1995.
3. Patrick Henry Winston, "Artificial Intelligence", Addison Wesley, Third edition, 2000.
4. H.J. Zimmerman, "Fuzzy Set Theory and its Applications", Allied Publishers Ltd., Second Edition.

### **REFERENCES**

- 1.Nils J. Nilsson, "Principles of Artificial Intelligence", Narosa Publishing House, 2000.

## **MCAXX10H NETWORK SECURITY**

**AIM :** To study the various issues concerning Network security, Database security and Program security

**Symmetric Ciphers :** Classical Encryption Techniques - Block Ciphers and the Data Encryption Standard – Finite Fields – Advanced Encryption Standard – Symmetric Ciphers – Confidentiality using Symmetric Encryption.

**Public Key Encryption and Hash Functions :** Introduction to Number Theory – Public Key Cryptography and RSA - Key Management- other Public Key Cryptosystem – Message Authentication and Hash Functions – Hash and MAC Algorithms – Digital Signatures and Authentication Protocols.

**Program Security :** Secure Programs – NonMalicious Program Errors – Viruses and Others Malicious Code – Targeted Malicious Code – Control Against Threats.

**Database Security :** Introduction to Database – Security Requirement – Reliability and Integrity – Sensitive Data – Inference – Multilevel Databases - Multilevel Security

**Network Security :** networks Concepts – Threats in Networks – Network Security Controls – Firewalls – 1. Electronic Mail Security – IP Security – Web Security.

### **TEXT BOOKS :**

1. Charles B. Pfleeger - Shari Lawrence Pfleeger - “ Security in Computing “- Third Edition- Pearson Education- 2003.
2. William Stallings - “Cryptography and Network Security – Principles and Practices “- Pearson Education - Fourth Edition - 2003



## MCAXX10I MAINFRAME SOFTWARE

AIM : To study the basic principles and concepts of mainframe software.

MVS Overview – MVS Characteristics Program Development – System Initialization – Job Management – Storage Management – Data Management – Input/Output Management – Termination and Recovery – DASD – Volume Organization.

TSO/ISPF: TSO Commands – General Syntax of JCL Statements – JES (Job Entry System) – JCL Explanation of Job Statements – Explanation of EXEC Statements - Explanation of DD Statements – Additional Parameters on JOB-EXEC-DD Statements – IBM Utilities – Procedures – Procedures Overriding Parameters – Symbolic Parameters.

VSAM: VSAM data set Organization Structure – VSAM in Application Programming - Internal Organization - IDCAMS Comments – JCL for VSAM – Buffering – Alternative index –Repro – Backup and Recovery – Export and Import – KSDS – ESDS – RRDS – LDS.

DB2: Introduction to DBMS- RDBMS – Codd’s Rule – Normalization Introduction to XDB – Data Base Design – SQL – Relationship – DB2 Objects – Locks – Program Preparation – Cursor – Null Indicators – Optimizer – Utilities.

CICS: CICS Introduction – Role of CICS – CICS Operations – CICS Components – CICS Services – CICS Tables –EIP/EIB-CICS - Terminal Control –BMS map – Map Definition Macros – Map I/O Operations – Screen Definition Facility – Program Control - Application House Keeping – Exec- Interface block – Supplied Transactions- CESN-CESF-CEMT-CEDF – NMDS – BMS – Abend Codes – File Control – Program Control – TSQ – TDQ – Pseudo Conversation - LINK Command – XCTL - Recovery and Rollback.

File Control – Write Command – Browsing – Delete- Unlock – Accessing Relational Database – Temporary Storage Queue – TD – I/O – Dynamic Transaction Backout – CICS Supplied Transaction – Exception Handling in CICS.

### TEXT BOOKS:

1. Yukihiisa KArgeyama, "CICS Handbook", Tata MCGraw, Hill, 1997.
2. Craig S. Mullins, "DB2(3<sup>rd</sup> Edition) – Developers Guide", Techmedia, SAMS Publishing, 1998.
3. Brown, (JCL) Job Control Language, John Wiley, 1999.
4. Chander Rande, "JCL", McGraw, Hill, 1994.
5. Doug lowe, "MVS", Mike Murach Associates; 1994.
6. C.J. Date, "DB2"

### REFERENCES:

1. Craig S. Mullins, "DB2(3<sup>rd</sup> Edition) – Developers Guide", Techmedia, SAMS Publishing, 1998.

## **MCAXX10J MANAGERIAL ECONOMICS**

### **INTRODUCTION TO MANAGERIAL ECONOMICS**

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.

### **SUPPLY, PRODUCTION AND COST ANALYSIS**

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.

### **MARKET STRUCTURE AND PRICE DETERMINATION**

Market structure – Perfect Competition – Monopoly – Monopolistic Competition – Oligopoly - characteristics – Pricing of Goods and Services- Pricing and output decisions – Price Discrimination – Price Determinants – Profit Maximization and free pricing-methods of pricing – differential pricing – Government intervention and pricing.

### **PROFIT AND INVESTMENT ANALYSIS**

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.

### **MACROECONOMIC ISSUE**

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.

### **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.

## **MCAXX10K FAULT TOLERANT COMPUTING**

**AIM:** To study the basic principles and concepts towards fault Tolerant computing

**INTRODUCTION:** Fault prevention – Fault tolerance- fundamental Terminology – objectives of Fault Tolerance – Test generation for digital systems – Redundancy Techniques Design Methodology – Fault simulation.

**ARCHITECTURE:** Fault tolerant computers – general-purpose computing – fault tolerant multiprocessor – critical computations – Long-life systems.

**FAULT TOLERANCE:** Coding technique – Self-checking and fail safe circuits – Reconfiguration in multiprocessors – construction of Acceptance Tests Exception Handling – Dealing with Faulty programs – Reliability Models for Fault – Tolerant software.

**ERROR MODEL:** General coding schemes-Parity checking code – arithmetic code – code for computer memories – communication coding.

**FAULT TOLERANT SOFTWARE:**Design -N- Version Programming-recovery block – Roll back recovery-using checkpoints-Design of Fault Tolerant software using Diversity – validation of fault tolerant systems.

### **TEXT BOOKS:**

1. K.K. Pradhan- “Fault Tolerant computing-Theory and Techniques”- Volume III- Prentice Hall- 1989.
2. Pradhan- D. K.- "Fault Tolerant Computer System Design"- Prentice-Hall- 1996.

### **REFERENCES :**

1. Los Alamitos- CA- “Fault – tolerant Software systems; Techniques and Applications”- IEE computer Society Press- 1992.
2. Anderson and Lee- “Fault Tolerant Principles and Practice”- PH- 1989.

## MCAXX10L C# and .NET FRAMEWORK

AIM: To study about the .NET Framework, C# Basics, Libraries and advanced features of C#

**The NET framework:** Introduction- Common Language Runtime-Common type system- Common language specification- The base class library-the NET class Library intermediate language-Just-in-time compilation- garbage collection- application installation & assemblies- web services- unified classes.

**C# Basics:** Introduction- Data types- Identifiers- Variable & constants- C# statements- Object Oriented Concepts- Object and classes- Arrays and Strings- System collections- Delegates and Events- Indexes Attributes- Versioning.

**C# Using Libraries :** Namespace-System-Input Output-Multi-Threading- Networking and Sockets- Data Handling-Windows forms-C# in web application- Error Handling.

**Advanced Features Using C#:** Web Services-Windows services- messaging- Reflection- COM and C#- Localization.

Distributed application in C#- XML and C#- Unsafe Mode- Graphical Device Interface with C#- Case Study (Messenger Application).

### TEXT BOOKS:

1. Shibi Panikkar and Kumar Sanjeev, "Magic of C# with NET Frame Work", Firewall Media,. 2005.
2. Hebert Schildt, "C# 2.0: The Complete Reference", TataMc-Graw Hill, 2006.

### REFERENCES:

1. Jeffrey Richter, "Applied Microsoft Net Framework Programming", Microsoft Press, 2002.
2. Fergal Grimes, "Microsoft Net for Programmers",.Manning Publication 2002
3. Tony Baer, Jan D. Narkiewicz, Kent Tegels, Chandu Thota, Neil Whitlow, "Understanding the Net Framework",Wrox Press, 2002
4. Balagurusamy, "Programming with C#" - TataMc-Graw Hill.,2002

## **MCAXX10M SOFTWARE TESTING**

**AIM : To study the basic concepts involving software Testing**

### **SOFTWARE TESTING PRINCIPLES**

Need for testing – Psychology of testing – Testing economics – White box- Black box testing – SDLC and Testing – Verification and Validation – Weyuker’s adequacy axioms.

### **TESTING STRATEGIES**

White box testing techniques – Statement coverage – Branch coverage – Condition coverage – Decision/Condition coverage – Multiple Condition coverage – Dataflow coverage – Mutation testing – Automated Code Coverage Analysis.

Black box testing techniques – Boundary Value Analysis – Robustness testing – equivalence Partitioning – syntax Testing – Finite State testing – Levels of testing – Unit-Integration- and System Testing.

### **TESTING OBJECT-ORIENTED SOFTWARE**

Challenges – Differences from testing non-OO software – Class testing strategies – Class Modality – State based testing – Message Sequence Specification.

### **TESTABILITY AND RELATED ISSUES**

Design for testability – Observability and Controllability – Built-in test – Design by Contract – Precondition- Post condition and Invariant – Impact on Inheritance – Regression Testing – Challenges – Test Optimization.

### **MISCELLANEOUS TOPICS**

Automated tools for testing – Static code analyzers – Test case Generators – GUI capture/playback – Stress testing – testing Client/Server applications – Testing compilers and language processors – Testing web-enabled applications.

### **TEXT BOOKS :**

1. Glenford J. Myers- “The Art of Software Testing”- John Wiley & Sons- 1979.
2. Boris Bezier- “Black Box Testing: Techniques for Functional Testing of Software and Systems”- John Wiley & sons- 1995.

### **REFERENCES :**

1. P. C. Jorgenson- “Software Testing – A Craftsman’s Approach”- CRC Press- 1995.
2. William E. Perry- “Effective Methods for Software Testing”- 2<sup>nd</sup> Edition- John Wiley & Sons- 2000.
3. Robert V. Binder- “Testing Object-Oriented Systems : Models- Patterns- and Tools”- Addison-Wesley- 2000.
4. Boris Beizer- “Software Testing Techniques”- 2<sup>nd</sup> Edition- Van Nostrand Reinhold- 1990.

## **MCAXX10N WEB DESIGN AND MANAGEMENT**

AIM To Study about Web environment, HTML,XML,Java Script and JSP

**Web Environment:** WWW- HTTP- Web Server and its deployment- N-Tier Arch.- Services of Web Server – Mail server- News server- Proxy server- Multimedia server-

**HTML:** Formatting- tags- links- list- tables- frames- forms- comments in HTML.

**XML :** Introduction- displaying an XML Document- Data interchange with an XML Document- Document type definition- Parsers using XML- Client-side usage- Server-side Usage.

**Java Script :** Introduction- Documents- forms- Statements- Functions- Objects in Java scripts- events and event handling- arrays- FORMS- Buttons- Checkboxes- Text fields and text areas.

**JSP:** JSP overview- JSP language basics- JSP translation and compilation directives- Standard java objects from JSP- JSP configuration and deployment- actions and tags of JSP; Java servlets – Arch- servlet interface- applications of servlets.

### **TEXTBOOKS:**

1. Phil Hanna, “Instant Java Servlets”, Tata McGraw Hill 2000
2. William B.Brogden Bill Brogden- Chris Minnick,”Java Developer's Guide to E-Commerce with XML and JSP”, Sybex book, 2001
3. Stephen Walther and others, “Active Server Pages Unleashed”, Wrox press Ltd ,1998.

### **REFERENCES :**

1. John Wiley , “COM+ & XML: ASP.Net on the Edge” 2001
2. Burdman- “Collaborative Web Development”- Addison Wesley,.1999
3. Sharma & Sharma- “Developing E-Commerce Sites”- Addison Wesley,. 2000
4. Ivan Bayross- “Web Technologies Part II”- BPB Publications. McGraw Hill 2004
5. Shishir Gundavarma- “CGI Programming on the World Wide Web”- O'Reilly & Associate,. 1996
6. DON Box- “Essential COM”- Addison Wesley,1998
7. Greg Buczek- “ASP Developer's Guide”, Tata McGraw-Hill, 2000

## MCAXX100 DIGITAL IMAGING

AIM: To Introduce the basic concept of image processing .To explore the time and frequency Aspects of image processing

**Digital Image Processing Systems:** Introduction- Structure of human eye- Image formation in the human eye- Brightness adaptation and discrimination- Image sensing and acquisition- Storage- Processing- Communication- Display. Image sampling and quantization- Basic relationships between pixels

**Image Enhancement in the Spatial Domain:** Gray level transformations- Histogram processing- Arithmetic and logic operations- Spatial filtering: Introduction- Smoothing and sharpening filters

**Image Enhancement in the Frequency Domain:** Frequency domain filters: Smoothing and Sharpening filters- Homomorphic filtering

**Wavelets and Multiresolution Processing:** Image pyramids- Subband coding- Haar transform- Series expansion- Scaling functions- Wavelet functions- Discrete wavelet transforms in one dimensions- Fast wavelet transform- Wavelet transforms in two dimensions

**Image Data Compression:** Fundamentals- Redundancies: Coding- Interpixel- Psycho-visual- Fidelity criteria- Image compression models- Error free compression- Lossy compression- Image compression standards: Binary image and Continuous tone still image compression standards- Video compression standards.

**Morphological Image Processing:** Introduction- Dilation- Erosion- Opening- Closing- Hit-or-Miss transformation- Morphological algorithm operations on binary images- Morphological algorithm operations on gray-scale images

**Image Segmentation:** Detection of discontinuities- Edge linking and Boundary detection- Thresholding- Region based segmentation

**Image Representation and Description:** Representation schemes- Boundary descriptors- Regional descriptors

### TEXT BOOKS:

1. R.C.Gonzalez R.E.Woods, "Digital Image Processing", Second Edition, Pearson Education 2002
2. Anil K.Jain, "Fundamentals of Image Processing", PHI New Delhi 2001

### REFERENCES:

- 1 .William Pratt, "Digital Image Processing", John Wiley

## **MCAXX10P OBJECT ORIENTED ANALYSIS AND DESIGN**

AIM: To Study the OOPs Concepts that are used in the OOSD

**Complexity:** Introduction-Object Basics-OOA-OOD-OO Modelling-Object Oriented Systems development life cycle-The Inherent Complexity of Software-The Structure of Complex Systems-On Designing Complex Systems.

**Classes and Objects:** The Nature of an Object-Relationships among Objects-The Nature of a Class-Relationships among Classes-The Interplay of classes and objects-On building quality classes and objects.

**Classification:** The Importance of Proper Classification-Identifying Classes and Objects-Key Abstractions and Mechanisms.

**The Notation:** Elements of the Notation-Class Diagrams-State Transition Diagrams-Object Diagrams-Interaction Diagrams-Module Diagrams-Process Diagrams-Activity Diagram-Component Diagram-Deployment Diagram-Use Case Diagram-Applying the Notation.

**The Process:** First Principle-The Micro Development Process-The Macro Development Process.

**Pragmatics:** Management and Planning-Staffing-Release Management-Reuse-Quality Assurance and Metrics-Documentation-Tools-Special Topics-The Benefits and Risks of Object Oriented Development.

### **Analysis- Design- Evolution and Maintenance of:**

- 1)Data Acquisition:Weather Monitoring Station.
- 2)Frameworks:Foundation Class library and
- 3)Client/Server Computing:Inventory Tracking.

### **TEXT BOOK:**

1. Grady Booch, "Object Oriented Analysis and Design with Applications", The Benjamin / Cummings Publishing Company Inc.,Second Edition,1994.

### **REFERENCES:**

- 1.Taylor.D., "Object Oriented Information Systems", John Wiley and Sons,1992.
- 2.Pinson.L. and Wiener R., "Application of Object Oriented Programming", Addison Wesley Publishing Company,1990.
- 3..Ali Bahrami, "Object Oriented Systems Development", Irwin Mcgraw Hill, International Edition,1999.



## **MCAXX10Q DISTRIBUTED OBJECTS COM/DCOM**

AIM: To know about fundamentals to programming in distributed objects using Microsoft's COM/DCOM architecture.

Fundamental programming architecture and IUnknown – ICLASSFACTORY

From OLE to DCOM – parallel processing – advantages of distributed computing – building distributed systems – COM background – three faces of COM-componentware – COM interfaces – types of components – the COM library – COM as a foundation – activex on COM

The interface definition language – the component's client – the component – COM reuse mechanisms .

Type libraries, language integration, threading models and apartments.

Type libraries – C++ client utilizing type library – active template library – COM programming in visual basic – COM programming in java.

Threads – apartments- apartment interactions – implementing multithreaded components – the ten threading commandments.

COM facilities – automation and component categories – the IDispatch interface –building an automation client in C++ - building an automation client in visual basic – building an automation client in VBScript – scriptlets : building COM objects in HTML – error handling – component categories.

Connection points, type information, monikers and structured storage.

A simple version of a connectable object – a complete implementation of a connectable object – type information.

Initializing objects – monikers – the class moniker – the java monitor – the running object table – structured storage.

Remoting architecture – DLL surrogates – marshaling – executable components.

Standard vs custom marshaling, the IDL and security

Marshalling interface pointers – standard marshaling – handler marshaling – custom marshaling – converting marshaled interface pointers to strings.

IDL types – directional attributes – arrays – pointers – interface design recommendations.

Security models – declarative security: the registry – programmatic security.

The network protocol, MTS and COM+

Spying on the network protocol – calling all remote objects – marshaled interface pointers – the OXID resolver – DCOM garbage collection – channel hooks.

Three – tier architecture – MTS – OLE, network OLE, COM, activeX, DCOM, COM+

**TEXT BOOK:**

1. Guy Eddon and Henry Eddon, “ Inside distributed COM”, WP, Microsoft press, 1998  
Reference book

**REFERENCES :**

1. Dale rogerson, “ Inside COM, Microsoft Component Object Model”, WP, Microsoft press, 1998

# **MCAXX10R BIO INFORMATICS**

**AIM: To study basic principles and applications of Bio informatics**

## **INTRODUCTORY CONCEPTS**

The Central Dogma – The Killer Application – Parallel Universes – Watson’s Definition – Top Down Versus Bottom up – Information Flow – Convergence – Databases – Data Management – Data Life Cycle – Database Technology – Interfaces – Implementation – Networks – Geographical Scope – Communication Models – Transmissions Technology – Protocols – Bandwidth – Topology – Hardware – Contents – Security – Ownership – Implementation – Management.

## **SEARCH ENGINES AND DATA VISUALIZATION**

The search process – Search Engine Technology – Searching and Information Theory – Computational methods – Search Engines and Knowledge Management – Data Visualization – sequence visualization – structure visualization – user Interface – Animation Versus simulation – General Purpose Technologies.

## **STATISTICS AND DATA MINING**

Statistical concepts – Microarrays – Imperfect Data – Randomness – Variability – Approximation – Interface Noise – Assumptions – Sampling and Distributions – Hypothesis Testing – Quantifying Randomness – Data Analysis – Tool selection statistics of Alignment – Clustering and Classification – Data Mining – Methods – Selection and Sampling – Preprocessing and Cleaning – Transformation and Reduction – Data Mining Methods – Evaluation – Visualization – Designing new queries – Pattern Recognition and Discovery – Machine Learning – Text Mining – Tools.

## **PATTERN MATCHING**

Pairwise sequence alignment – Local versus global alignment – Multiple sequence alignment – Computational methods – Dot Matrix analysis – Substitution matrices – Dynamic Programming – Word methods – Bayesian methods – Multiple sequence alignment – Dynamic Programming – Progressive strategies – Iterative strategies – Tools – Nucleotide Pattern Matching – Polypeptide pattern matching – Utilities – Sequence Databases.

## **MODELING AND SIMULATION**

**9**

Drug Discovery – components – process – Perspectives – Numeric considerations – Algorithms – Hardware – Issues – Protein structure – AbInitio Methods – Heuristic methods – Systems Biology – Tools – Collaboration and Communications – standards - Issues – Security – Intellectual property.

## **TEXTBOOK :**

1. Bryan Bergeron, “Bio Informatics Computing”, Second Edition, Pearson Education, 2003.

## **REFERENCES :**

2. T.K.Attwood and D.J. Perry Smith, “Introduction to Bio Informatics, Longman Essen, 1999.

## **MCAXX10S SOFTWARE REUSE**

**AIM : To understand the concepts of software reuse and reengineering**

### **INTRODUCTION**

Organizing Reuse – Introduction – Motivation for Reuse – *Framework for Reuse-Evolution of Reuse - Reuse in industry* – Managing a reuse project – *Software Reuse Products- Software Reuse Processes and paradigms* – Reuse tools.

### **REUSE MANAGEMENT**

Managing a repository – The REBOOT component model – Classification – Configuration management of the repository – Managerial aspects of software Reuse– Software Reuse Metrics – Software Reuse Cost estimation – Forming a reuse Strategy – Assessing reuse maturity.

### **REUSABLE COMPONENTS**

Practicing reuse – Reuse Techniques- Generic reuse development processes – Develop for reuse – Testing reusable components – Object oriented components – Object oriented development for reuse – Reuse Techniques- Reuse Technologies- Detailed design for reuse – Implementation for reuse – Verification, test and validation.

### **REUSE PHASES**

Development with reuse – with reuse specific activities – Common reuse processes – Phases of development with reuse – Impact of reuse on development cycle- Reuse Technologies.

### **CLEANROOM SOFTWARE ENGINEERING**

Re-engineering for reuse – Methodology – Retrieving objects in non-object oriented code–Measurements – Tools support for re-engineering – Overview of clean room software engineering – Phases in clean room method – Box structures algorithms – Adapting the box structures.

### **TEXTBOOKS:**

1. Wayne C.Lim, “Managing Software Reuse”, Prentice Hall, 2004.
2. Hafedh Mili , Ali Mili, Sherif Yacoub, “Reuse based Software Engineering: Techniques, Organizations and Controls”, John Wiley and Sons, 2002.

### **REFERENCES:**

- 1.Karma McClure, "Software Reuse Techniques – Additional Reuse To The Systems Development Process ", Prentice Hall, 1997.
- 2.Even-Andre Karisson, "Software Reuse – A Holistic Approach", John Wiley And Sons, 1996.

## **MCAXX10T GRID COMPUTING**

**AIM: To understand the concepts of Grid Computing, Architecture and Grid Computing Technologies.**

### **INTRODUCTION TO GRID COMPUTING**

Introduction – The Grid – Past, Present and Future – Applications of grid computing organizations and their roles.

### **GRID COMPUTING ARCHITECTURE**

Grid Computing anatomy – Next generation of Grid computing initiatives–Merging the Grid services architecture with Web services architecture.

### **GRID COMPUTING TECHNOLOGIES**

OGSA – Sample use cases that drive the OGSA platform components – OGSI and WSRF– OGSA Basic Services – Security standards for grid computing.

### **GRID COMPUTING TOOL KIT**

Globus Toolkit –Versions – Architecture –GT Programming model –A sample grid service implementation.

### **HIGH LEVEL GRID SERVICES**

High level grid services – OGSI .NET middleware Solution Mobile OGSI.NET for Grid computing on Mobile devices.

### **TEXT BOOK:**

1. Joshy Joseph & Craig Fellenstein, “Grid Computing”, Pearson/PHI PTR-2003.

### **REFERENCES:**

1. Fran Berman, Geoffrey Fox, Anthony J.G. Hey, “Grid Computing: Making the Global Infrastructure a reality “, John Wiley and sons,2003.
2. Ahmar Abbas, “Grid Computing: A Practical Guide to Technology and Applications”, Charles River media, 2003.

## **MCAXX10U STORAGE MANAGEMENT**

**AIM :** To study the concept of storage management and storage system architecture.

**INTRODUCTION TO STORAGE TECHNOLOGY:** Concepts of storage networking -Business applications defined for Storage - Sources of Data and states of data creation - Data center requirements and evolution - Managing complexity - I/O and the five pillars of technology - Storage infrastructure - Evolution of storage - Information lifecycle management.

**STORAGE SYSTEMS ARCHITECTURE:** Storage architectures- Device overviews- Peripheral connectivity- Components and concepts- Magnetic disk storage- Disk systems -Disk arrays- RAID storage arrays- Magnetic tape storage- Physical vs. Logical disk organization- Caching properties and algorithms connectivity options- Differences in bus and network architectures.

**INTRODUCTION TO NETWORK STORAGE:** Putting storage on the Network- The NAS Hardware- Software architecture- Network connectivity- NAS as a Storage system- NAS connectivity options- Connectivity protocols- Management principles- Storage Area Networks: Architecture- Hardware devices- Host bus adaptors- Connectivity- Content Addressable Storage (CAS) : Elements- Connectivity options- Standards and Management principles- Hybrid storage solutions overview.

**INTRODUCTION TO INFORMATION AVAILABILITY:** Business continuity and disaster recovery basics: Local business continuity techniques- Remote business continuity techniques- Storage design and implementations of the Business continuity plan- Managing availability- Disaster recovery principles & techniques.

**MANAGING AND STORAGE VIRTUALIZATION:** Managing Availability: Availability metrics implementing the plan finding the holes maintaining serviceability capacity planning- Management tools overview information security virtualization- Different virtualization technologies and processes including file and block level virtualization.

### **TEXT BOOKS:**

1. Robert Spalding, "Storage Networks: The Complete Reference" Tata McGraw Hill Publishing Company, New Delhi, 2003.
2. Gerald J Kowalski and Mark T Mayburk," Information storage and Retrieval Systems", Springer International Edition, New Delhi, 2006.

### **REFERENCES:**

1. Ulf Troppens, Rainer Erkens and Wolfgang Müller "Storage Networks Explained" Wiley & Sons, USA, 2004.
2. Marc Farley Osborne, "Building Storage Networks", Tata McGraw Hill Publishing Company, New Delhi, 2000.

## **MCAXX10V PERVASIVE COMPUTING**

**AIM:** To study the basic principles and concepts involved in Pervasive Computing.

**CONTEXT-AWARE COMPUTING:** Ubiquitous/Pervasive Computing – Context - Types of context-Context aware computing and applications - Middleware support.

**INTRODUCTION TO MOBILE MIDDLEWARE:** Mobile middleware - The spectrum of adaptation-Resource monitoring - Characterizing adaptation strategies - Mobile agents -Agent architectures - Migration strategies - Communication strategies.

**SERVICE DISCOVERY MIDDLEWARE:** Common ground – Services - Universally unique identifiers - Standardization - Textual Descriptions - Interfaces for standardization - Discovery and advertisement Protocols - Unicast discovery - Multicast discovery - Service catalogs - Garbage collection – Eventing – Security - Interoperability.

**INTRODUCTION TO ADHOC AND SENSOR NETWORKS:** Overview - Properties of an Adhoc network – Unique features of sensor networks-Proposed applications - Challenges – Constrained resources – Security – Mobility – Protocols – Auto configuration - Energy efficient communication - Mobility requirements.

**APPROACHES AND SOLUTIONS:** Deployment and configuration – Routing - Fault tolerance and reliability - Energy efficiency.

**PDA IN PERVASIVE COMPUTING:** Introduction - PDA software components – Standards - Emerging trends - PDA device characteristics - PDA based access architecture – User interface issues – Architecture - Smart card based authentication mechanisms - Wearable Computing Architecture.

### **TEXT BOOKS:**

1. Frank Adelstein, Sandeep K S Gupta, Golden G Richard III and Loren Schwiebert, "Fundamentals of Mobile and Pervasive Computing", Tata McGraw-Hill Publishing Company, New Delhi, 2005.
2. Uwe Hansman, Lothar Martin S Nicklous and Thomas Stober, "Pervasive Computing – Handbook", Springer – Verlag, New Delhi, 2003.

### **REFERENCES:**

1. Uwe Hansman, Lothar Martin S Nicklous and Thomas Stober, "Principles of Mobile Computing", Springer – Verlag, New Delhi, 2003.
2. Jochen Burkhardt, Horst Henn, Stefan Hepper and Thomas Schaeck Klaus Rindtorff, "Pervasive computing Technology and Architecture of Mobile Internet Applications", Addison Wesley, New Delhi, 2002.

## **MCAXX10W E-COMMERCE**

**AIM:** To study the basic concepts of E-Commerce network Infrastructure- Information publishing Technology security and search Engine Service

Introduction to E-Commerce: Benefits – Impacts - Classification and Application of E-Commerce - Business Model - Architectural Frame Work

Network Infrastructure: Local Area Network – Ethernet – Wide Area Network- Internet – TCP/IP Reference Model – Domain Name System – Internet Industry structure – Information Distribution and Messaging: FTP Application – Electronic Mail – World Wide Web Server - HTTP – Web Server Implementations

Information Publishing Technology: Information Publishing – Web Browsers – HTML-CGI- Multimedia Content- Other Multimedia Objects – VRML- Securing the Business on Internet- Why Information on Internet is Vulnerable?- Security Policy-Procedures and Practices –Site Security- Protecting the Network-Firewalls-Securing the Web Service

Securing Network Transaction- Electronic Payment Systems: Introduction – Online Payment Systems – Pre-paid Electronic Payment System-Post-paid Electronic Payment System – Requirement Metrics of a Payment System

Search Engines and Directory Services: Information Directories - Search Engines – Internet Advertising – Agents in Electronic Commerce: Needs and Types of Agents – Agent Technologies – Agents Standards and Protocols – Agents Applications - Case Study.

### **TEXT BOOK:**

1. Bharat Bhasker, 'Electronic Commerce Framework Technologies and Applications', Tata McGraw Hill Publication 2003.

### **REFERENCES**

1. Ravi Kalakota and Andrew B Whinston, “ Frontiers of Electronic Commerce “, Pearson Education Asia, 1999.( Chapters 1,2,3,6-10,16)
2. Marilyn Greenstein and Todd M Feinman , ” Electronic commerce: Security, Risk Management and Control “ Tata McGraw-Hill , 2000.(Chapters 7,8,10-12)



## MCAXX10X ADVANCED DATA STRUCTURES AND ALGORITHMS

**AIM:** To Study about the Advance Data Structures including various types of trees Graphs and Methods.

**INTODUCTION:** Algorithms – analysis of algorithms – best case and worst case complexities, analysis of some algorithms using simple data structures, Amortized time complexity.

**BINARY SEARCH TREES:** Searching – Insertion and deletion of elements – Analysis.

**AVL TREES :** Definition – Height – searching – insertion and deletion of elements, AVL rotations – Analysis.

**RED BLACK TREES :** Definition – searching – insertion and deletion of elements – algorithms and their time complexities.

**SPLAY TREES :** Definition – Steps in Splaying – Analysis

**MULTIWAY SEARCH TREES :** Indexed Sequential Access – m-way search trees – B-Tree – searching, insertion and deletion - B+ trees - Tries.

**GRAPHS :** Definition – representations, Adjacency matrix, packed adjacency list and linked adjacency list, – network representation – Graph search methods, Breadth first Search and Depth first Search.

**DIVIDE AND CONQUER :** Method – examples – Merge sort, Quick sort, Binary Search.

**GREEDY METHOD :** Optimization problems – method – examples – Minimum cost spanning tree, Kruskal's and prim's algorithms, Topological sorting, optimal storage on tapes.

**DYNAMIC PROGRAMMING:** Method – examples – All pairs shortest path problem – Traveling salesman problem.

**BACK TRACKING:** Method – Examples – Eight queen's problem, Hamiltonian Cycles – Analysis.

**BRANCH & BOUND :** Method – Example – 0/1 knapsack – Analysis.

**NP-HARD, NP-COMPLETE CLASSES :** Basic concepts – Non deterministic algorithms – satisfiability problem – NP-hard and NP-complete Problems – Cooks theorem (informal proof).

### TEXT BOOKS :

1. Thomas H.Cormen, Charles E. Leiserson, and Ronald L.Rivest “Introduction to Algorithms”, Mc Graw Hill, 2002.
2. Mark Allen Weiss, “Data Structures and Algorithm Analysis in C++”, Pearson Education, 2002.

## REFERENCES

1. Adam Drozdek, “ Data Structures and Algorithms in C++”, Vikas Publishing House Pvt.Ltd., 2002.
2. Sahni Sartaj, “ Data Structures, Algorithms and Application in C++”, WCB / Mc Graw Hill, 2000.
3. Ellis Horowitz and Sahni Sartaj, “ Fundamental of Computer Algorithms”, Galgotia publications Pvt.Ltd, 2002.
4. Robert L Kruse, Clovis L Tondo, Bruce P Leung, “ Data Structures and Program design in C” Pearson’s Education, 2004.

## **MCAXX10Y SERVICE ORIENTED ARCHITECTURE**

**AIM:** To Study the Service Oriented Architecture for Web services, Business Process management etc.

**INTRODUCTION TO SOA WITH WEB SERVICES:** The service-oriented enterprise – Service oriented development – Service abstraction – Service-oriented architecture – SOA and web services – Rapid integration – Multi-channel access – Occasionally connected computing – Business Process Management – Extended Web Services Specifications.

**SERVICE ORIENTED ARCHITECTURE CONCEPTS:** Service governance, processes, guidelines, principles, methods and tools – Key Service characteristics – Technical benefits of a service-oriented architecture – Service-oriented architecture – Benefits.

**SOA AND WEB SERVICES:** The web services platform – Service contracts – Service-level data model – Service discovery-registration and lookup – Service-level security – Service level interaction patterns – Atomic services and composite services – Generating proxies and skeletons and service contracts – Service-level communication and alternative transports – A Retrospective on Service-oriented architectures- Overview of integration – Integration and Interoperability using XML and web services- Business benefits of SOA and multi-channel access.

**SOA AND BUSINESS PROCESS MANAGEMENT:** Basic Business process management concepts – Examples – Combining BPM, SOA, and web services – Orchestration and Choreography specification - Examples - Web services.- The simple approach to metadata management – Metadata specification-- Impact of web services on transactions.

**SERVICES SECURITY:** Overarching concern – Core concepts – Summary of challenges, threats and remedies – Securing the communication layer – Overview of message-level security – Data-level security.

### **TEXT BOOKS:**

1. Eric Newcomer and Greg Lomow, “Understanding SOA with Web Services”, Pearson Education India, New Delhi, 2005.
2. Barry Douglas K, “Web Services and Service oriented Architectures- The Savvy Manager’s Guide” Morgan Kaufmann Publishers, USA, 2003.

### **REFERENCES:**

1. Chatterjee, Sandeep and James Webber, “Developing Enterprise Web Services: An Architect’s Guide”, Prentice Hall of India, New Delhi, 2004.
2. Bernstein Philip A and Eric Newcomer, “Principles of Transaction Processing.” Morgan Kaufmann Publishers, USA, 1997.

## **MCAXX10Z OPEN SOURCE RESOURCES**

**AIM:** To Study about the open source resources tools and technologies. Example: Phthon

**INTRODUCTION:** Introduction to open sources- Need of Open Sources- Advantages of Open Sources- Applications of Open Sources- commercial aspects of Open source movement.

**OPEN SOURCE OPERATING SYSTEMS: LINUX:** Introduction- General overview- Kernel mode and user mode-Process-Advanced Concepts-Scheduling-Personalities-Cloning- Signals-Development with LINUX.

**OPEN SOURCE DATABASE: MySQL:** Introduction- Setting up account-Starting, terminating and writing your own SQL programs- Record selection technology- Working with strings-Date and Time- Sorting Query Results- Generating Summary- Working with meta data- Using sequences- MySQL and Web.

**OPEN SOURCE PROGRAMING LANGUAGES: PHP:** Introduction- Programming in Web Environment- Variables- Constants- Data types- Operators- Statements-Functions- Arrays- OOP- String manipulation and regular expression- File handling and data storage- PHP and SQL database- PHP and LDAP- PHP connectivity- Sending and Receiving E-mails- debugging and Error Handling- Security – Templates.

**PYTHON:** Syntax and Style- Python objects-Numbers-Sequences-Strings-Lists and Tuples -Dictionaries- Conditionals and loops – Files – Input and Output – Error and Exceptions – Functions – Modules – Classes and OOP – Execution Environment

**OPEN SOURCE TOOLS AND TECHNOLOGIES: WEB SERVER:** Apache Web server – Working with Web server – Configuring and using Apache Web services – Open Source Software tools and processors – Eclipse IDE platform – Compilers – Model Driven Architecture tools.

**CASE STUDY:** Government Policy toward Open Source (E-Governance) – Wikipedia as an Open source project.

### **TEXT BOOKS :**

1. Remy Card, Eric Dumas and Frank Mevel, “The Linux Kernel Book”, Wiley Publications, New York, 2003.
2. Peter Wainwright, “Professional Apache”, Wrox Press, USA, 2002.

### **REFERENCES:**

1. Stephen J Mellor and Marc Balces, “Executable UMS: A foundation for MDA”, Addison Wesley, USA, 2002.
2. Steve Suchring, “MySQL Bible”, John Wiley, New York, 2002.
3. Rasmus Lerdorf and Levin Tatroe, “Programming PHP”, O’ Reilly Publications, USA 2002.
4. Wesley J Chun, “Core Python Programming”, Prentice Hall of India, New Delhi, 2001.

## MCAXX10AA PATTERN RECOGNITION

**AIM :** To Study about Pattern Classification models and techniques like Bayesian belief networks and Support vector machines etc.

Introduction: Machine perception - pattern recognition systems - design cycle – learning and adaptation. Bayesian decision theory: Continuous features – minimum-error-rate classification - classifiers, discriminant functions, and decision surfaces - normal density - discrete features - Bayesian belief networks.

Maximum-likelihood and Bayesian parameter estimation: Maximum-likelihood estimation - Bayesian estimation - Bayesian parameter estimation: Gaussian case. Problems of dimensionality.

Component analysis and discriminants: Principal component analysis - fisher linear discriminant - multiple discriminant analysis. Expectation-maximization algorithm. Hidden Markov models: Evaluation – decoding - learning.

Nonparametric techniques: Probabilistic neural networks - k-nearest-neighbor rule. Linear discriminant functions and decision surfaces. Support vector machines: Training - multicategory generalizations.

Neural networks: Biological and artificial neurons - perceptron training algorithm - backpropagation training algorithm and error surfaces - radial basis function neural network training algorithm. Decision trees - classification and regression trees. K-means clustering - fuzzy k-means clustering. Neural network approach to component analysis: Principal component analysis - nonlinear component analysis - independent component analysis.

### **Text Books :**

1. R. O. Duda, E. Hart, and D.G. Stork, Pattern classification, second edition, John Wiley & Sons, Singapore, 2003.
2. S. Haykin, Neural networks: A comprehensive foundation, second edition, Pearson education, Singapore, 2001.

### **References**

1. V. Vapnik, Statistical learning theory, John Wiley & Sons, New York, 1998.
2. J.C. Burges Christopher, “A tutorial on support vector machines for pattern recognition”, Data mining and knowledge discovery, pp. 121-167, 1998.

## **MCAXX10AB INTELLECTUAL PROPERTY RIGHTS**

Introduction – Invention and Creativity – Intellectual Property (IP) – Importance – Protection of IPR – Basic types of property (i. Movable Property ii. Immovable Property and iii. Intellectual Property).

IP – Patents – Copyrights and related rights – Trade Marks and rights arising from Trademark registration – Definitions – Industrial Designs and Integrated circuits – Protection of Geographical Indications at national and International levels – Application Procedures.

International convention relating to Intellectual Property – Establishment of WIPO – Mission and Activities – History – General Agreement on Trade and Tariff (GATT).

Indian Position Vs WTO and Strategies – Indian IPR legislations – commitments to WTO- Patent Ordinance and the Bill – Draft of a national Intellectual Property Policy – Present against unfair competition.

Case Studies on – Patents (Basumati rice, turmeric, Neem, etc.) – Copyright and related rights – Trade Marks – Industrial design and Integrated circuits – Geographic indications – Protection against unfair competition.

### **TEXT BOOK**

1. Subbaram N.R. “ Handbook of Indian Patent Law and Practice “, S. Viswanathan (Printers and Publishers) Pvt. Ltd., 1998.

### **REFERENCES**

1. Eli Whitney, United States Patent Number : 72X, Cotton Gin, March 14, 1794.
2. Intellectual Property Today : Volume 8, No. 5, May 2001, [www.iptoday.com].
3. Using the Internet for non-patent prior art searches, Derwent IP Matters, July 2000. [www.ipmatters.net/features/000707\_gibbs.html.

## **MCAXX10AC Open CL PROGRAMMING**

### **UNIT I**

Overview of pipelining and Instruction Level parallelism. Introduction to Multiprocessors, Shared memory architecture, Multi-threading, Interconnection networks and clusters. Architecture of recent CPUs and GPUs: Intel Dual and Quad core processors, NVIDIA Fermi and AMD Fusion processors.

### **UNIT II**

Programming with MPI: Introduction, collective communication, programming model and GPU programming.

### **UNIT III**

OpenCL programming on CPU/GPU/APU: Software and hardware overview. OpenCL for GPU/APU processor, memory access and architecture, communication between Host and GPU, device scheduling, terminology, programming model and example programs.

### **UNIT IV**

Building and running OpenCL programs on GPU/APU: compiling, running calling conventions, predefined macros, debugging, setting the environment and breakpoint and sample GDP session.

### **UNIT V**

OpenCL Applications on GPU/APU: Few examples of applications in Electromagnetic Estimations, Digital Signal Processing, Video processing and Image processing.

### **TEXTBOOK:**

1. Aaftab Munshi, Benedict R. Gaster, Timothy G. Mattson and James Fung, “OpenCL Programming Guide”, July 2011.

### **REFERENCES:**

1. John L. Hennessy and David A. Patterson, “Computer Architecture – A Quantitative Approach”, 3<sup>rd</sup> Edition, Elsevier Publications, 2003.
2. Peter S Pacheco, “A User’s Guide to MPI”
3. Benedict Gaster, Lee Howes, David R Kaeli and Perhaad Mistry, “Heterogeneous Computing with OpenCL”, August 2011.
4. AMD Accelerated Parallel Processing OpenCL Programming Guide, April 2011.

## **MCAXX10AD WINDOWS PHONE 7 PROGRAMMING**

### **UNIT – I**

Targeting Windows Phone 7 – The Hardware Chassis – Sensors and Services – File | New | Project – A First Silverlight Phone Program – The Standard Silverlight Files – Color Themes – Points and Pixels – The XAP is a ZIP – An XNA Program for the Phone – Silverlight and Dynamic Layout – Orientation Events – XNA Orientation – Simple Clocks (Very Simple Clocks) – Low Level Touch Handling in XNA – The XNA Gesture Interface – Low Level Touch Events in Silverlight – The Manipulation Events – Routed Events – Some Odd Behavior – XNA Texture Drawing

### **UNIT – II**

Basic Navigation – Passing Data to Pages – Sharing Data Among Pages – Retaining Data across – Instances – The Multitasking Ideal – task Switching on the Phone – Isolated Storage – XNA Tombstoning and Settings – Testing and Experimentation – A Textblock in Code – Property Inheritance – Property – Element Syntax – Colors and Brushes – Content and Content Properties – The Resources Collection – Sharing Brushes - x:Key and x:Name – An Introduction to styles – Style Inheritance – Themes – Gradient Accents – Basic Shapes – Transforms – Animating at the Speed of Video – Handling Manipulation Events – The Border Element – TextBlock Properties and Inlines – More on Images – Playing Movies – Modes of Opacity – Non-Tiled Tile Brushes – The Single – Cell Grid – The StackPanel Stack – Text Concatenation with StackPanel – Nested Panels – Visibility and Layout

### **UNIT – III**

The Problem Illustrated – The Dependency Property Difference – Deriving from UserControl – A New Type of Toggle – Panels with Properties – Attached Properties – Source and Target – Target and Mode Binding Converters – Notification Mechanisms – A Simple Binding Server – Setting the DataContext – Simple Decision Making – Converters with Properties – Give and Take – TextBox Binding Updates – Canvas and Grid – Overlapping and ZIndex – Caps, Joins and Dashes – Polygon and Fill – The Stretch Property – Dynamic Polygons – The Path Element – Geometries and – Transforms – Grouping Geometries – The Versatile PathGeometry – The ArcSegment – Bezier Curves – The Bitmap Class Hierarchy – Animating Perspective Transforms – Animations and Property Precedence.

### **UNIT – IV**

Content Control and Data Template – Examining the Visual Tree – The Visual State Manager – Custom Controls in a Library – Variations on the Slider – The Ever-Handy Thumb – Custom Controls – Items Controls and Visual Trees – Customizing Item Displays – Binding to Items Source – Databases and Business Objects – Fun with DataTemplates – Sorting – Changing the Panel – The Data Template Bar Chart – A Card File Metaphor – Compare and Contrast – Music by Composer – The XNA Connection - The XNA Music Classes: MediaLibrary – Displaying the Albums - The XNA Music Classes: MediaPlayer – The Native Approach – Moving Sprites with Vectors – Working with Parametric Equations – Fiddling with the Transfer Function – Scaling the Text – Two Text Rotation Programs – The Draw Variants – Another Hello Program – Driving Around the Block



## UNIT – V

Gestures and Properties – Scale and Rotate – Matrix Transforms – The *Pinch* Gesture – Flick and Inertia – The Mandelbrot Set – Pan and Zoom – Game Components – Affine and Non-Affine Transforms – More Game Components – The PhingerPaint Canvas – A Little Tour Through SpinPaint – The SpinPaint Code – The Actual Drawing – PhreeCell and a Deck of Cards – The Playing Field – Play and Replay – 3D Vectors – A Better Bubble Visualization – The Graphical Rendition – Follow the Rolling Ball – Navigating a Maze.

### TEXTBOOK:

1. Charles Petzold, “Programming Windows Phone 7”, Microsoft Press, 2010
2. Charles Petzold, “Applications = Code + Markup A Guide to the Microsoft Windows Presentation Foundation”, Microsoft Press, 2006

### REFERENCES:

1. Henry Lee, Engene Chuvyrov, “Beginning Windows Phone 7 development”, Apress Copyrighted material, 2011
2. Adan Nathan, “101 Windows Phone 7 Apps”, Volume 1, SAMS, 2011