ANNAMALAI UNIVERSITY

ANNAMALAINAGAR

FACULTY OF SCIENCE

DEPARTMENT OF COMPUTER AND INFORMATION SCIENCE

(Syndicate Resolution No. 3, dated 15.12.2015)

MASTER OF COMPUTER APPLICATIONS (MCA)

(Three Year Degree Programme)

(Choice Based Credit System)

(FULL-TIME)

2015 – 2016 ONWARDS

DEPARTMENT OF COMPUTER AND INFORMATION SCIENCE
MASTER OF COMP UTER APPLICATIONS(M.C.A)
CHOICE BASED CREDIT SYSTEM (ON CAMPUS PROGRAMME)
(FULL-TIME) (FROM 2015-2016 ONWARDS)
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 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 24 credits per semester

Sixth semester : 20 credits

The total credits for the programme will be 140. For the award of the degree, the student has to earn a minimum of 140 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.
The break-up of assessment and examination marks for theory courses is as follows.

First assessment (Sessional Test - I) : 10 marks

Second assessment (Sessional Test - II) : 10 marks
Assignment : 5 marks
End Semester Examination : 75 marks

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

First assessment (Practical Test-I) : 15 marks
Second assessment (Practical Test-II) : 15 marks
Record note : 10 marks
End Semester Examination : 60 marks

The Project work will be assessed for 50 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. 150 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 sixth semester committee only) who shall be appointed by the Head of the Department from among the project supervisors.

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 end semester 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.

MARKS AND GRADING

A student cannot repeat the assessment of Sessional Test - I and Sessional Test - II. However, if for any compulsive reason the student could not attend the test, the

prerogative of arranging a special test lies with the teacher in consultation with the Head of the Department.

A minimum of 50% marks in each course is prescribed for a pass. A student has to secure 50% minimum in the End Semester Examinations.

If a candidate who has not secured a minimum of 50% of marks in a course shall be deemed to have failed in that course.

The student can repeat the End Semester Examination when it is offered next in the subsequent Odd/Even Semesters till the regulations are in force. However, a candidate cannot move to the next odd/even semester if he/she has more than six papers as arrears at any point of time.

A candidate who has secured a minimum of 50% marks in all courses prescribed in the programme and earned a minimum of the credits will be considered to have passed the Master's Programme.

GRADING

A ten point rating is used for the evaluation of the performance of the student to provide letter grade for each course and overall grade for the Master's Programme.

Marks	Grade Points	Letter Grade	Class
90+	10	S	Exemplary
85-89	9.0	D + +	Distinction
80-84	8.5	D +	Distinction
75-79	8.0	D	Distinction
70-74	7.5	A + +	First Class
65-69	7.0	A +	First Class
60-64	6.5	A	First Class
55-59	6.0	B	Second Class
50-54	5.5	C	Second Class
49 or Less		F	Fail

The Successful candidates are classified as follows.

I-Class 60% marks and above in over all percentage of marks (OPM).

II-Class 50-59% marks in over all percentage of marks.

Candidates who obtain 75% and above but below 90% of marks (OPM) shall be deemed to have passed the examination in First Class (Distinction) provided he/she passes all the courses prescribed for the programme at the first appearance.

Candidates who obtain 90% and above (OPM) shall be deemed to have passed the examination in First Class (Exemplary) provided he/she passes all the courses prescribed for the programme at the first appearance.

Candidates who obtain highest marks in all examinations at the first appearance alone considered for ranking.

COURSE-WISE LETTER GRADES

The percentage of marks obtained by a candidate in a course will be indicated in a letter grade.

A student is considered to have completed a course successfully and earned the credits if he/she secures an overall letter grade other than F. A letter grade F in any course implies a failure in that course. A Course successfully completed cannot be repeated for the purpose of improving the Grade point.

The F grade once awarded stays in the grade card of the student and is not deleted even when he/she completes the course successfully later. The grade acquired later by the student will be indicated in the grade sheet of the Odd/Even semester in which the candidate has appeared for clearance of the arrears.

If the student secures F grade in the Project / Field Work / Practical Work / Dissertation, he/she shall improve it and resubmit it, if it involves only rewriting incorporating the clarification of the evaluators or he/she can re-register and carryout the same in the subsequent semesters for evaluation.

ELECTIVES

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

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FACULTY OF SCIENCE

DEPARTMENT OF COMPUTER AND INFORMATION SCIENCE

MASTER OF COMPUTER APPLICATIONS (M.C.A)

COURSES OF STUDY AND SCHEME OF EXAMINATIONS

FIRST SEMESTER

Code No	Course Name	L	P	D	Sessional marks	Exam marks	Total marks	Credits
MCAS1110	Mathematical foundations for Computer Science	4	-	3	25	75	100	4
MCAS1210	Data Structures	4	-	3	25	75	100	4
MCAS1310	Data Base Management Systems	4	-	3	25	75	100	4
MCAS1410	Microprocessor and applications	4	-	3	25	75	100	4
MCAS1510	Problem Solving Techniques and C	4	-	3	25	75	100	4
MCAS1610	Programming Lab - I (Office Automation Tools)		6	3	40	60	100	2
MCAS1710	Programming Lab - II (Data Structures Using C)	-	6	3	40	60	100	2
	TOTAL	20	12	21	205	495	700	24

L – Lecture P-Practical D- Duration of Exam

SECOND SEMESTER

Code No	Course Name	L	P	D	Sessional marks	Exam marks	Total marks	Credits
MCAS2110	Accounting and Financial management	4	-	3	25	75	100	4
MCAS2210	Computer Architecture	4	-	3	25	75	100	4
MCAS2310	Soft skills development	4	-	3	25	75	100	4
MCAS2410	Operating Systems	4	-	3	25	75	100	4
MCAS2510	Internet and Java Programming	4	-	3	25	75	100	4
MCAS2610	Programming Lab - III (Java Programming)	-	6	3	40	60	100	2
MCAS2710	Programming Lab - IV (RDBMS)	-	6	3	40	60	100	2
	TOTAL	20	12	21	205	495	700	24

L – Lecture P-Practical D- Duration of Exam

THIRD SEMESTER

Code No	Course Name	L	P	D	Sessional marks	Exam marks	Total marks	Credits
MCAS3110	Resource Management Techniques	4	-	3	25	75	100	4
MCAS3210	Computer Networks	4	-	3	25	75	100	4
MCAS3310	Software Engineering	4	-	3	25	75	100	4
MCAS3410	Compiler Design	4	-	3	25	75	100	4
MCAS3510	Unix and Windows Programming	4	-	3	25	75	100	4
MCAS3610	Programming Lab - V (Network Programming)	-	6	3	40	60	100	2
MCAS3710	Programming Lab- VI (Unix and Windows Programming)	-	6	3	40	60	100	2
	TOTAL	20	12	21	205	495	700	24

FOURTH SEMESTER

Code No	Course Name	L	P	D	Sessional marks	Exam marks	Total marks	Credits
MCAS4110	Data Warehousing and Mining	4	-	3	25	75	100	4
MCAS4210	Web Technology	4	-	3	25	75	100	4
MCAS4310	Mobile Computing	4	-	3	25	75	100	4
MCAS4410	C# and .Net Frame work	4	-	3	25	75	100	4
MCAS4510	Elective – I	4	-	3	25	75	100	4
MCAS4610	Programming Lab - VII (Web Design)	-	6	3	40	60	100	2
MCAS4710	Programming Lab -VIII (.Net Programming)	-	6	3	40	60	100	2
	TOTAL	20	12	21	205	495	700	24

L – Lecture P-Practical D- Duration of Exam

FIFTH SEMESTER

Code No	Course Name	L	P	D	Sessional marks	Exam marks	Total marks	Credits
MCAS5110	Software Testing and Quality assurance	4	-	3	25	75	100	4
MCAS5210	Computer Graphics and Multimedia	4	-	3	25	75	100	4
MCAS5310	Object Oriented Analysis and Design	4	-	3	25	75	100	4
MCAS5410	Big Data Analytics	4	-	3	25	75	100	4
MCAS5510	Elective –II	4	-	3	25	75	100	4
MCAS5610	Programming Lab - IX (Software Design Lab)	-	6	3	40	60	100	2
MCAS5710	Programming Lab - X (Data Mining and Data Analytics)	-	6	3	40	60	100	2
	TOTAL	20	12	21	205	495	700	24

SIXTH SEMESTER

Code No	Course Name	L	P	D	Sessional marks	Exam marks	Total marks	Credits
MCAS6110	Project work and Viva-Voce	-	-	-	50	150	200	20

L – Lecture P-Practical D- Duration of Exam

TOTAL NO. OF CREDITS: 140

ELECTIVE COURSES

Course Code	Course
Elective - I	
MCASXX10A	Open Source Resources
MCASXX10B	Service Oriented Architecture
MCASXX10C	Client / Server Computing
MCASXX10D	Network Security
MCASXX10E	Artificial Intelligence
MCASXX10F	Soft Computing
Elective - II	
MCASXX10G	Open CL Programming
MCASXX10H	Digital Imaging processing
MCASXX10I	E-Commerce
MCASXX10J	Pattern Recognition
MCASXX10K	Cloud Computing
MCASXX10L	Natural Language Processing

MCAS1110: 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.

Unit–I **10 periods**

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

Unit-II **12 periods**

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.

Unit-III **12 periods**

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.

Unit–IV **13 periods**

Formal Languages and Finite State Automata: Deterministic finite accepters – Regular languages- Non deterministic finite accepters-Equivalence of deterministic and Non deterministic finite accepters – Reduction of the number of states in finite automata – Regular expressions – Connection between regular expressions and regular languages.

Unit–V **13 periods**

Formal Languages and Finite State Automata (continuation): Closure properties of regular Languages – Identifying nonregular Languages-A Pumping Lamma – A contex free Languages – contex free grammars – leftmost and rightmost derivation – derivation tree – relation between sentential form and derivation tree.

Text Books:

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.
3. Peter Linz, "An Introduction to formal Languages and automata", Jones & Bartlett Publishers,Inc, 2011

Reference Books:

1. Tamilarasi A & A.M.Natarajan, "Discrete Mathematics and its Application", Khanna Publishers, 2nd Edition, 2005.
2. Venkataraman M K, "Engineering Mathematics", Volume II, National Publishing

Company, 2nd Edition,1989.
3. John Hopcropt and Jeffrey Ullam, “Introduction to automata Theory, Language, and Computation, Pearson, 3rd Edition, 2006.

MCAS1210: DATA STRUCTURES

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

Unit-I **10 periods**

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

Unit-II **12 periods**

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

Unit-III **13 periods**

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

Unit-IV **13 periods**

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.

Unit-V **12 periods**

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", 2nd Edition, Tata McGraw Hill Pub, Company Ltd, 2007.
2. Alfred V Aho, Hopperoft John E., UIlman Jeffrey D, "Data Structures and Algorithms",Addison Wesley, 1987.

Reference Book:

1. Yedidyah Langsam, Moshe J.Augenstein, Aaron M. Tenenbaum, "Data
2. Structures Using C", Prentice Hall, 1996.
3. Jean Paul Tremblay, Paul G. Sorenson, "An Introduction to Data Structures with Applications", Tata McGraw Hill, Second Edition, 2010.

MCAS1310: DATA BASE MANAGEMENT SYSTEMS

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

Unit -I **10 periods**

Database System Applications – Purpose of Database Systems – View of Data – Database Languages – Relational Databases – Database design – Data storage and Querying – Transaction Management – Database Architecture – Data Mining and Information Retrieval – Database Users and Administrators – History of Database Systems.

Unit -II **12 periods**

Structure of Relational Databases - Database Schema – Keys - Schema Diagrams - Relational Query Languages - Relational Operations – Formal Query Languages - The Relational Algebra - The Tuple Relational Calculus - The Domain Relational Calculus - Database Design and the E-R Model - Overview of the Design Process - The Entity-Relationship Model - Constraints - Removing Redundant Attributes in Entity Sets - Entity-Relationship Diagrams - Reduction to Relational Schemas - Entity-Relationship Design Issues - Extended E-R Features - Alternative Notations for Modeling Data - Other Aspects of Database Design.

Unit -III **12 periods**

Features of Good Relational Designs - Atomic Domains and First Normal Form - Decomposition Using Functional Dependencies - Functional-Dependency Theory - Algorithms for Decomposition - Decomposition Using Multivalued Dependencies - More Normal Forms - Database-Design Process.

Unit -IV **13 periods**

Basic Concepts - Ordered Indices - B+-Tree Index Files - B+-Tree Extensions - Multiple-Key Access - Static Hashing - Dynamic Hashing - Comparison of Ordered Indexing and Hashing - Bitmap Indices - Index Definition in SQL- Measures of Query Cost - Selection Operation - Sorting - Join Operation - Other Operations - Evaluation of Expressions - Query Optimization - Transformation of Relational Expressions - Estimating Statistics of Expression Results - Choice of Evaluation Plans

Unit -V **13 periods**

Transactions - Transaction Concept - A Simple Transaction Model - Storage Structure - Transaction Atomicity and Durability - Transaction Isolation - Serializability - Transaction Isolation and Atomicity - Transaction Isolation Levels - Implementation of Isolation Levels - Transactions as SQL Statements - Distributed Databases - Homogeneous and Heterogeneous Databases - Distributed Data Storage - Distributed Transactions - Commit Protocols - Concurrency Control in Distributed Databases - Availability - Distributed Query Processing - Heterogeneous Distributed Databases - Cloud-Based Databases - Directory Systems.

Text Books:

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

Reference Books:

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.

MCAS1410: MIRCROPROCESSOR AND APPLICATIONS

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

Unit-I **10 periods**

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.

Unit-II **13 periods**

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.

Unit-III **12 periods**

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.

Unit-IV **12 periods**

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).

Unit-V **13 periods**

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 – nalog 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.

Reference Books:

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.

MCAS1510: PROBLEM SOLVING TECHNIQUES AND C

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

Unit-I **12 periods**

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

Unit-II **13 periods**

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

Unit-III **12 periods**

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.

Unit-IV **13 periods**

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.

Unit-V **10 periods**

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.

Text Books:

1. Dromey R.G , " How to Solve it by Computer ", PHI , 1998.(Unit-I & Unit-II)
2. Balagurusamy E, " Programming in ANSI C " , Tata McGraw Hill, 2004. (Unit-III to Unit-V)

Reference Books:

1. Deitel and Deitel, "C How to Program ", Addisson Wesley, 2001.
2. Brian W.Kernighan & Dennis Ritchie, "C Programming Language", PHI, 1990.
3. Byron.S.Gottfried "Schaum's Outline of Programming with C", 2nd Edition, 1996.
4. Byron G. Gottrifiried, "Programming with C", Schaums Outline Series, McGraw Hill book Company, 1996.

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MCAS2110: ACCOUNTING AND FINANCIAL MANAGEMENT

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

Unit-I **12 periods**

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 - rading & Profit & Loss A/c - Balance sheet.

Unit-II **13 periods**

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.

Unit-III **13 periods**

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.

Unit-IV **12 periods**

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.

Unit-V **10 periods**

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

Text Books:

1. Shukla, M C and T.S.Grewal, "Advanced Accounts I", S.Chand & Co., 1992.
2. Gupta R.L and M.Radhaswamy,"Advanced Accountancy" Sultan Chand & Sons, 1989.
3. Kuchal S.C ,"Financial Management",Chitanya Publishing House, 1990.
4. Hingorani N.L and A.R.Ramanathan,"Management Accounting",Sultan Chand& Sons, 1989.
5. Maheswari S.N,"Principles of Cost Accounting", Sultan Chand & Sons, 1990.

Reference Books:

1. Jain S.P and 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.

MCAS2210: COMPUTER ARCHITECTURE

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

Unit-I **12 periods**

Overview And History – Computer Design Process – Structure and Functions – Dimension of computer - Evolutions - System Buses - Bus Interconnection – PCI - Future bus - Performance Metrics - Memory Hierarchy

Unit-II **12 periods**

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

Unit-III **12 periods**

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

Unit-IV **13 periods**

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.

Unit-V **11 periods**

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

Text Book:

1. Hennessy J and D.Patterson,"Computer Architecture- A Quantitative approach" organ and Kafumann, Fifth Edition, 2012.

Reference Books:

1. John .P. Hayes,"Computer Architecture and Organization", Tata McGraw Hill,Third Edition,1998.
2. Hamatcher V.C, et al "Computer Organization", Tata Mcgraw Hill, 1996.
3. Govindarajalu B, "Computer Architecture and Organization", Tata McGraw Hill, Second Edition,2005
4. Stallings, W., "Computer Organization and Architecture: Designing for Performance ", Prentice Hall, Tenth Edition, 2015.
5. Hennessy,J.L. and D. A. Patterson, "Computer Architecture: A Quantitative Approach", Morgan Kaufmann , Fifth Edition, 2011.

MCAS2310: SOFT SKILLS DEVELOPMENT

Unit-I **12 periods**

Soft skills and developing positive Attitude

Soft skills: introduction – what are soft skills? - selling your soft skills - attribute regarded as soft skills – soft skills – social- soft skills- thinking – soft skills –Negotiating –exhibiting your soft skills- indentifying your soft skills- improving your soft skills - soft skills training –train yourself-top 60 soft skills.

Developing positive attitude: introduction – meaning - features of attitudes- attitude and behavior formation of attitudes– change of attitudes – what can you do to change attitude?-ways of changing attitude in a person – attitude in a workplace – the power of positive attitude-developing positive attitude-example of positive attitude- example of negative attitude-over coming negative attitude- negative attitude and its result.

Unit-II **12 periods**

Art of speaking and writing

Art of speaking: Introduction-what make communication important? - Defining communication-special features of communication – communication process- channel of communication-importance of communication - tips for effective communication - tips for powerful presentation-art of public speaking - importance of public speaking.

Art of writing: Introduction – importance of writing –creative writing - writing tips- drawbacks of writing communication.

Unit-III **12 periods**

Body language

Introduction – body talk – voluntary and involuntary body language-forms of body language-parts of body language - origin of body language - uses of body language - body language in building interpersonal relations – body language in building industrial relations-reason to study body language-improving your body language – types of body language-Gender differences-female interest and body language - shaking hands with women - interpreting body language-developing confidence with correct body language.

Unit-IV **12 periods**

Group discussion

Introduction – meaning of GD – why group discussion? - characters tested in a GD – tips on GD – types of GD - skills required in a GD - consequences of GD - behavior of a GD - essential elements of GD - different characters in GD - traits tested in a GD - GD etiquette - areas to be concentrated while preparing for a GD - imitating a GD - techniques to initiate a GD - Non-verbal communication in GD – movement and gestures to be avoided in a GD-topics for GD.

Interview skills

Introduction – why an interview?.- types of interview - interview panel-types of questions asked-reason for selecting a candidate –reason for rejecting a candidate – on the day of interview– on the interview table – attending job fair-common mistakes that you would't want to do-questions the candidate should not ask during the interview –post- interview etiquette-how does one follow up?- telephonic interview –dress code at interview – typical questions

asked – interview mistakes –quick tips- how to present well in interview –tips to make a good impression in an interview – job interview-basic tips-how to search for job effectively – interview quotations.

Unit-V **12 periods**

Time management

Introduction- the 80:20 rule- take a good look at the people around you- examine your work-sense of time management – time is money – features of time- three secretes of time management - time management matrix- analysis of time matrix-effective scheduling – grouping of activities – five steps to successful time management –difficulties in time management- evils of not planning - time management is a myth – overcoming procrastination – ways of find free time- time management tips for students – interesting facts about time- ideal way of spending a day- time wasters – time savers – realizing the value of time-time circle planner.

Text Book:

1. Alex K., "Soft Skills: Know yourself and know the world" S.Chand & company Pvt Lts, Third revised Edition, 2014.

Reference Book:

1. Gopalaswamy Ramesh, and Mahadevan Ramesh, " The ACE of Soft Skills, Attitude, Communication and Etiquette for Success", Pearson; First edition, 2013.
2. Barun K. Mitra, "Personality Development and Soft Skills", Oxford university press, New Delhi, 2011.
3. Rao M.S, "Soft Skills - Enhancing Employability: Connecting Campus with Corporate", I K International Publishing House Pvt. Ltd, 2011
4. Sanjay Kumar and Pushp Lata, "Communication Skills", Oxford university press, New Delhi, 2011.

MCAS2410: OPERATING SYSTEMS

Aim: The basic objective of this lesson is to provide students with the understanding and knowledge of Operating System Concepts.

Unit-I **12 periods**

Introduction – Operating System Structure - Operating System Operations – Protection and Security – Kernel Data Structures - Computing Environments - Open Source Operating Systems - Operating System Services – User operating system Interface – System calls – Types of system calls – System programs – Operating System design and Implementation – Operating System-debugging - Operating System-Generation – System Boot.

Unit-II **12 periods**

Process Management – Process Concepts – Process Scheduling – Operation on Processes – Interprocess Communication – Threads – Multicore Programming - Multithreading Models – Thread Libraries - Implicit Threading - Threading Issues – Process Synchronization – The Critical Section Problem – Peterson's Solution – CPU Scheduling – Scheduling Criteria – Scheduling Algorithms - Deadlocks – System Model – Deadlock Characterization – Methods for handling Deadlocks – Deadlock Prevention – Deadlock Avoidance – Deadlock Detection – Recovery from Deadlock.

Unit-III **12 periods**

Memory Management – Background – Swapping – Contiguous Memory Allocation – Paging – Structure of the Page Table – Virtual Memory Background - Demand Paging – Copy-on-Write – Page Replacement – Allocation of Frames – Thrashing – Memory- Mapped Files – Allocating Kernel Memory – Other Considerations – Operating System Examples.

Unit-IV **12 periods**

Storage Management – Overview of Mass Storage Structure – Disk Structure – Disk Attachment – Disk Scheduling – Disk Management – Swap Space Management- RAID Structure – Stable Storage Implementation – Tertiary Storage Structure – I/O Hardware – Application of I/O Interface – Kernal I/O Subsystem - File Concept – Access Methods – Directory Structure – File System Mounting – File Sharing – Protection – File System Structure – File System Implementation – Directory Implementation – Allocation Methods – Free Space Management – Efficiency and Performance.

Unit-V **12 periods**

Case study - Windows 7- History - Design Principles - System Components - Terminal Services and Fast User Switching - File System - Networking - Programmer Interface - **Android -** Overview of Android Operating System - The Android ecosystem - Android Architecture - Android Versioning.

Text Book:

1. Abraham Silberschatz, Peter Baer Galvin and Greg Gagne, Operating Systems Concepts, John Wiley & Sons, Inc., Ninth Edition, 2004.

Reference Books:

1. Andrew S. Tanenbaum, Modern Operating Systems, Prentice Hall of India, Third Edition, 2007.
2. Deitel ,H. M., Operating Systems, Pearson Education, Third Edition, 2004.
3. https://android.googlesource.com

MCAS2510: INTERNET AND JAVA PROGRAMMING

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

Unit-I **8 periods**

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.

Unit-II **12 periods**

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.

Unit-III **14periods**

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.

Unit-IV **13 periods**

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.

Unit-V **13 periods**

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 5th edition, 2002.

Reference Books:

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, 1st edition, 2001.
4. Setven Holzner, "Java2 Black Book", Coriolis Group Books, 2001.

MCAS3110: RESOURCE MANAGEMENT TECHNIQUES

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

Unit-I **10 periods**

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

Unit-II **12 periods**

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 .

Unit-III **12 periods**

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

Unit-IV **13 periods**

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

Unit-V **13 periods**

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.

Reference Books:

1. Billey E. Gillet, "Introduction To Operations Research A Computer OrientedAlgorithmic Approach", Tata McGraw Hill, New Delhi, 1979.
2. Hamdy A. Taha, A.M. Natarajan, P.Balasubramnie and A.Tamilarasi, "Operations Research-An Introduction", 2009.
3. Kandi swarup, P.K Gupta and Manmohan, "Operations Research", 18the edition, 2015.
4. Ravidran, Phillips and Solterg, "Operations Research: Principles & Practice", 2nd EDC(WSE series), 2007.

MCAS3210: COMPUTER NETWORKS

AIM: To study the various protocol models, Network services based on the Computer Networks

Unit-I **10 periods**

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.

Unit-II **12 periods**

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.

Unit-III **13 periods**

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).

Unit-IV **13 periods**

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

Unit-V **12 periods**

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.

Reference Book:

1. William Stallings," Data and computer communications", PHI- 2001.
2. Douglas E. comer," Internetworking with TCP/IP-Volume-I", PHI, 1997.
3. Larry L. Peterson and Bruce S. Davie, "Computer Networks: A Systems Approach", Fifth Edition, Morgan Kaufmann Publishers, 2012.
4. William Stallings, "Data and Computer Communications", Tenth Edition, Pearson, 2013.
5. James F. Kurose, Keith W. Ross, "Computer Networking: A Top-DownApproach", Fifth Edition, Pearson Education,2012

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MCAS3310: SOFTWARE ENGINEERING

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

Unit-I **12 periods**

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.

Unit-II **12 periods**

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

Unit-III **12 periods**

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

Unit-IV **12 periods**

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

Unit-V **12 periods**

Software Configuration and Management, 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", 6th Edition, Mcgraw Hill, 2005.

Reference Books:

1. Fleeger P, "Software Engineering", Prentice Hall, 1999.
2. Carlo Ghezzi, Mehdi Jazayari, Dino Mandrioli, "Fundamentals of Software Engineering", Prentice Hall of India, 1991.
3. Sommerville I, "Software Engineering", 5th Edition: Addison Wesley, 1996.
4. Pankaj Jalote, "An Integrated Approach to Software Engineering", Third Edition, Narosa publications, 2011.
5. Ian Sommerville, "Software engineering", Ninth Edition, Pearson Education Asia, 2010.

MCAS3410: COMPILER DESIGN

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

Unit-I **10 periods**

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.

Unit-II **13 periods**

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.

Unit-III **13 periods**

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.

Unit-IV **12 periods**

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.

Unit-V **12 periods**

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.

Reference Books:

1. Sudha Sadasivam G, “Compiler Design”, Scitech Publications (India) Private Limited, Chennai, 2008.
2. Dick Grone, Henri E Bal, Ceriel J H Jacobs and Koen G Langendoen, “Modern Compiler Design”, John Wiley & Sons, USA, 2000.
3. Dhamdhere 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.

MCAS3510: UNIX AND WINDOWS PROGRAMMING

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

Unit-I **10 periods**

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.

Unit-II **12 periods**

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

Unit-III **13 periods**

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

Unit-IV **12 periods**

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

Unit-V **13 periods**

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]

Reference Books:

1. Richard Stevens W, "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. Tare R.S, "Unix Utilities", McGraw Hill, First Edition, 1988.

MCAS4110: DATA WAREHOUSING AND MINING

AIM: To studies the basic principles of data mining and data warehousing architecture.

Unit-I **11 periods**

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-

Unit-II **13 periods**

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.

Unit-III **13 periods**

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.

Unit-IV **12 periods**

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.

Unit-V **11 periods**

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.

Reference Books:

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.
3. Hanand J and M. Kamber, “Data Mining: Concepts and Techniques”, Second Edition, Morgan Kaufman, 2006.

MCAS4210: WEB TECHNOLOGY

AIM: Students should possess a firm grounding in some of the existing web technologies as well as commercial web applications.

Unit-I **10 periods**

HTML: History of the Internet and World Wide Web – HTTP, SMTP, POP3, MIME, Understanding roles of Web Browsers and Web Servers. Structure of HTML, Text formatting, Text styles, hyper link, image, and tables.

Unit-II **12 periods**

Frames, Forms and CSS: Frames, Forms and controls, Embedding audio, video and animated files in HTML, CSS –Understanding CSS, Internal CSS, External CSS, Font Properties, Text Properties, Color and Background properties, Table properties, Numbering and List Properties.

Unit-III **13 periods**

JavaScript: Data types and literals, operators, conditional statements, loop constructs, reserved words; core Objects: Array Object, Date Object; Functions: passing value to JavaScript functions, user defined functions, Handling old browsers , java script events, formatting cookie, retrieving cookie value from the cookie file, removing a cookie , animations using events.

Unit-IV **13 periods**

ASP & XML: ASP – Working of ASP – Request and Response Objects – File System Objects – Session tracking and cookies – ADO – Access a Database from ASP – XML – Structure in Data – Name spaces – DTD – Vocabularies – Accessing Web servers – IIS – Apache web server.

Unit-V **12 periods**

PHP & MySQL: Why PHP and MySQL - Server-Side Web Scripting - Getting Started with PHP - Adding PHP to HTML -Syntax and Variables - Control and Functions - Passing Information between Pages – Strings – Arrays and Array Functions – Numbers - MySQL Database Administration - PHP/MySQL Functions -Displaying Queries in Tables - Building Forms from Queries.

Text Books

1. Kris Jamsa, konrad King and Andy Anderson, “HTML & Web Design Tips and Techniques”, Tata McGraw-Hill, First Edition, 2002.
2. Powell T.A, HTML: Complete Reference, Tata McGraw-Hill, Fifth Edition, 2010.
3. Deitel & Deitel, Goldberg, Internet and World Wide Web – How to Program, Third Edition, Pearson Education Asia, 2005.
4. Elizabeth Naramore, Jason Gerner, Yann Le Scouarnec, Jeremy Stolz, and Michael K. Glass, “Beginning PHP5, Apache, and MySQL Web Development”, First Edition, Wrox publications, 2005.
5. Rajkamal, “Web Technology”, First Edition, Tata McGraw-Hill, 2001.
6. Tim Converse, Joyce Park and Clark Morgan “PHP5 and MySQL Bible”, Wiley Publishing, Inc. 2004.

MCAS4310: MOBILE COMPUTING

AIM: To study the need and nature of mobile applications and understand the design issues in the development of mobile applications.

UNIT-I **12 periods**

Introduction: Aspects of Mobility – Mobile Device Profiles – Device Portability – Mobile Applications – Characteristics and Benefits – Application Model – Infrastructure and Managing Resources – Frameworks and Tools – Generic UI Development – Visual UI – Text to Speech Techniques – Multiodal and Multichannel UI .

UNIT-II **12 periods**

Tools: Google Android Platform – Eclipse Simulator – Android Application Architecture – Event based programming – Apple iPhone Platform – UI and Toolkit Interfaces – Event handling – Graphical Services – Animation Techniques.

UNIT-III **12 periods**

Application Design: Memory Management – Design Patterns for Limited Memory - Work Flow for Application development – Techniques for Composing Applications - Dynamic Linking - Plug ins and rule of thumb for using DLLs - Concurrency and Resource Management - Look and Feel

UNIT-IV **12 periods**

Application Development: Intents and Services – Storing and Retrieving data – Communication via the Web – Notification and Alarms – Graphics and Multimedia – Telephony – Location based Services – Packaging and Deployment – Security and Hacking

UNIT-V **12 periods**

Cellular Networks And Wireless Lans: Cellular Network Structure and Operation - Principles - Tessellation, Frequency Reuse, Hand off - GSM - System Architecture, Elements, Interfaces, Frame Structure, Protocol Stack, Types of Handover - IEEE 802.11 WLAN - Architecture, Reference Model - Physical layer - MAC Layer - CSMA/CA- Interference Spacing – Security – WEP,802.1x Authentication.

Text Books:

1. Reza B'Far, "Mobile Computing Principles: Designing and Developing Mobile Applications with UML and XML", Cambridge Press University, 2009.
2. Asoke K Talukder, Hasan Ahmed, Roopa R Yavagal, “Mobile Computing Technology, Applications and Service Creation”, 2nd ed, Tata McGraw Hill, 2010.

Reference Books:

1. Reto Meier, “Professional Android 2 Application Development”, Wrox Wiley, 2010.
2. Neil Smyth, “iPhone iOS 4 Development Essentials – Xcode”, 4 Edition, Payload media, 2011.
3. Ben Shneiderman and Catherine Plaisant, “Designing the User Interface: strategies for Effective Human Computer Interaction”, Addison– Wesley, 5th Edition, 2009.

4. Zigurd Mednieks, Laird Dornin, G, Blake Meike and Masumi Nakamura, “Programming Android”, O‟Reilly, 2011.
5. Reto Meier, Wrox Wiley, “Professional Android 2 Application Development”, 2010.
6. Alasdair Allan, “iPhone Programming”, O‟Reilly, 2010.
7. Wei-Meng Lee, “Beginning iPhone SDK Programming with Objective-C”, Wrox Wiley, 2010.
8. Stefan Poslad, “Ubiquitous Computing: Smart Devices, Environments and interactions”, Wiley, 2009.

MCAS4410: C# and .NET FRAMEWORK

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

Unit-I **10 periods**

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.

Unit-II **12 periods**

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.

Unit-III **12 periods**

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

Unit-IV **13 periods**

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

Unit-V **13 periods**

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.

Reference Books:

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.

MCAS5110: SOFTWARE TESTING AND QUALITY ASSURANCE

AIM: To study behavior of the testing techniques to detect the errors in the software, functionality of automated testing tools and understands the models of software reliability

UNIT- I **10 periods**

Testing Environment and Test Processes: World-Class Software Testing Model – Building a Software Testing Environment - Overview of Software Testing Process – Organizing for Testing – Developing the Test Plan – Verification Testing –Analyzing and Reporting Test Results – Acceptance Testing – Operational Testing – Post Implementation Analysis

UNIT-II **13 periods**

Testing Techniques and Levels of testing: Using White Box Approach to Test design - Static Testing Vs. Structural Testing – Code Functional Testing – Coverage and Control Flow Graphs –Using Black Box Approaches to Test Case Design – Random Testing – Requirements based testing –Decision tables –State-based testing – Cause-effect graphing – Error guessing – Compatibility testing – Levels of Testing - Unit Testing – Integration Testing - Defect Bash Elimination. System Testing - Usability and Accessibility Testing – Configuration Testing - Compatibility Testing - Case study for White box testing and Black box testing Techniques.

UNIT- III **13 periods**

Incorporating Specialized Testing Responsibilities: Testing Client/Server Systems – Rapid Application Development Testing – Testing in a Multiplatform Environment – Testing Software System Security - Testing Object-Oriented Software – Object Oriented Testing – Testing Web based systems – Web based system – Web Technology Evolution – Traditional Software and Web based Software – Challenges in Testing for Web-based Software – Testing a Data Warehouse - Case Study for Web Application Testing.

UNIT-IV **12 periods**

Test Automation: Selecting and Installing Software Testing Tools - Software Test Automation – Skills needed for Automation – Scope of Automation – Design and Architecture for Automation – Requirements for a Test Tool – Challenges in Automation – Tracking the Bug – Debugging – Case study using Bug Tracking Tool.

UNIT-V **12 periods**

Software Testing and Quality Metrics: Testing Software System Security - Six-Sigma – TQM - Complexity Metrics and Models – Quality Management Metrics - Availability Metrics - Defect Removal Effectiveness - FMEA - Quality Function Deployment – Taguchi Quality Loss Function – Cost of Quality. Case Study for Complexity and Object Oriented Metrics.

Text Books:

1. William Perry, “Effective Methods of Software Testing”, Third Edition,Wiley Publishing 2007.
2. Srinivasan Desikan and Gopalaswamy Ramesh, “Software Testing – Principles and Practices”, Pearson Education, 2007.
3. Naresh Chauhan , “Software Testing Principles and Practices ” Oxford University Press , New Delhi , 2010.
4. Dale H. Besterfiled et al., “Total Quality Management”, Pearson Education Asia, Third Edition, Indian Reprint (2006).

5. Stephen Kan, “Metrics and Models in Software Quality”, Addison – Wesley, Second Edition, 2004.

Reference Books:

1. Llene Burnstein, “ Practical Software Testing”, Springer International Edition, Chennai, 2003
2. Renu Rajani,Pradeep Oak, “Software Testing – Effective Methods, Tools and Techniques”, Tata McGraw Hill,2004.
3. Edward Kit, “Software Testing in the Real World – Improving the Process”, Pearson Education,1995.
4. Boris Beizer, “Software Testing Techniques” – 2nd Edition, Van Nostrand Reinhold, New York,1990.
5. Adithya P. Mathur, “Foundations of Software Testing – Fundamentals algorithms and Techniques”, Dorling Kindersley (India) Pvt. Ltd., Pearson Education, 2008.

MCAS5210: COMPUTER GRAPHICS AND MULTIMEDIA

AIM: To understand the computer graphics concept in detail and multimedia system application.

Unit-I **10 periods**

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

Unit-II **12 periods**

2D Transformations: Two dimensional transformations – Interactive Input methods - Polygons - Splines – Bezier Curves - Window view port mapping transformation.

Unit-III **13 periods**

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.

Unit-IV **12 periods**

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

Unit-V **13 periods**

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)

Reference Books:

1. Siamon J. Gibbs and Dionysios C. Tsichritzis, "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.

MCAS5310: OBJECT ORIENTED ANALYSIS AND DESIGN

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

Unit-I **10 periods**

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.

Unit-II **12 periods**

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.

Unit-III **13 periods**

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-Appling the Notation.

Unit-IV **12 periods**

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.

Unit-V **13 periods**

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.

Reference Books:

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.

MCAS5410: BIG DATA ANALYTICS

AIM: To understand the concepts of Big Data Analytics

Unit-I **10 periods**

Introduction to Big Data: Introduction to Big Data Platform – Traits of Big data -Challenges of Conventional Systems - Web Data – Evolution Of Analytic Scalability - Analytic Processes and Tools - Analysis vs Reporting - Modern Data Analytic Tools - Statistical Concepts: Sampling Distributions - Re-Sampling - Statistical Inference - Prediction Error.

Unit-II **12 periods**

Data Analysis: Regression Modeling - Multivariate Analysis - Bayesian Modeling - Inference and Bayesian Networks - Support Vector and Kernel Methods - Analysis of Time Series: Linear Systems Analysis - Nonlinear Dynamics - Rule Induction - Neural Networks: Learning And Generalization - Competitive Learning - Principal Component Analysis and Neural Networks - Fuzzy Logic: Extracting Fuzzy Models from Data - Fuzzy Decision Trees - Stochastic Search Methods.

Unit-III **13 periods**

Mining Data Streams: Introduction To Streams Concepts – Stream Data Model and Architecture - Stream Computing - Sampling Data in a Stream – Filtering Streams – Counting Distinct Elements in a Stream – Estimating Moments – Counting Oneness in a Window – Decaying Window - Real time Analytics Platform(RTAP) Applications - Case Studies - Real Time Sentiment Analysis, Stock Market Predictions.

Unit-IV **13 periods**

Frequent Itemsets and Clustering: Mining Frequent Itemsets - Market Based Model – Apriori Algorithm – Handling Large Data Sets in Main Memory – Limited Pass Algorithm – Counting Frequent Itemsets in a Stream – Clustering Techniques – Hierarchical – K-Means – Clustering High Dimensional Data – CLIQUE And PROCLUS – Frequent Pattern based Clustering Methods – Clustering in Non-Euclidean Space – Clustering for Streams and Parallelism.

Unit-V **12 periods**

Hadoop and R for Visualization: Backgroundd and fundamentals-moving data in and out of Hadoop-data serialization-applying MapReduce patterns to big data- streaming big data-integrating R and Hadoop for statistics and more-predictive analytics with Mahout- Hacking with Hive-Programming pipelines with pig – HBase-MySQL-NoSQL- RHadoop

Text Books:

1. Michael Berthold, David J. Hand, “Intelligent Data Analysis”, Springer, 2007.
2. Anand Rajaraman and Jeffrey David Ullman, “Mining of Massive Datasets”, Cambridge University Press, 2012.

Reference Books:

1. Bill Franks, “Taming the Big Data Tidal Wave: Finding Opportunities in Huge Data Streams with Advanced Analytics”, John Wiley & sons, 2012.
2. Glenn J. Myatt, “Making Sense of Data”, John Wiley & Sons, 2007.
3. Pete Warden, “Big Data Glossary”, O’Reilly, 2011.

4. Jiawei Han, MichelineKamber, “Data Mining Concepts and Techniques”, Second Edition, Elsevier, second edition, 2006.
5. Alex Holmes, “Hadoop in Pracice”,2012 by Manning Publications,2012.
6. Ohri A, “R for Business Analytics”, Springer, 2012.
7. Prabhanjan Narayanachar Tattar, “R Statistical Application Development by Example Beginner's Guide” , packt publishing,2013.

MCASXX10A: OPEN SOURCE RESOURCES

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

Unit-I **12 periods**

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.

Unit-II **12 periods**

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.

Unit-III **12 periods**

Open Source Programming 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.

Unit-IV **12 periods**

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

Unit-V **12 periods**

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.

Reference Books:

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.

MCASXX10B: SERVICE ORIENTED ARCHITECTURE

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

Unit-I **10 periods**

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.

Unit-II **12 periods**

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.

Unit-III **13 periods**

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.

Unit-IV **13 periods**

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.

Unit-V **12 periods**

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.

Reference Books:

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.

MCASXX10C: 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

Unit-I **10 periods**

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.

Unit-II **12 periods**

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.

Unit-III **13 periods**

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.

Unit-IV **12 periods**

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

Unit-V **13 periods**

Development Methodology And Tools: Convert Existing Screen Interfaces-Re_Engineering Existing Applications-Business Re_Engineering-MethodologyTools-EASELWorkbench-Ellipse- SQL Window Power Builder-SQLTool set-Future of Client Server Computing.

Text Book:

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

Reference Books:

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.

MCASXX10D: NETWORK SECURITY

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

Unit-I **10 periods**

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

Unit-II **13 periods**

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.

Unit-III **12 periods**

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

Unit-IV **13 periods**

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

Unit-V **12 periods**

Network Security: networks Concepts – Threats in Networks – Network Security Controls – Firewalls – l. 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.

MCASXX10E: ARTIFICIAL INTELLIGENCE

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

Unit-I **10 periods**

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.

Unit-II **13 periods**

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.

Unit-III **13 periods**

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.

Unit-IV **12 periods**

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.

Unit-V **12 periods**

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. Zimmerman H.J, "Fuzzy Set Theory and its Applications", Allied Publishers Ltd., Second Edition.

Reference Book:

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

MCASXX10F: SOFT COMPUTING

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

Unit-I **12 periods**

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.

Unit-II **12 periods**

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.

Unit-III **12 periods**

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.

Unit-IV **12 periods**

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.

Unit-V **12 periods**

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. Haykin. S, "Neural Networks: A Comprehensive Foundation", 2nd Ed, Prentice Hall. 1999.
2. Timothy J.Ross, "Fuzzy Logic Engineering Applications", McGraw Hill, NewYork, 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.

MCASXX10G: Open CL PROGRAMMING

AIM: To learn basic concepts of various processors and open CL program

Unit-I **12 periods**

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, NVDIA Fermi and AMD Fusion processors.

Unit-II **10 periods**

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

Unit-III **13 periods**

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

Unit-IV **13 periods**

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

Unit-V **12 periods**

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

Text Book:

1. Aaftab Munshi, Benedict R. Gaster, Timothy G. Mattson and James Fung, "Open CL Programming Guide", July 2011.

Reference Books:

1. John L. Hennessy and David A. Patterson, "Computer Architecture – A Quantitative Approach", 3rd Edition, Elsevier Publications, 2003.
2. Peter S Pacheco, "A User's Guide to MPI", University of San Francisco,1998.
3. Benedict Gaster, Lee Howes, David R Kaeli and Perhaad Mistry, "Heterogeneous Computing with Open CL", Elsevier Publications, 2011.
4. AMD Accelerated Parallel Processing Open CL Programming Guide, 2013 Advanced Micro Devices, In April, 2011.

MCASXX10H: DIGITAL IMAGING PROCESSING

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

Unit-I **10 periods**

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

Unit-II **12 periods**

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

Unit-III **12 periods**

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

Unit-IV **13 periods**

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.

Unit-V **13 periods**

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

Reference Book:

1. William Pratt, "Digital Image Processing", John Wiley & Sons, Third edition, 2001.
2. Hany Farid, "Fundamentals of Image Processing", Dartmouth College, 2010.
3. Stefan G. Stanciu,"Digital Image Processing", InTech **,** 2012.
4. Dwayne Philipps," Image processing in C: Analysis and Enhancing Digital Images", R & D Books**,** 1997

MCASXX10I: E-COMMERCE

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

Unit-I **10 periods**

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

Unit-II **12 periods**

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

Unit-III **13 periods**

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

Unit-IV **12 periods**

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

Unit-V **13 periods**

Search Engines and Directory Services: Information Directories - Search Engines – Internet Adverting – 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.

Reference Books:

1. Ravi Kalakota and Andrew B Whinston, "Frontiers of Electronic Commerce", Pearson Education Asia, 1999.
2. Marilyn Greenstein and Todd M Feinman, " Electronic commerce: Security, RiskManagement and Control ", Tata McGraw-Hill, 2000.

MCASXX10J: PATTERN RECOGNITION

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

Unit-I **12 periods**

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.

Unit-II **12 periods**

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

Unit-III **12 periods**

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

Unit-IV **12 periods**

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

Unit-V **12 periods**

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

Reference Books:

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

MCASXX10K: CLOUD COMPUTING

AIM: To help the learners understand the underlying principles of various techniques available for Cloud Computing, Virtualization techniques, Cost effectiveness, Vulnerability, Data Security and Advantages of Green Computing.

Unit-I **10 periods**

Introduction: Basics, applications, intranet and cloud, examples: Amazon, Google, Microsoft, IBM– advantages and disadvantages of cloud computing, Google appengine, Microsoft Azure, Amazon(EC2, S3,SQS),open stack, cloud computing services

Unit-II **13 periods**

Hardware and architecture: clients-security-network-services. Accessing the cloud: platforms-web applications-web APIs-web browsers. Cloud storage: overview-providers. Standards: application-client-infrastructure-service.

Unit-III **12 periods**

Software as Service: overview-driving forces-company offerings-industries. Software plus services: Overview-mobile device integration-providers-Microsoft Online.

Unit-IV **13 periods**

Developing Applications: Google-Microsoft-Intuit QuickBase-Cast Iron Cloud-Bungee Connect-Development (Appengine, Azure, openstack etc.)- trouble shooting and application management.

Unit-V **12 periods**

Local clouds and thin clients: Virtualization-server solutions-thin clients. Cloud Migration: cloud services for individuals-enterprise cloud- methods for migration-analyzing cloud services.

Text Book:

1. Anthony T.Velte, Toby Velte ,"Cloud Computing a practical approach" , Mcgraw Hill, 2010.

Reference Books:

1. Janakiram M.S.V, "Demystifying the Cloud – An introduction to Cloud Computing", version 1.1, 2010.
2. Mark C. Chu-Carroll, "Code in the Cloud- Programming Google App Engine", The Pragmatic Bookshelf Raleigh, North Carolina Dallas, Texas, 2011.

MCASXX10L: NATURAL LANGUAGE PROCESSING

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

Unit-I **12 periods**

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.

Unit-II **12 periods**

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

Unit-III **12 periods**

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

Unit-IV **12 periods**

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

Unit-V **12 periods**

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.

Reference Books:

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