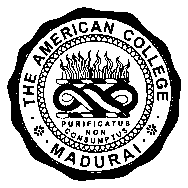
**33**

**THE AMERICAN COLLEGE, MADURAI.**

**DEPARTMENT OF MASTER OF COMPUTER APPLICATION**

**ELIGIBILITY:**

1. A pass with minimum percentage of marks in Part III as per the Government norms in
2. B.Sc degree in Computer Science / IT / IT and Management/ Software/ Mathematics/ Statistics/ Physics/ Chemistry/ Applied Science/ Electronics
3. Any Degree with PGDCA
4. B.Com, B.Com with CA, B.Com with IT, B.B.A with Mathematics at the HSS/Degree level
5. B.E/B.Tech
6. Entrance Test : As per the Government norms
7. Reservation : As per the Government norms
8. Minimum marks : As per the Government norms

**SHEME OF EXAMINATION FOR THEORY CUM LAB COURSES:**

For courses having both theory and practical’s there will be two tests, one on theory and the other on practical’s which will be taken as Test 1 and Test 2. Assignment and Quiz will be only on theory. The final examination will be only on Theory and will be of 3 hours duration with a course maximum of 100 marks.

**QUESTION PATTERN FOR THEORY PAPER**

**PART A**

20 Multiple choice questions (5 from each unit) carries one mark each.

(20 x 1 = 20 marks)

**PART B**

Four questions of either or type one from each unit carries 8 marks each.

(4 x 8 = 32 marks)

**PART C**

Four out of Six questions of open choice type questions carries 12 marks each. Maximum of two questions shall be asked from any two units and the rest will have one question each.

(4 x 12 = 48 marks).

**Department of Master of Computer Application**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **COURSE CODE** | **COURSE TITLE** | **Hrs/**  **Credit** | **Marks** | **COURSE CODE** | **COURSE TITLE** | **Hrs** | **Marks** |
| **SEMESTER I** | | | | **SEMESTER II** | | | |
| MCA 4421 | Mathematical Foundation for Computer Applications | 4 | 80 | MCA 4422 | Design and Analysis of Algorithm | 4 | 80 |
| MCA 4423 | Digital principles & Computer Organization | 4 | 80 | MCA 4424 | System Software | 4 | 80 |
| MCA 4425 | Advanced Programming in C | 4 | 80 | MCA 4426 | C++ & OOP | 4 | 80 |
| MCA 4627 | Operating Systems (TL ) | 4+2 | 120 | MCA 4628 | Advanced DBMS (TL) | 4+2 | 120 |
| MCA 4429 | Web Programming (TL) | 2+2 | 80 | MCA 4430 | Embedded System Programming | 2+2 | 80 |
| MCA 4431 | Business Communication | 4 | 80 | MCA 4432 | Essentials of Management | 4 | 80 |
| MCA 4433 | Lab I - C | 4 | 80 | MCA 4434 | Lab II - C++ | 4 | 80 |
| **SEMESTER III** | | | | **SEMESTER IV** | | | |
| MCA 5421 | Computer Oriented Numerical Method & Statistics | 4 | 80 | MCA 5422 | Optimization Techniques | 4 | 80 |
| MCA 5423 | OOAD & UML | 4 | 80 | MCA 5424 | Adv Software Engineering | 4 | 80 |
| MCA 5425 | Programming in JAVA | 4 | 80 | MCA 5426 | J2EE Programming | 4 | 80 |
| MCA 5627 | Computer Graphics (TL) | 4+2 | 120 | MCA 5628 | Computer Networks (TL) | 4+2 | 120 |
| MCA 5429 | LINUX Programming (TL) | 2+2 | 80 |  | Elective I | 4 | 80 |
| MCA 5431 | Accounting & Financial Management | 4 | 80 |  | Elective II | 4 | 80 |
| MCA 5433 | Lab III - Java | 4 | 80 | MCA 5434 | Lab IV –J2EE | 4 | 80 |
| **SEMESTER V** | | | | **SEMESTER VI** | | | |
| MCA 6421 | Distributed and Cloud Computing | 4 | 80 | MCA 6620 | PROJECT – VIVA VOCE |  | 200 |
| MCA 6423 | Data Mining & Warehousing | 4 | 80 |  |  |  |  |
| MCA 6625 | .NET | 6 | 120 |  |  |  |  |
| MCA 6427 | Advanced Networking (TL) | 2+2 | 80 |  |  |  |  |
|  | Elective III | 4 | 80 |  |  |  |  |
|  | Elective IV | 4 | 80 |  |  |  |  |
| MCA 6433 | Lab V – .Net | 4 | 80 |  |  |  |  |

**Electives:**

1. Parallel computing using Open CL
2. Soft Computing
3. Biometrics
4. Digital Image Processing
5. Network security
6. Artificial Intelligence & Expert System
7. Compiler Design
8. Data Analytics and Big Data
9. Mobile Computing
10. Organizational Behaviour
11. Multimedia and Applications
12. ERP
13. Software Testing
14. Distributed Systems
15. Distributed Database Design
16. Robotics
17. Hardware components

**MCA 4421 Mathematical Foundation for Computer Applications 4Hrs**

**OBJECTIVE:**

The aim of this course is to train the students with fundamental concepts of mathematics that would be necessary for Computer application.

This course will enable the students to know the logic and basic fuzzy, set, relation, graph theory and automata. Theorems are discussed with examples.

**UNIT I**

LOGIC-Connectives –Normal Form - Rules of Inference Theory in Statement Calculus - Predicate Calculus - Introduction to Fuzzy Logic - Fuzzy Set – Fuzzy Sets versus Crisp Sets – Operation on Fuzzy Sets

**UNIT II**

Relation – Equivalence Relation- Partial Order Relation - Relational Matrix - Relational Graph – Partition - Function – Recurrence Function –Characteristic Function

**UNIT III**

# GRAPH – Walk – Path – Tree - Binary Tree - Kurskal Algorithm - Prims Algorithm – Connectivity- Planner Graph -Coloring

**UNIT IV**

Finite Automata – Deterministic Finite Automata – Non-deterministic Finite Automata - Languages – Grammars - Push Down Automata.

**REFERENCE:**

1. Tremblay JP, Manohar R, “Discrete Mathematical Structures with application to Computer Science”, McGraw Hill Publication, 2012.
2. AR Vasishtha, KiranVasishtha, “Modern Algebra”, Krishna Prakashan Mandir Publication, 2013.
3. Narsingh Deo, “Graph Theory with applications to Engineering and Computer Science”, Prentice Hall India, 2012.
4. Hopcroft J Eullman, JD, “Introduction to Automata Theory, Languages and Computation”, Narosa Publishing House, 2013.
5. Klir, GJ, Youan Bo, “Fuzzy Sets and Fuzzy Logic”, Prentice Hall, 2012.

# MCA 4423 Digital Principles and Computer Organization 4Hrs

**OBJECTIVE:**

The aim of this course is to give the students with basic ideas regarding digital hardware components at the level of gate and realization of sequential circuits and combinatorial circuits.

This course will enable the students to design digital systems employing the techniques and also gives better insights into the basic digital hardware building blocks.

**UNIT I**

Introduction to digital systems and computers – Applications of digital systems Number systems and Codes - Conversion Binary to Decimal – Hexa decimal – octal – Representation of Negative Numbers, Complements in other Number systems 1’s Complement – 2’s Complement \_ BCD Representation. ASCII, Excess\_3, Gray, Weighted and unweighted codes

**UNIT II**

Introduction to logic circuits – Basic building blocks - Boolean algebra - Universal gates - De Morgan’s Law - Truth tables - Boolean Expressions –Sum of products - Products of sum methods - Karnaugh map – Don’t care conditions

**UNIT III**

Multiplexers - De\_Multiplexers - Decoder- Encoder - Introduction to Flip Flops -RS Flip-flop - Clocked Flip Flop – D Flip Flop - JK Flip Flop -JK Master Slave Flip Flop - Introduction to Registers -Types of Registers - Introduction to Counters – Counter Design

**UNIT IV**

Basic computer Organization – system buses – instruction cycles.CPU Organization - Memory subsystem organization – types of memory – internal chip organization – memory subsystem configuration – I/O Sub system Organization and interfacing.

**REFERENCE:**

1. TC Bartee, “Digital Computer Fundamentals”, Tata McGraw Hill, 6th Edition, 2011.
2. Malvino AP & Leach DP, “Digital Principles and Applications”, Tata McGraw Hill Publications, 6th Edition 2002.
3. Morris Mano, “Digital Design”, Prentice Hall of India Pvt. Ltd, 2012.
4. John D Carpinelli, Computer systems Organization & Architecture, Pearson Education, 1st Edition, 2012.
5. John P. Hayes, Computer Architecture and Organization, Tata McGraw Hill, 2nd Edition, 2013.

**MCA 4425 Advanced Programming in C 4 Hrs**

**OBJECTIVE:**

This course introduces programming concepts and helps them to write programs in an advanced level. It introduces control structures, arrays, functions, pointers, file handling. Also, gives Introduction to TSRs programs and interfaces programming using c.

**UNIT I**

C introduction – Operators and expressions – Data types – Arithmetic expressions - I/O statements – Control statements – Looping statements – Arrays – Strings and string functions – Procedures – Functions – User defined functions – Built-in-functions including all graphics commands

## UNIT II

Introduction to pointers – Operators - expressions, passing on addressing to a function, function returning pointers. pointers and arrays – Passing an array element to a function - pointers and arrays - one dimensional array - two dimensional array - three dimensional array - array of pointers - Pointers and strings – Strings – Standard library functions - array of pointers to string - limitation of array of pointers - Pointers and structures – array of structure -structure pointer - dynamic memory allocations - Pointers and miscellaneous – Pointers to function - Command line arguments – Near, far and huge pointers

## UNIT III

Structure definition - processing a structure, user defined data types –typedef array of structures – Self referential structures – More about structures – Union – Files – C pre-processor

## UNIT IV

Advanced concepts – pointers and type casting - ROM-BIOS Functions –Basics of TSR –Introduction to Network programming and Interface – introduction to Low level programming

**REFERENCE:**

1. Henry Mullish Herbert L. Cooper, “The Spirit of C”, Jaico Publishing House, 1987.
2. Yashwant Kanetkar, “Understanding C pointers”, BPB Publications, New Delhi, 2009.
3. Les Han Cock, Morris Kriger, “C primer”, 3rd Edition, Tata McGraw Hill, 1991.
4. Yashwant Kanetkar, “Writing TSRs through C”, BPB Publications, 1995.
5. Barry Nance, “Network Programming in C”, PHI, New Delhi, 2002.

**MCA 4627 Operating Systems 6Hrs (4T+2L)**

**OBJECTIVE:**

The aim of this course is to learn the evolution of Operating systems and to understand the organization and strategies of the Operating Systems. This course makes the student to create an environment in which a user can execute programs in a convenient manner.

**UNIT I**

Architecture of OS (Ex. Monolithic, Microkernel, Layered, Exokernel) - Virtual Computers, Interaction of O. S. & hardware architecture - Evolution of operating systems, Batch, multiprogramming. Multitasking - Multiuser, parallel, distributed & real –time O.S. Computers and Software – Operating System Strategies – The abstract model of computing- resources – processes – threads – Operating System Organization – Device Management – Process Management – Storage Management-Scheduling-Computing Environment-Mobile Operating system.

**UNIT II**

Basic Synchronization principles – Interacting and Coordinating Processes, Semaphores - High-level synchronization – Monitors - Interprocess Communication – Deadlock – Memory Management – Virtual Memory – Paging, Segmentation and algorithms - Operating System Services- Operating System Structure-System calls and its types- Operating System Design and Implementation-Virtual Machines- Operating System Generation-System Boot.

**UNIT III**

Threads-Multithreads-Thread Libraries-Models File Management – Protection and Security – Remote Files – Distributed Computing-CPU Scheduling-Deadlocks-Three Memory Management (Main Memory, Virtual Memory, Secondary Memory) - Storage Management.

**UNIT IV**

Introduction to UNIX and the Shell – UNIX Directories and Pathnames - Working with UNIX files – Shell Programming -User and system administration – pipelining – Communicating with other user and systems – Accessing other Unix systems on the network or Internet – Accessing Unix from windows – Unix and the internet-Production and Security(Cryptography, Firewall)-Distributed File System-Seven Special-Purpose Systems(Real Time and Multimedia)

Case Studies on LINUX, WINDOWS, MAC-OS, ANDROID and IOS

**REFERENCE:**

1. Gary Nutt, “Operating Systems a Modern Perspective”, Pearson Education Asia, 2010.
2. Deital, “Operating Systems”, Addison Wesley publications, 2013.
3. Milan Milenkovic, “Operating Systems”, Tata McGraw Hill, 2012.
4. Tennenbaum, “Operating systems”, Tata McGraw Hill, 2011.

**MCA 4429 Web Programming 4Hrs (2T+2L)**

**OBJECTIVE:**

This course would enlighten the students to organise and manage e-content available in the Websites, making them to learn host static and dynamic websites and also gain knowledge on Web Resources

**UNIT I**

Basic Web Concepts - How the web server works – static web pages-Dynamic web pages-How scripting languages work – Server side scripting Language – Client Side Scripting – Overview of HTML – Formatting text and pages – Linking pages – Formatting the body section of the web page – Using block level Elements –Using Text level Elements – Including audio and video files in web pages – Style sheets – Image maps – Frames – Tables – DHTML – Creating Layers – Moving and Sliding objects – HTML5

**UNIT II**

Java Script: object, names, literals-operators and expression-statements-functions-events-windows-documents-frames- data types-statements-I/O-built in functions- Handling Events – Browser object model – Verifying forms - Cookies.

**UNIT III**

Introducing XML – Main features of XML technology – XML syntax –Elements –Attributes – Entity References– Processing instructions – CDATA sections – Document structure – Document Type Definition – Writing DTD’s – Formal DTD structure – Conditional sections – Data modelling and XML –DOM(Document Object model ) and XML – Simple API for XML – Namespaces and schemas – XSL (Extensible Style sheet Language ) – XML and Databases – CSS and XML.

**UNIT IV**

Introduction to PHP – Advantages of PHP – Variables, Data types, Arrays, Conditional statements, Functions – Forms – Cookies – Sessions- Exception– Connecting Databases using ODBC.

**REFERENCE**:

Danny Goodman, “Dynamic HTML” 3rd Edition, O'reilly, 2006.

Media Paul Colton, R Allen Wyke, Richard Wagner, “JavaScript Unleashed”, Sams Publication, 3rd Edition, 2000.

1. Eric. C Richardson, “Programming web server”, Galgotia Publications, 1996.
2. Moulding, Peter, “PHP Black Book”, Dreamtech Press Ltd, 2001.
3. Mark Pilgrim, “HTML5: Up and Running”, O'Reilly Publications 2010.
4. “HTML5 Black Book: Covers CSS3, JavaScript, XML, XHTML, Ajax, PHP and JQuery”, Kogent Learning Solutions Inc.

**MCA 4431 Business Communication 4Hrs**

# OBJECTIVE:

# The aim of this course is to focus on communication for computer professionals. It begins with a quick review of the essentials of English grammar and enables the learners to communicate in real life situations. Special training will be offered to students to strengthen their life skills, employability skills and corporate skills. An hour of Language Lab Training will concentrate on listening, pronunciation, accent neutralization, practice, interactive speaking, reading activities, presentations, blogging and voice resume.

**UNIT I**

Tenses – Prepositions – Articles - Phrasal Verbs – Interrogation - Models - Conditionals - Subject- Verb Concord - Errors In Usage - Vocabulary

**UNIT II**

Listening Comprehension - Reading with effect - Writing CV and resume -Speech Practice

**UNIT III**

Soft skills - Life skills: Attitude - Emotional Intelligence - Interpersonal Skills - Self Development - Employability Skills: Interview skills - Group Discussion - Corporate Skills: Mass line Communication - Negotiation skills - Time Management - Stress Management

**UNIT IV**

Self-introduction - Micro presentation - Presentation using PPT - Presentation using Flash - Blogging on a theme - Model content for web pages - Voice Resume(AV)

**REFERENCE**:

1. Chapelle, Carol A, “English Language Learning and Technology”, John Benjamin Publishing Company, 2003.
2. Hariharan S. and Et.Al, “Soft skills”, MJP Publishers, 2010.
3. Mohan, Krishna and Meera Banerji, “Developing Communication Skills”, New Delhi, Macmillan India Ltd, 1990.
4. Sasikumar V Et Al, “Course in Listening and Speaking Vol I and II”, New Delhi: Foundation Books, 2005.
5. Dhanavel S.P., “English and Soft skills”, Orient Blackswan Private Limited, 2010.
6. Murphy, Raymond, “Essential Grammar in Use”, Cambridge University Press, 2012 .

**MCA 4433 Laboratory – I (C Lab) 4 Hrs**

**OBJECTIVE:**

The aim of this course is to train the students in the developing the following programs and enable them to develop a mini project.

1. I/O Statements and. Control Structures

2. Arrays and strings

3. Functions

i) Call by Value

ii) Call by Reference

iii) User defined

iv) Built-in

4. Pointers

i) Operators & expressions

ii) Pointers and arrays

iii) Pointers and strings

iv) Pointers and structures

v) Pointers to function

5. Structures and Unions

6. C Preprocessors, Command line arguments

9. File Handling

10. TSR programs

11. Simple network programming

12. Program to implement Client / Server concepts

13. Interface programming

**MCA 4422 Design and Analysis of Algorithm 4 Hrs**

**OBJECTIVE:**

The aim of this course is to make the student to understand the analysis and efficiency of an algorithm and enable them to apply while writing algorithm/programs.

This course introduces elementary data structures, concepts like Divide and Conquer, Greedy method and Dynamic programming, Graph Algorithms and Back Tracking and will enable the students to analyse algorithms.

**UNIT I**

Introduction – Algorithm as technology – Analysing an algorithm – designing an algorithm – Asymptotic notations – standard notations and common functions - Elementary Data Structures -Stacks Queues - Linked Lists – Implementing pointers and objects - Trees – Hashing - Direct Address tables – Hash Tables – Hash Functions – Open Addressing – Perfect Hashing

**UNIT II**

Binary trees – binary search tree – Insertion and deletion in Binary search tree – Red Black Trees – Properties- Rotations – Insertion – Deletion.

Divide and Conquer-Merge sort – Quick Sort – performance of quick sort – randomized version of quick sort – Linear- Time Sort– Counting Sort – Radix Sort – bucket Sort - General Method – Heap Sort – Building Heap and Heap sort algorithm-selection Sort

###### **UNIT III**

Greedy Method- Optimal Storage on Tapes – Knapsack Problem – Minimum Spanning Trees – Single Source Shortest Path- Bellman-Ford algorithm – Dijkstra’s algorithm

Dynamic Programming - General Method – Multistage Graphs – Optimal Binary Search Trees – 0/1 Knapsack – Reliability Design – Travelling Sales Man Problem – Flow Shop Scheduling

**UNIT IV**

Graph algorithms :- Representation of graph – breadth-first method – depth-first method- topological sort- strongly connected components – Minimal spanning trees – All pairs shortest path algorithm – the Floyd- Warshall algorithm – Johnson algorithm for sparse graphs-Eight queen problem-backtracking

**REFERENCE**:

* 1. Thomas H Cormen, Charles E Leiserson, Ronald L Rivest, Clifford Stein, “Introduction to algorithms”, 2nd Edition, PHI, 2011.
  2. Ellis Horowitz, Sartaj Sahni, “Fundamentals of Computer Algorithms”, Galgotia Publications, 2010.
  3. Donald E Knuth, “Fundamental algorithms -The art of computer programming”, Pearson Education, 3rd Edition, 2002.

**MCA 4424 System Software 4 Hrs**

**OBJECTIVE:**

The aim of this course is to give a detailed understanding about designing of various system software like assemblers, loaders, linkers, macro processors, compilers, debugging systems and text editors. Hypothetical machine architecture is used to impart the know-how of this system software. Implementation examples will give insights into the system software used in the existing machines.

**UNITI**

Introduction to system software and machine structure -System programs-Assembler, Compiler, Interpreter, Operation, System, Machine Structure, Instruction set and operation modes for various systems like SIC, SIC/XE – CISC, RISC machines – Implementation examples.

**UNIT II**

Assembler - basic assembler functions – one pass assembler – two pass assembler-machine dependent and independent features -multi pass assembler – Implementation examples.

**UNIT III**

Loader - Basic loader functions-machine dependent and independent loader features-loader design – Linker - Linkage editors - Dynamic linking - Bootstrap loaders – Implementation examples.

Macro processors - Basic macro processor functions – machine dependent and independent macro processor features – Macro processors design – Recursive, general purpose and macro processing with language translators– Implementation examples

**UNIT IV**

Compilers - Basic compiler functions – phases in a compiler - machine dependent and machine independent compiler features – Compiler design options – division into passes – Implementation examples - Software utilities -Text editors, interactive debugging systems

###### **REFERENCE**s:

1. LL Beck, “System Software an Introduction to System Programming”, Addison Wesley Co, 2013.
2. John J Donavan, “System Programming”, Tata McGraw Hill Intl., 2011.
3. Damhere, “Introduction to System Software”, Tata McGraw Hill Publication,2011.

**MCA 4426 C++ and Object Oriented Programming 4 Hrs**

**OBJECTIVE:**

The aim of this course is to enable the student to understand the fundamental concepts of Object-Oriented programming and enable them to apply the concepts into the Real world problems using c++. It introduces the object oriented concepts such as objects, constructors, inheritance, overloading of operator and functions, polymorphism, and templates.

**UNIT I**

Introduction – Programming Paradigms - advantages and applications of OOP – Features of OOP – objects - classes- Data Abstraction-User Defined Types-Concrete Types – Namespace -Abstract Types- Friend function - Virtual Functions - C++ console I/O –– constructor and destructor functions – Overloading Constructor Functions - Inline Functions –Automatic In-lining.

**UNIT II**

Assigning objects – passing objects to functions – returning objects from functions –references –passing references to objects – returning references independent references and restrictions – using pointers to objects – the this pointer – using new and delete functions.

**UNIT III**

Operator overloading – Overloading unary and binary operators-using friend for operators –using friend for operator functions – type conversions - Functions overloading – Inheritance - levels of inheritance – multiple inheritance – multilevel inheritance – hierarchical inheritance - hybrid inheritance - virtual base classes - pointers to derived classes – virtual functions - applying polymorphism

**UNIT IV**

Formatted I/ O – I/O Manipulators – File Handling – File I/O Basics – Binary I/O – Random access – checking the I/O status – customized I/O and files - Templates and exception handling - class templates-function templates-member function templates-template arguments – exception handling - Advanced Casting Operators

**REFERENCE:**

* + - 1. Herbert Schildt, “C++ Complete reference, Osborne McGraw Hill”, 2ndEdition, 2012.
      2. Robert Latfore, “Object Oriented Programming in Microsoft C++”, Galgotia publication, 2009.

1. E Balagurusamy, “Object Oriented programming with C++”, PHI 6th Edition
2. Y.P. Bhave, S.A.Patekar, “object Oriented Programming with C++”, Pearson Education (Singapore) Pvt Ltd., 2004
3. Debasish Jana, “C++ and Object Oriented Programming Paradigm”, PHI, NewDelhi, 2010.

**MCA 4628 Advanced Database Management Systems 6Hrs (4T+2L)**

**OBJECTIVE:**

The aim of the course is to train the students to design complex databases in an efficient manner.

In this course an introduction to fundamental concepts in DBMS, Data models, and relational algebra concepts are discussed. Hands on training is given using ORACLE.

**UNIT I**

Introduction to DBMS – Data Models – Database Languages – Database System Structures – ER Model – Relational Model – QBE

**UNIT II**

Introduction to RDBMS-SQL – Introduction to ORACLE – Data types - DDL – DML – TCL – Sub queries – Functions and Procedures – Triggers – Packages - Types – Objects – Methods – Collectors – Pl/SQL – Built in Functions – Programming constructs – Cursors – Error Handling-normalization.

**UNIT III**

Data Storage and Indexing – File Organizations – Query Optimization – Security -Transaction Management – Concurrency Control – Crash Recovery.

**UNIT IV**

Parallel and Distributed Databases – Internet Databases – Decision Support - Data Mining – Object Database Systems – ORDBMS – OODBMS.

**REFERENCE:**

* + - 1. Silberschatz, Sudharshan and Korth, “Database System Concepts”, McGraw Hill Publications, 6th Edition, 2010.
      2. Ramakrishnan and Gehrke, “Database Management Systems”, McGrawHill, 3rd Edition, 2012.
      3. Loney and Koch, “ORACLE 9i - The Complete Reference”, Tata McGraw Hill Edition, 2010.
      4. Urman, “ORACLE PL/SQL programming”, Tata McGraw Hill, 1997.
      5. McFadden, Hoffer and Prescott, “Modern Database Management”, Pearson Education, 5th Edition, 2001.

**MCA 4430 Embedded System Programming 4 Hrs**

**OBJECTIVE:**

This course facilitates to gain an understanding of the overall system architecture involving hardware and software components as well as of its complex communication structures, enabling them to understand the underpinnings of modern design methodology.

**UNIT I**

Microcomputer architecture- The IntelCPU’s-8086/8088 CPU components: Bus interface unit-execution unit - 8086 CPU registers- instruction set: addressing modes. Programmable peripheral Interface-8279 Programmable keyboard / display interface-8254 Timer – 8251A Communications interface-DMA – Interrupts - A Simple Micro Controller – Parallel I/O Ports – Serial I/O Interface – Counter Timer – Interrupt Control Mechanism - Assembly Language Programming For Micro Controllers - Micro Controllers For Embedded Systems

# UNIT II

Assembly language fundamentals: segment and end directives—data definition directives – the assume directives - Input/output services - interrupts – Dos function calls - Assembly language program development tools - editor – assembler ( MASM/TASM) – linker – loader – debugger - simple assembly programs - Interfacing Assembly Language Routines to High Level Language Programmes

**UNIT III**

Introduction to ES-What is ES, Examples of ES-Inside ES : processor, memory, peripherals, software.- Embedded Processors , Memories &Peripherals ,Microcontrollers 8051 -Discrete processors : 8-bit architecture, 16/32 bit CISC, RISC, DSP-Integrated processors : ARM RISC-Choosing a processor-Memory systems : types (SRAM, DRAM, FLASH), organization, access-time, validating the contents of memory-Basic peripherals : parallel ports, timers, clocks

**UNIT IV**

Real time without RTOS - Choosing the SW environment - Deriving real time performance from non-real time system-Scheduling and data sampling - Controlling from an external switch- Problems

**REFERENCE**:

* + - 1. Barry B Brey, “The Intel Microprocessor 8086/8088, 80186/80188, 80286, 80386, 80486, Pentium and Pentium Pro Processor: Architecture, programming and Interfacing”, 4th Edition, Prentice Hall of India 2011.
      2. Carl Hamacher, Zvonko Vranesic, Safwat Zaky , “Computer Organization”, McGraw Hill Higher Education, Fifth Edition, 2013.
      3. Douglas V Hall, “Microprocessor and Interfacing – Programming and Hardware”, McGraw-Hill, 2011.

1. Muhammad Ali Mazidi, Janice Gillispie Mazidi, “The 8051 Micro controller and Embedded systems”, Pearson Education Asia, 2002.
2. Internet Sites: www.chips.ibm.com, www.intel.com, www.nexgen.co

**MCA 4432 Essentials of Management 4Hrs**

**OBJECTIVE:**

The aim of this course is to introduce the basic Management processes in organizations. It introduces students to the environment of management and covers the basic management

Functions like planning, organizing, leading and controlling. Further, it develops an Understanding of the development of management thoughts ages and its applications. This course intends to familiarise the students with the theories and practices of management so as to develop basic managerial way of thinking.

**UNIT I**

Managers & Organization: Definition – Evolution of Management – Management Theories, Approaches and Movements.

Managerial styles – Modern Management thought – Management Functions (Planning, Organizing, Staffing, Leading, Controlling) – Manager: Roles and Responsibilities.

**UNIT II**

Traditional versus Modern Management – Skills required to a Manager, Major challenges of Management.

**UNIT III**

Introduction and Definition of Planning – Nature of Planning, Planning Process, types of Planning - Why Plan

**UNIT IV**

Controlling: Introduction, Why Should Managers is concerned about control systems? Control process, types of control, controls as management tools, controlling techniques.

**REFERENCE**:

1. Koontz and Weihrich, “Essentials of Management: An International perspective”, 7th Edition, Tata Mcgraw Hill Publications, 2007.
2. Koontz and O Donnel, “Management – A Global Perspective”, 10th Edition, Tata Mcgraw Hill Publications.
3. Drucker, “Management Challenges for the 21stcentury”, Utterworth-Heinemann Ltd, 2nd Edition, 2007.
4. Stephen P Robbins, Mary Coulter, “Management”, Prentice Hall, 2009.
5. Andrew J Dubrin, “Essentials of Management”, Thomson South Western, 2010.
6. VSP Rao and VH Krishna, “Management”, Excel Books, 2008.
7. Harold and Heinez Weihrich, “Essentials of Management”, Tata McGraw Hill, 2009.
8. Joseph and Massie, “Essentials of Management”, Prentice Hall, 2009.

**MCA 4434 Laboratory II (C++) 4 hrs**

**OBJECTIVE:**

The aim of the course is to train the students to develop the following programs and enable them to develop a mini project.

1. I/O statements

2. Function Overloading

3. Functions with default arguments

4. Constructors and Destructors

* + - * 1. Constructors without parameters
        2. Constructors with parameters
        3. Overloaded Constructors
        4. Copy Constructors

5. Passing objects to functions

By Value and By Reference

* 1. Friend functions and Inline functions
  2. Call by Reference and Return by Reference

6. Operator overloading

1. Overloading binary operators
2. Overloading unary operators
3. Overloading logical operators

7. Inheritance

1. Single Inheritance
2. Multilevel inheritance
3. Multiple inheritance
4. Hierarchical inheritance
5. Hybrid inheritance

8. Pointers

a. Pointers to objects

b. This pointer

9. Virtual functions

10. Formatted I/O

11. Files (Formatted and Unformatted)

12. Templates and Exception Handling

13. Writing Programs to implement the concepts Algorithms (Data Structure)

**MCA 5421 Computer Oriented Numerical Methods and Statistics 4 Hrs**

**OBJECTIVE:**

The aim of this course is to enable the students to understand the concepts of the numerical and statistical methods for solving various mathematical models.

This course explores various techniques in numerical methods for solving different mathematical models such as linear and non-linear equations, system of linear equations, interpolation, differentiation, integration and ordinary differential equations. It also enables to solve the various statistical methods such as Distribution of Random variables, Distributions, Sampling theory and Hidden Markov Models.

**UNIT I**

Solutions of Non-Linear Equations : Roots of an equation- - Methods for finding roots of linear and non-Linear equations - Bisection Method- False Position Method- Iterative Method, Newton - Raphson Method and secant Method – System of linear equations - Gauss-Elimination Method, Gauss - seidel Method –Gauss- Jordan method.

**UNIT II**

Interpolation – Newton Forward and Backward differences interpolation methods – Lagrange Interpolation – Newton divided difference interpolation – Numerical Differention – Integration - Solving first order ordinary differential equations

**UNIT III**

Distributions of Random Variables – probability set function – Distribution function – probability models – mathematical expectations – Some special mathematical Expectations – chebyshev’s inequality- Conditional probability -marginal and conditional distributions – The correlation coefficient – stochastic independence.-The binomial distribution – The poission distribution

**UNIT IV**

Sampling theory - confidence intervals for means – confidence intervals for difference of variance – Hypothesis – Examples and Definitions – T\_Tests – Chi\_square Tests – F\_Test – The Analysis of Variance

**REFERENCE**:

Freund, “Mathematical Statistics”, 5th Edition, Prentice Hall India, 1997.

S.C. Gupta & VK Kapoor Sultan Chand, “Elements of Mathematical Statistics”, New Delhi, 1992.

M.K.Jain, S.R.K. Iyengar, R.K. Jain, “Numerical Methods Problems and Solutions”, New Age International, 2008.

E Balagurasamy, “Numerical Methods”, Tata McGraw Hill, 2012.

Robert J Elloit, Lakhdan Aggous and John B Moore, “Hidden Markov Models: Estimation and Control”, Springer Verlog, Newyork, 1995.

Geoffrey Mclachlan, “Finite Mixture Models -Wesley Series in probability and statistics”, Wiley-Interscience, 2000.

# MCA 5423 Object Oriented Analysis and Design and UML 4 Hrs

**OBJECTIVE:**

The aim of the course is to train the students to understand the existing system and to provide practical guidance on construction of Object-Oriented Systems.

In this course the basic concepts in system analysis and design are introduced. More Emphasis is on Object-Oriented Analysis and Design. UML is used for the realization of OOAD. In UML the basic structural, behavioural and architectural modellings are disscused

**UNIT I**

Systems - Role of System Analyst - SDLC – Feasibility Analysis – Fact Finding Techniques – SSAD - ER Diagrams – DFD – Decision Table – Decision Trees – Structured English – Case Study

**UNIT II**

System Design - Application Architecture and Modeling – Database Design - Input and Output Design - User Interface Design – System Construction and Implementation – System Operations and Support – Case Study

**UNIT III**

OOAD - Comparison of SSAD and OOAD - Modelling as a Design Technique – Object Modelling – Dynamic Modelling - Functional Modelling – Object Design – OOD Design Process – Case Study

**UNIT IV**

Introduction to UML – Basic Structural Modelling – Classes – Relationships Common Mechanisms – Class Diagrams – Behavioural Modelling – Interaction – Uses cases - Architectural Modelling – Component Diagrams – Deployment Diagrams – Collaboration - Case Study

**REFERENCE**:

Sen, “System Analysis and Design”, Tata McGraw Hill, 1989.

* + - 1. Jeffrey, “Structured System Analysis and Design”, Tata McGraw Hill 2002.
      2. Rumbaugh, Blaha, Premerlani, Eddy and Lorensen, “Object-Oriented Modeling and Design”, PHI, 1997.
      3. Booch, Rumbaugh and Jacobson, “The Unified Modeling Language User Guide”, Pearson Education, 2003.
      4. Jason, “UML - A Beginners Guide”, Tata McGraw Hill, 2003.
      5. Yourdon, “Object-Oriented Analysis”, Pearson Education, 2nd Edition, 2001.
      6. Object- Oriented Analysis and Design with Applications, Addison-Wesley Professional, 2nd Edition, 2007.

**MCA 5425 Programming in JAVA 4Hrs**

**OBJECTIVE:**

The aim of the course is to train the students in Java Programming. In this course fundamental concepts of Java, Applets and swings are included. JDBC Concepts used for database Applications.

**UNIT I**

Introduction -Genesis of Java- Types of Java applications – Data types, variables and arrays – Operators – Control statements – Classes and Methods – Inheritance – Packages and Interfaces –Exception Handling – Multithreaded Programming – Input/Output – Files – Utility Classes – String Handling –Collections – Serialization

**UNIT II**

Java Applets- Life Cycle Of An Applet – Adding Images and Sound To An Applet –Java Applets In Web Page Creation – Building GUI With Java.awt – Buttons, Labels, Check Boxes, Radio Buttons, Choices, Lists, Text Fields And Text Areas – Scrollbars – Canvases – Event Delegation Model – Exceptions – Event Classes – Listener Interfaces – Containers And Layout Managers – Frames –Dialogs – Insets

**UNIT III**

Java Foundation Classes(JFC) /Swings – Adding Controls – Adding Tooltips And Icons – Popup Menus – Tabbed Panes – Sliders –Progress Bars – Tables – Images

**UNIT IV**

ODBC and JDBC – JDBC Overview – JDBC implementation – Connection class – Statements – Other JDBC classes – Communications and Networking – Inet Address class – URL class- TCP sockets – UDP sockets

**REFERENCE**:

1. Ken Arnold and James Gosling, “The Java Programming language”, Addison Wesley, 4th Edition, 2005.
2. Patrick Naoghton and Herbert Schidt, “The Complete Reference - JAVA” 9th Edition Tata McGraw Hill, 2014.
3. Maydene Fisher, Jon Ellis, Jonathan Bruce, “JDBC API Tutorial and Reference”, 3rd Edition, Addison-Wesley Professional,2003
4. Kathy Sierra, Bert Bates, “Head First Java” by O'Reilly Publications, 2008.
5. Kogent Learning Solutions Inc, “JAVA 7 Programming- Black Book”, Wiley India Publications.

**MCA 5627 Computer Graphics 6 Hrs (4T+2L)**

**OBJECTIVE:**

The aim of this course is to implement computer graphics concept using c programming. This course will help students to develop graphical packages using different output primitives with different attributes and applying transformation in both 2D and in 3D. It also discusses hidden surfaces and virtual reality.

**UNIT I**:

Graphics System: Application of computer graphics-Graphics Systems- Video Display Devices- Raster Scan Systems- output primitives - points- Line Drawing Algorithms- Circle Generating Algorithms- ellipse generating -Scan-Line Polygon

**UNIT-II**

Fill Algorithm - Boundary-Fill Algorithm- Flood Fill Algorithm- Scan- Line Polygon Fill Algorithm - Character Generation – Attributes- Line Attributes - Character Attributes - Color Tables - Two dimensional Geometric Transformations - Composite Transformations -Transformations between Coordinate Systems Raster methods for Transformations- Two Dimension Viewing.

**UNIT III**

TWO-Dimension Viewing- Clipping- Line Clipping- Polygon Clipping – Text Clipping-Three Dimensional Concepts- Three Dimensional Display Methods viewing – Three Dimensional Object Representations – Polygon Surfaces- Polygon Tables-Polygon Meshes- Bezier Curves - Bezier Surfaces- Sub Division Method – Octrees - BSP Trees

**UNIT IV**

Three Dimensional Transformations – Projection - Parallel Projection - Perspective Projection Hidden Surface And Hidden – Line Removal-Classification of Algorithms – Back Face Removal – Depth Buffer Method – Scans Line Method- Fractals

**REFERENCE:**

Computer Graphics by Donald Hearn and M Pauline Baker PHI Publications 2013.

Principles of Interactive computer graphics – William M. Newman & F Sproull.

Steven Harrington. Computer Graphics McGraw Hill International Edition 2nd Edition, 1987.

**MCA 5429 Linux Programming 4 Hrs**

**OBJECTIVE:**

This course would enable the students to design the Linux Operating System with respect to security and automation. This makes them to emphasize on Linux Shell Programming, Kernels, File Systems, Systems Administration, Web Environments, Socket Programming, and other business applications for Linux Systems.

**UNIT I**

Introduction to Linux - [Why Linux is the Best OS](http://www.yolinux.com/TUTORIALS/LinuxEditorial-Advantage.html) – Linux Packages -[GNOME and KDE Desktop](http://www.yolinux.com/TUTORIALS/GNOME.html) - Linux Installation – Basic Shell commands, shell programming, Linux administration commands - [YUM](http://linux.duke.edu/projects/yum/) - [RPM: Red Hat Package Manager](http://www.rpm.org/)

**UNIT II**

[System Admin](http://www.yolinux.com/TUTORIALS/LinuxTutorialSysAdmin.html) - [Networking and configuration](http://www.yolinux.com/TUTORIALS/LinuxTutorialNetworking.html) - [Adding a Network Interface](http://www.yolinux.com/TUTORIALS/LinuxTutorialNetworking-Add_NIC.html) - [Linux Web Server Configuration](http://www.yolinux.com/TUTORIALS/LinuxTutorialWebSiteConfig.html) - [Linux Security](http://www.yolinux.com/TUTORIALS/LinuxTutorialInternetSecurity.html) - [Linux Server Security Audit and Tools](http://www.yolinux.com/TUTORIALS/LinuxSecurityTools.html) - [System Recovery and Boot Disk Creation](http://www.yolinux.com/TUTORIALS/LinuxTutorialRecoveryAndBootDisk.html) - [Managing User and Groups](http://www.yolinux.com/TUTORIALS/LinuxTutorialManagingGroups.html) - [Init/Boot process](http://www.yolinux.com/TUTORIALS/LinuxTutorialInitProcess.html) - [File system quotas](http://www.yolinux.com/TUTORIALS/LinuxTutorialQuotas.html) - [Open LDAP Directory Services](http://www.yolinux.com/TUTORIALS/LinuxTutorialLDAP.html) - [NIS Services](http://www.yolinux.com/TUTORIALS/NIS.html) - [DHCP server services](http://www.yolinux.com/TUTORIALS/DHCP-Server.html) - [System Optimization](http://www.yolinux.com/TUTORIALS/LinuxTutorialOptimization.html) - [MP3 Audio Streaming](http://www.yolinux.com/TUTORIALS/LinuxTutorialAudioStreaming.html) - [Real Media Streaming](http://www.yolinux.com/TUTORIALS/LinuxTutorialRealVideoStreaming.html) - Tomcat and Apache

**UNIT III**

Inter process communication - [GTK+ Programming](http://www.yolinux.com/TUTORIALS/GTK+ProgrammingTips.html) – TUTORIAL -[GNOME GDK Threads](http://www.yolinux.com/TUTORIALS/GDK_Threads.html) – TUTORIAL - [GTK.org](http://www.gtk.org/) - [GTK examples](http://www.softintegration.com/chhtml/toolkit/demos/GTK/) - [Gnome apis/Reference](http://developer.gnome.org/)- [gtmmm.org](http://www.gtkmm.org/) - Gtk- - [sys admin guide](http://library.gnome.org/admin/system-admin-guide/stable/) - [gtkperl](http://gtk2-perl.sourceforge.net/) - [pygtk](http://www.yolinux.com/TUTORIALS/PyGTK.html) - Python/Gtk GUI

**UNIT IV**

Word Processing LATEX-LDAP Basics - Open Source- PHP – PYTHON – Data Management -File Locking - Databases - MYSQL - Accessing MYSQL Data from PHP - Linux Firewall

**REFERENCE:**

1. Richard Stones, Beginning, “Linux Programming”, Wrox Press 2011.
2. Jonathan Corbet, Alessandro Rubini, Greg Kroah-Hartman, “Linux Device Drivers”, 3rdEdition, O’Reilly, 3rd Edition 2005.
3. Robert Love, “Linux System Programming”, 2013.
4. Robert Love,”Linux Kernel Development”, Third Edition, Pearson Education, 2010.
5. “Linux: The Complete Reference”, 6th Edition, 2008.
6. <http://www.server-world.info/en/>
7. http://www.linuxhomenetworking.com/

**MCA 5431 Accounting and Financial Management 4 Hrs**

**OBJECTIVE:**

The aim of this course is to impart knowledge of basic principles of accountancy and the principles of financial management so as to enable the students to apply them in areas of computerization of accounting procedures and for data processing.

**UNIT I**

Accounting Principles, Concepts and conventions – Double entry book-keeping – Journal, Ledger, Trial balance, Final accounts of sole-trader concern and company -Analysis and interpretation of financial statements – Accounting ratios - Advantage and Limitations

**UNIT II**

Fund Flow and Cash Flow Analysis – Meaning and need – Preparation of Fund Flow and Cash Flow statements – Uses and limitations

Basic Cost concepts – Meaning of cost accounting – Objectives – Elements of Cost – Cost Sheet - Inventory management – Purchase procedure – E.O.Q – Stock levels – ABC analysis and V.E.D analysis

**UNIT III**

Marginal costing – Meaning – Applications of marginal costing – Advantages and limitations – Break Even Analysis

Budgetary Control – Meaning – Merits and demerits – Difference between budget and forecast – Kinds of budgets

Standard Costing – Meaning – difference between standard costing and budgetary control – Uses and limitations – variance analysis

**UNIT IV**

Capital Budgeting – Appraisal of capital investment projects – Investment decisions.

Note: The students will be exposed to some accounting packages E.g. Tally

**REFERENCE:**

1. T.S. Grewal, “Double entry Book-keeping”, Sultan Chand and Sons, New Delhi, 2002.
2. S.N.Maheshwari, “Principles of Financial management”, Sultan Chand & Sons, New Delhi, 2003.
3. M.C. Shukla and T.S. Grewal, “Advanced Accounts”, Sultan Chand and ons, New Delhi, 2000.
4. R.L. Gupta and M.Radhasamy, “Advanced Accountancy Vol I”, Sultan Chand and Sons, New Delhi, 2001.
5. M.Y. Khan and P.K.Jain, “Financial Management”, Tata McGraw Hill Publications, New Delhi 1999.
6. M.N.Arora, “Cost Accounting, Principles and practice”, Vikas Publishing House Ltd., New Delhi 2001.
7. Manmohan and Goyal, “Principles of Management accounting”, Sahitya Bhavan, Agra 1999.
8. S.P. Jain and K.L. Narang, “Cost Accounting”, Sultan Chand and Sons, New Delhi, 1999.

**MCA 5433 Laboratory III (Java) 4 hrs**

**OBJECTIVE:**

The aim of this course is to train the Students on the use of the Java programming language to code and test applications, applets for the Java platform. To do this, they will need to utilize various features of the Java programming language, including language fundamentals, objective orientation, execution threads, and Java packages.

* + - * 1. Declarations and access control
        2. Flow control and exception handling
        3. Garbage collection
        4. Language fundamentals
        5. Overloading, overriding, runtime type, and object orientation
        6. Threads
        7. The java.awt package – layout
        8. The java.lang package
        9. The java.util package
        10. Demonstrate understanding of database connectivity (JDBC)
        11. Access and manipulate database information in Java technology-based applications
        12. Build form-based database applications using the development tool
        13. Create and test applets.

**MCA 5422 Optimization Techniques 4Hrs**

**OBJECTIVE:**

The aim of this course is to train the students to formulate any mathematical model in to L.P.P and solve it by various methods. This course would enable the students to solve the transportation problem, assignment problem and also help to understand network modeling for planning and scheduling the project activities and different models on queuing theory.

**UNIT I**

Mathematical Formulation - Graphical Solution of linear programming models – Simplex method –Artificial variable Techniques- Two Phase Method

**UNIT II**

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

**UNIT III**

Formulation – Gomory’s IPP method – Gomory’s mixed integer method – Branch and bound technique - Network Construction – Critical Path Method – Project Evaluation and Review Technique – Resource Analysis in Network Scheduling

**UNIT IV**

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

**REFERENCE**:

* 1. Taha H.A., “Operations Research: An Introduction”, 8th Edition, Pearson Education, 2008.
  2. A.M.Natarajan, P.Balasubramani, A.Tamilarasi, “Operations Research”, Pearson Education, Asia, 2005.
  3. Prem Kumar Gupta, D.S. Hira, “Operations Research”, S.Chand & Company Ltd, New Delhi, 3rd Edition , 2008.
  4. John W. Chinneck “Feasibility and Infeasibility in Optimization Algorithms and Computational Methods”, Springer, 2008
  5. Ravindran, Phillips, Solberg, “Operations Research: Principles And Practice”, 2nd Edition, John Wiley & Sons, 2007.
  6. Ibe, O.C. “Fundamentals of Applied Probability and Random Processes”, Elsevier, U.P., 1stIndian Reprint, 2007.
  7. Gross, D. and Harris, C.M., “Fundamentals of Queuing Theory”, Wiley Student, 3rdEdition, New Jersy, 2004

**MCA 5424 Advanced Software Engineering 4 Hrs**

**OBJECTIVES:**

The aim of the course is to train the students to analyse, estimate and design new software with quality standards.

In this course the Essentials in Software Engineering, software processes and the various software engineering paradigms are introduced. Software testing methods and quality maintenance strategies are included.

**UNIT I**

Software Characteristics – Introduction to Software Engineering – Factors influencing quality and productivity – Software Process – CMM – PSP – TSP - Software Engineering Models – Cost Estimation – Feasibility Analysis – Software Project Management.

**UNIT II**

System Engineering – Requirements Engineering – Requirements Documentation – Requirements Elicitation – Requirements Analysis and Negotiation – Requirements Validation – Requirements Management

**UNIT III**

System Analysis – Information Flow Analysis – DSSD- OOA- Use Case Modelling – Class Modelling – Dynamic Modelling – Design Engineering – Creating Architectural Design – Modelling Component level design – User Interface design – Transform and Transaction Analysis - OOD

**UNIT IV**

Testing Principles – Testing Strategies – Unit Testing – Integration Testing – White Box Testing – Black Box Testing – Black Box Testing - OOTM – Domain Testing

Implementation – Software Maintenance – Issues in Maintenance – Change Management- Software Quality and Quality Assurance – Human Factors in Software Engineering – Introduction to Web Engineering

**REFERENCE**:

1. Roger S Pressman, “ Software Engineering -A Practical Approach” Tata McGraw Hill, 7th Edition, 2013
2. Stephen R Schach, “ Object Oriented and Classical Software Engineering”, Tata McGraw Hill, 8th Edition,2010
3. Watts S Humphrey, “A Discipline for Software Engineering”, Pearson Education, 2001.
4. Boriz and Beizer, “Software Testing Techniques”, DreamTech, 2nd Edition, 2000.
5. Ian Sommer Ville, “Requirements Engineering”, John Willey, 1998.

**MCA 5426 J2EE Architecture and Programming 4Hrs**

**OBJECTIVE:**

The Aim of the course is to train the students in developing Web Oriented Application using Servlet and JSP in J2EE Platform. JDBC Concepts used for database Applications.

**UNIT I**

J2EE Platform Introduction -Enterprise Architecture Styles - J2EE Architecture - J2EE Technologies -Developing J2EE Applications - Naming and directory services - Application Servers - Implementing the J2EE Specifications - J2EE packaging and Deployment - J2EE packaging overview - Configuring J2EE packages

**UNIT II**

Introduction to Servlet: Lifecycle of a Servlet - JSDK The Servlet API - The javax.servlet Package - Reading Servlet parameters, Reading Initialization parameters. The javax.servlet HTTP package - Handling Http Request & Responses - Using Cookies- Session Tracking, - Security Issues

**UNIT III**

Introduction to JSP - the Problem with Servlet - The Anatomy of a JSP Page - JSP Processing - JSP Application Design with MVC Setting Up and JSP Environment: Installing the Java Software Development Kit, Tomcat Server & Testing Tomcat JSP Application Development: Generating Dynamic Content - Using Scripting Elements Implicit JSP Objects- Conditional Processing – Displaying Values Using an Expression to set an attribute - Declaring Variables and Methods – Error Handling and Debugging -Sharing Data between JSP pages Requests -Users Passing Control and Date between Pages – Sharing Session and Application Data – Memory Usage Considerations

**UNIT IV**

Database Access - Database Programming using JDBC Studying Javax.sql.\* package - Accessing a Database from a JSP Page Application – Specific Database Actions Deploying JAVA Beans in a JSP Page. Introduction to Springs, Struts and Hibernate.

**REFERENCE:**

# James Keogh, “J2EE: The complete Reference”, Tata Mcgraw Hill, 2002

1. Subrahmanyam Allamaraju  , Cedric Beust , Marc Wilcox, “Professional Java Server Programming J2EE”, 1.3 Edition, 2007.
2. Marty Hall, Larry Brown, Yaakov Chaikin, “Core Servlets and Java Server Pages: Advanced Technologies, Vol. 2” 2nd Edition, Elsevier India, 2008.
3. Murach, “Murach’s beginning JAVA JDK 5”, Shroff Publishers, 2005.
4. Wang-Thomson, “An Introduction to Web Design and Programming”, Course Technology/Cengage Learning India, 2012.

**MCA 5628 Computer Networks 6 hrs (4T+2L)**

**OBJECTIVE:**

The aim of this course is to develop a strong understanding of network technologies from the physical to application layer and get a feel of networking research. This makes them to improve their team work by analysing various networks

**UNIT I**

Uses of computer networks – Network hardware – Network software – Reference models – The OSI Reference models – The TCP / IP Reference– A comparison of the OSI and TCP Reference models – Example networks – Novell NetWare, The ARPANET – NSFNET – The Internet – X.25 networks – network standardization

**UNIT II**

Fourier analysis – Bandwidth limited signals – The maximum data rate of a channel – Transmission media –Wireless transmission – The telephone system – Structure of the telephone system – The local loop – Cellular radio – Communication Satellites

**UNIT III**

The channel allocation problem – Multiple accesses protocols – IEEE standard for LANS and MANS – Bridges – High speed LANS – Satellite networks - Data link layer design issues – error detection and correction elementary data link protocols. Network layer design issues – Routing algorithms –congestion control algorithms-internetworking- Internet layer in the internet

**UNIT IV**

The transport – The transport service – Elements of transport protocols – A simple transport protocol - Network security – Domain Name system – Electronic Mail – USENET NEWS – The World Wide Web – Multimedia - Distributed processing

**REFERENCE**:

1. Andrew S Tanenbaum, “Computer Networks”, Prentice Hall of India private Ltd., New Delhi 3rd edition, 2013.
2. John Freer Pitman, “Computer Communication and Network”, Computer system series, 2010.
3. Sitnie, “Computer Network (TCP/IP), Tata McGraw Hill, 2011.
4. Willams Stallings, “Data & computer communications”, Pearson Education Asia, Sixth Edition, 2012.
5. RS Rajesh, KS Easwara kumar, R Balasubramanian, “Computer Networks-Fundamentals and Applications”, 12th Edition, Vikas Publications, NewDelhi, 2012.

**MCA 5414 Laboratory - IV (J2EE) 4 hrs**

**Objective:**

Students are trained on creating small or large applications that will be deployed in an Internet environment. Students at this level will need to utilize Object-Oriented principles to effectively design and implement component based systems using J2EE. They will utilize the Java Bean component model to construct an application from new and existing components, and will access and manipulate database information using Java Database Connectivity (JDBC) technology.

1. Distribute applets and applications using jar files.
2. Construct applets using the development tools library of beans.
3. Write and deploy Enterprise JavaBeans (EJB) technology-based components.
4. Design and build reusable enterprise components.
5. Design and build web components for Java Server Pages (JSPs) and Servlets including vendor-specific features.
6. Develop clients that access the enterprise components.
7. Configure and package EJBs, Servlets, and JSP and deploy them in the application server.

**MCA 6421 Distributed and Cloud Computing 4Hrs**

**OBJECTIVE:**

The Aim of this course is to introduce Distributed computing and the broad perceptive Cloud Architecture model, and to understand the concept of Virtualization and design of cloud Services, and be familiar with the lead players in cloud, and to explore the features of cloud simulator, and to employ different cloud programming model as per need.

**UNIT I**

Definition of distributed computing system – evolution – models-issues in designing a distributed Operating System - Introduction to Distributed Computing Environment – Introduction to Network types - LAN,WAN technologies - Communication Protocols - ATM technologies - Cloud Computing –NIST Cloud Computing Reference Architecture - Cloud Models: - Characteristics – Cloud Services – Cloud models (IaaS, PaaS, SaaS) – Public vs Private Cloud –Cloud Solutions - Cloud ecosystem – Service management – Computing on demand.

**UNIT II**

Basics of Virtualization - Types of Virtualization - Implementation Levels of Virtualization - Virtualization Structures - Tools and Mechanisms - Virtualization of CPU, Memory, I/O Devices - Virtual Clusters and Resource management – Virtualization for Data-center Automation. Architectural Design of Compute and Storage Clouds – Layered Cloud Architecture Development – Design Challenges - Inter Cloud Resource Management – Resource Provisioning and Platform Deployment – Global Exchange of Cloud Resources.

**UNIT III**

Parallel and Distributed Programming Paradigms – Map Reduce, Twister and Iterative Map Reduce – Hadoop Library from Apache – Mapping Applications - Programming Support - Google App Engine, Amazon AWS - Cloud Software Environments - Eucalyptus, Open Nebula, Open Stack, Aneka, Cloud Sim

**UNIT IV**

Security Overview – Cloud Security Challenges and Risks – Software-as-a-Service Security –Security Governance – Risk Management – Security Monitoring – Security Architecture Design – Data Security – Application Security – Virtual Machine Security - Identity Management and Access Control– Autonomic Security.

**REFERENCE**:

* + - 1. Kai Hwang, Geoffrey C Fox, Jack G Dongarra, “Distributed and Cloud Computing”, Parallel, 2012.

1. Kai Hwang, Jack Dongarra, Geoffrey C. Fox, Jack J. Dongarra, “Distributed and Cloud Computing - Processing to the Internet of Things”, Morgan Kaufmann Publications, 2012.
2. John W.Rittinghouse, James F.Ransome, “Cloud Computing: Implementation, Management and Security”, CRC Press, 2010.
3. Toby Velte, Anthony Velte, Robert Elsenpeter, “Cloud Computing - A Practical Approach”, Tata McGraw Hill, 2011.
4. Kumar Saurabh, “Cloud Computing – insights into New-Era Infrastructure”, Wiley India, 2011.
5. George Reese, “Cloud Application Architectures: Building Applications and Infrastructure in the Cloud”, O'Reilly, 2009.

**MCA 6423 Data Mining and Warehousing 4 Hrs**

### OBJECTIVE:

The aim of the course is to help the students to understand the basic concepts of data mining and its classification along with its applications

This course introduces data warehousing and data mining and its architectures, Tasks under data mining, Association Rules, classifications of data mining and application in data mining.

###### **UNIT I**

Introduction – Data mining – Data mining functionalities – kinds of patterns can be mined – classification – major issues. Data warehouse – A multidimensional data model – Data warehouse architecture – Data warehouse implementation – From data warehouse to data mining

###### **UNIT II**

Data pre-processing – Data cleaning – Data Integration and Transformation – Data Reduction – Discretization and concept hierarchy generation – Data mining primitives – Data mining Task – A data mining query language - Architecture of Data mining systems – Characterization and comparison

###### **UNIT III**

Association Rule Mining – Mining single dimensional Boolean association rules from transactional databases – mining multilevel association rules from transaction databases- mining multidimensional association rules from Relational databases and Data warehouses – From association mining to correlation analysis – constraint-based association mining

###### **UNIT I**V

Classification and prediction – Issues regarding classification and prediction – classification by decision Tree Induction – Bayesian Classification – Classification by Back propagation –classification based on concepts from association rule mining – prediction – classifier accuracy - Clustering – Types of Clustering Applications and Trends in Data Mining – Data mining system products and Research prototypes – Additional themes on Data mining – Social Impacts of Data Mining – Trends in Data mining

# REFERENCE:

Jiawei Han, Michelien Kamber, “Data Mining Concepts and Techniques”, 3rd Edition, 2014.

Arun K. Pujari, “Data Mining Techniques”, Universities Press (India) Limited,2 nd Edition, 2013.

Alex Berson, Stephen j Smith , Data Warehousing ,Data mining and OLAP ( Data warehousing / Data Management ) , McGraw Hill 2012.

George M Marakas, Modern Data warehousing, Mining and Visualization: core concepts, Prientice Hall , First Edition, 2002

John Wang, Encyclopaedia of Data warehousing and Mining, Idea Group Publishing, 2009.

**MCA 6625 .NET 6Hrs**

**OBJECETIVE:**

The aim of the course is to understand the fundamental concepts of .NET framework and Visual Basic.NET, ADO.NET and enable the students to write programs.

This course includes the .NET Framework, C#, VB.NET, JScript.NET, Web support for .NET, Web Services and ADO.NET, Introduction to VB.NET, and simple web applications using ASP.NET.

**UNIT I**

Introduction - .Net revolution - .Net framework and its architecture – CLR and its architecture – What is Assembly –Components of Assembly – DLL hell and Assembly Versioning – JIT -MSIL.

Introduction to VB.Net – Need – features of .NET- features of VB.NET- Architecture of VB.NET - Arrays - procedures –scope of variables – built-in functions – classes and objects – features of oops –constructors and destructors – creating property procedures – creating events – namespaces – import keyword - Inheritance , Polymorphism and Interfaces – overriding methods and properties – MyBase Keyword – MyClass Keyword – Abstract Base Classes – Shared members – Polymorphism- interfaces - Exception Handling – Err Object – User defined exceptions

**UNIT II**

Working with forms – Inheritance in windows forms – loading and showing forms –visual inheritance – adding controls – layout enhancement properties of controls – working with simple controls – adding menus – context menus - Advanced windows Application –Creating MDI application – custom windows control – delegates -overview of ADO.Net – ADO.NET Architecture – ADO.NET Components – Using ADO.NET – Data form wizard - Components and Interoperability.

**UNIT III**

Overview to C# - C # Compilation and Execution Process – C# Fundamentals (Data types, Operators, Programming constructs) –Inheritance –Sealed Classes – Interface - Polymorphism – Method Hiding – C# Property –Exception Handling

**UNIT IV**

ASP.Net- IIS - ASP.Net Page Life Cycle – ASP Vs ASP.Net - HTML Controls Vs Server side Controls –Validation Controls – Data binding in ASP.Net – Caching – Configuration in ASP.Net (web.config) –Session management – View State in ASP.Net – ASP.Net. Introduction - RIA – Silver light – XAML –App.Xaml – XAP – How Silver light application executes in a web browser

**REFERENCE:**

* + - 1. Nitini Pandey, Yesh Singhal, Mridula parihar, “Visual Studio.Net Programming”, Wiley-DreamTech India (p) Ltd, 2002
      2. Nikhil Kothari, Vandana Datye, “Developing Microsoft ASP.NET Server Control and Components”, Tata MaGraw Hill publishing company limited, 2003.
      3. E. Balagurusamy, “Programming in C#”, Tata MaGraw Hill publishing company limited, 2002.
      4. Steven Holzner, “Visual Basic .NET Black Book”, Coriolis Group Books.
      5. David Sceppa, “Microsoft ADO.NET (CoreReference)”, Microsoft Press, 2002.

**MCA 6427 Advanced Networking 4 Hrs (2T+2L)**

**OBJECTIVE:**

This course deals about practical aspects of computer networks, with emphasis to the internet and enabling the students on network-layer and transport-layer technologies with respect to VPN,NAT,Traffic Analization and Firewalls

**UNIT I**

Review of Basic Concepts - Network Architecture – Protocol Hierarchies, Layered model, services, interface - Reference Models - Underlying Technologies - LAN’s (Ethernet, Token Ring, Wireless) , Point-to-Point WAN’s -Switched WAN’s (X.25, Frame Relay, ATM), Connecting devices -Addressing (Physical, Network, Transport) - The Internet Layer Protocols- IP- Datagram, fragmentation and reassembly- ICMP- types of messages, error reporting, ICMP Package -Bootstrap and Auto configuration.-BOOTP and DHCP

**UNIT II**

Routing Protocols-Interior and Exterior Routing – RIP, OSPF, BGP - Multicast Routing - Unicast , Multicast and Broadcast, Multicasting, Multicast trees,-The Transport Layer-The transport Service- Services provided, Service primitives, Sockets-Process-to-Process Communication – Port addresses- Elements of transport protocols – addressing, connection establishment, connection release, flow control and buffering, multiplexing, crash recovery - UDP

**UNIT III**

Introduction, Remote Procedure Call-TCP – Service model, Protocol, frame format, connection establishment, release, connection management, Silly Window Syndrome - Nagle’s - algorithm, error control, congestion control, state transition diagram-Sockets and Client-Server Model-Client-Server Model – Concurrency, Processes-Socket Interface – Sockets, Byte Ordering, Socket System Calls, Connectionless and Connection Oriented applications-Implementation of Sockets ( C/Java etc)-

**UNIT IV**

Mobile IP - Mobility, routing and addressing, characteristics, operation, foreign agent discovery, registration and communication, two crossing problem, communication with computers on the home front. Introduction to Network Security-Cryptography, Symmetric key algorithms, Public Key Algorithms-Digital Signatures, Certificates, IPSec, Firewalls-Virtual Private networks, Network Address Translation, Authentication Protocols, Social Issues

**REFERENCES:**

1. Behrouz Forouzan, “TCP/IP Protocol Suite, 2nd Edition, Tata McGraw Hill
2. Andrew S Tanenbaum , “Computer Networks”, 4th Edition, Prentice Hall
3. Douglas E. Comer, “Internetworking with TCP/IP, Vol. 1, Principles, Protocols and Architecture”, 5th Edition, Prentice Hall, 2000.
4. William Stallings, “Data and Computer Communications”, 7th Edition, Pearson.
5. Douglas E. Comer, “Internetworking with TCP/IP, Vol. 2, Design, Implementation and Internals”, Prentice Hall.
6. Douglas E. Comer, “Internetworking with TCP/IP, Vol. 3, Client-server Programming and Applications”, Prentice Hall Publisher.
7. Richard Stevens, “TCP/IP Illustrated, Vol. 1”, Addison Wesley.

**MCA 6433 Laboratory V (.NET) 4hrs**

**OBJECTIVE:**

The aim of the course is to train the students in various components of .Net Using VB.NET and C# and enable them to develop a mini project:

1. Implementing Common Language Runtime.
2. Creating classes
3. Classes with property procedure and events
4. Name spaces
5. The Mybase and Myclass Keywords
6. Exception handling
7. Working with forms
8. Data accessing with ADO.Net
9. ADO.Net components
10. Writing web applications using ASP.Net
11. Writing web applications using data base connectivity
12. Common Web controls.

**MCA 6601 PROJECT – VIVA VOCE**

Each student shall be required to take up a Project work in the sixth semester. The Director shall assign the Guide at the end of the fifth semester and each student in consultation with the respective Guides shall choose their topic and company for which he/she shall do the project. Two copies of the Dissertation shall be submitted to the Director on or before the due date fixed by the Director.

Each student shall be required to appear for the viva voce in support of the Project report.

The Dissertation will be evaluated both by the External examiner nominated by the Director and Internal Guide.

The marks for the Project work would be as follows.

Project Guide : max 150 ( Continuous assessment -100: Viva voce – 50)

External Viva voce : max 50

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Total : max 200

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**MCA0412 Parallel computing using OpenCL 4Hrs**

(With effect from the academic year 2011-2012)

**OBJECTIVE:**

The aim of the course is to enable the students to understand OpenCL standard for programming heterogeneous computers built from CPUs, GPUs and other processors. Using OpenCL to write task-based and data-parallel programs to realize the advantage of these different types of processors in a single system.

**UNITI**

Introduction - Need for Parallel Computing - Scope of Parallel Computing – Issues in Parallel Computing - Models of Parallel Computing - Taxonomy of Parallel Architectures - Dynamic Interconnection Networks - Static Interconnection Networks - Message Transfer - Reduction, Parallel Prefix - GPU thread model -Performance Modelling - Metrics - Granularity - Scalability – Overhead - Isoefficiency - Matrix Algorithms - Matrix Partitioning - Matrix Transposition - Matrix Vector Multiply - Matrix Multiply - CUDA, vector add, matrix multiply, sequence alignment -Linear Equations - LU(P) Decomposition

**UNITII**

Searching and Optimization - The knapsack problem -Branch and Bound -Dynamic Programming -Sorting - Types of sorters -Sorting networks - Radix / Bucket sorts - Graph algorithms -Minimum Spanning Tree - Single Source Shortest Paths -All Pairs Shortest Paths - Fast Fourier Transforms - Fourier Series, basis functions, Euler - Discrete and Fast Fourier Transforms - Convolution, roots of unity, divide and conquer - Evaluation and Interpolation -Recursive, bit reversal, iterative Cooley - Tukey FFT - Pease FFT, locality

**UNIT III**

Introduction to OpenCL - OpenCL Architecture - Programming Model - Getting Started - Software Development Environment and Tools - Debugging tools -Getting into OpenCL Details - OpenCL Kernel Programming - Data Types and Type Checking-GPU - specific Features-Advanced OpenCL - Developing applications on Heterogeneous devices - OpenCL Images - API Features – Graphics API Bindings

**UNIT IV**

Generic Application tuning - Evaluating Application Performance - Performance Tuning Tips - Optimizations on Multi - Core CPUs-Optimization on Many - Core Architectures - GPU architectures - GPU Threading Concepts - GPU Memory Hierarchy - ATI GPU Architecture - Nvidia GPU Architecture

**REFERENCE**:

* + - 1. Kai Hwang and Zhi.Wei Xu, “Scalable Parallel Computing”, Tata McGraw-Hill, New Delhi, 2003.
      2. David E. Culler & Jaswinder Pal Singh, “Parallel Computing Architecture: A Hardware/Software Approach”, Morgan Kaufman Publishers, 1999.
      3. Michael J. Quinn, “Parallel Programming in C with MPI & OpenMP”, Tata McGraw-Hill, New Delhi, 2003.
      4. Kai Hwang, “Advanced Computer Architecture” Tata McGraw-Hill, New Delhi, 2003.
      5. David B. Kirk, Wen-mei W. Hwu. Programming Massively Parallel Processors: A Hands-on Approach. Morgan Kaufmann, 2010.
      6. http://amd.developers.opencl/

**MCA 0413 Soft Computing 4 Hrs**

**Objective**

The aim of this course is to provide the basic idea about Fuzzy sets and fuzzy logics. It also discusses the operations and applications of fuzzy logics.

This course also introduces various ANN structures such as feed forward with back propagation, Counter propagation networks, Hopfield nets, BAM structure and ART architecture.

**UNIT I**

Soft Computing: Meaning and Features - Introduction to Fuzzy Logic - Fuzzy set – Fuzzy Set versus Crisp set – Operation on Fuzzy Sets – Fuzzy Arithmetic - Fuzzy relations

**UNIT II**

Constructing Fuzzy Sets and Operations on Fuzzy Set – Fuzzy rule based system: Fuzzy propositions – formation - decomposition & aggregation of fuzzy rules, fuzzy reasoning, fuzzy inference systems, fuzzy decision making & Applications of fuzzy logic.

**UNIT III**

Why Neural Networks? - Characteristics of ANN – Training of ANN – Activation function – Multilayer networks - Back Propagation – The training algorithm, Forward pass, reverse pass, Adjusting weights – Advanced Algorithms – Applications.

**UNIT IV**

Counter Propagation Networks – Network Structure – Kohonen layer – Training, Interpolative Mode - The Grossberg Layer – An Application. Statistical methods – Training applications - Boltzmann Training - Cauchy Training - Hopfield Nets – Recurrent Network Configuration, Stability, Associative Memory BAM - Adaptive Resonance Theory – ART Architecture

**REFERENCE:**

1. Phillip D Wasserman – Neural Computing Theory and Practice – Van Nostrand Reinhold Publications, Newyork, 1989.
2. Valluru Rao, Haya Griva Rao and Valluru B Rao – C++ Neural Networks and Fuzzy Logic – Addison Wesley, 1999.
3. Stamastios V Kartalopoulos – Understanding Neural Networks and Fuzzy Logic Basic Concepts and Applications – IEEE press, PHI publications, 1996.
4. Klir, GJ, Youan Bo, “Fuzzy Sets and Fuzzy Logic”, Prentice Hall, 2012.

**MCA 0414 Biometrics 4 Hrs**

**OBJECTIVE:**

The aim of this course is to enable the student to understand the security and authentication methods available in biometrics techniques such as finger prints, hand print, face, Iris, Retina, and voice recognition and the technology behind them.

**UNIT I**

Biometrics – Introduction- Verification vs Identification – Applications – Facts other common Biometric characteristics. Finger print technology - Technical Description – Finger print security characteristics – Technology uses and applications increased or decreased costs.

**UNIT II**

Face Technology – Technical Description – Face Recognition security characteristics – Face Technology uses - Face Technology considerations – Network product commonalities. Iris and Retina Vascular Pattern Technology – Technical Description- Technology uses and applications- Implementation criteria – Increased or Decreased costs – Sample product.

**UNIT III**

Other Physical Biometrics – Hand Scan Geometry – Hand Print Biometrics – DNA Biometrics – Signature And Hand Writing Technology – Technical Description – Classification – Technology Uses And Applications

**UNIT IV**

Voice Recognition – The speaking voice and factors to consider – How vowels are formed – Rules for modifying vowels – Spectral Analysis – Factors influencing fundamental frequency – Voice qualities and Recognizing Distinctiveness - Multi-biometrics and Two factor authentication – Executive decision – Establish goals – Need analysis – Selection criteria – Ripple security logic – Selection process – Implementation Plan

**REFERENCE:**

1. John D Woodward Jr, Nicholos M Orlans and Peter T Higgins, “Biometrics”, Osborne Publications, 2003.
2. Julian Ashbourn, “Practical Biometrics: From Aspiration to Implementation”, Springer Professional Computing, 2001.
3. Rund Bolle Johnathan, H. Connell, Nalini K Ratha, “Guide to Biometrics” Springer Professional Publications, 2000.

**MCA 0415 Digital Image Processing 4 Hrs**

**OBJECTIVES:**

The aim of this course is to develop a theoretical foundation of fundamental Digital Image Processing concepts. Provide mathematical foundations for digital manipulation of images; image acquisition; pre-processing; segmentation; Fourier domain processing; and compression. Gain experience and practical techniques to write programs using MATLAB language for digital manipulation of images; image acquisition; pre-processing; segmentation; Fourier domain processing; and compression

**UNIT I**

Introduction And Digital Image Fundamentals- The origins of Digital Image Processing- Examples of Fields that Use Digital Image Processing -Fundamentals Steps in Image Processing - Elements of Digital Image Processing System- Introduction And Digital Image Fundamentals - Image Sampling and Quantization - Some basic relationships like Neighbours, -Connectivity, Distance -Measures between pixels - Translation, Scaling, Rotation and Perspective Projection of image.

**UNITII**

Introduction And Digital Image Fundamentals -Linear and Non Linear Operations -Digital image Representation -Reading, Displaying, Writing Images using MATLAB -Data Classes, Image Types using MATLAB --Digital image Representation -Converting Between data classes and Image Types -Introduction to M Function Programming using MATLAB -Image Enhancement in the Spatial Domain: Some basic Gray Level Transformations - Histogram Processing

**UNIT III**

Image Enhancement in the Spatial Domain - Enhancement Using Arithmetic and Logic operations-Combining Spatial Enhancement Methods- Basics of Spatial Filters -Image Enhancement in the Spatial Domain- Smoothening and Sharpening Spatial Filters - Intensity Transformation Function (MATLAB). Histogram Processing and Function Plotting (MATLAB) - Image Enhancement in the Frequency Domain-Introduction to Fourier Transform and the frequency Domain - Computing and Visualizing the 2D DFT (MATLAB) - Image Enhancement in the Frequency Domain -Smoothing Frequency Domain Filters -Sharpening Frequency Domain Filters- Homomorphic Filtering

**UNIT IV**

Image Restoration- A model of The Image Degradation / Restoration Process -Noise Models -Restoration in the presence of Noise Only Spatial Filtering -Processing Application (Implementation) - Image Restoration - Periodic Noise Reduction by Frequency Domain Filtering - Linear Position-Invariant Degradations - Estimation of Degradation Function - Image Restoration- Inverse filtering - Wiener filtering - Image Restoration - Geometric Mean Filter -Geometric Transformations - Image Compression-Coding - Interpixel and Psychovisual Redundancy - Image Compression models -Compression standards. Image Segmentation - Detection of Discontinuities **-**Edge linking and boundary detection - Thresholding - Object Recognition: - Patterns and Pattern Classes - Decision-Theoretic Methods - Structural Methods.

**REFERENCE:**

1. R C Gonzalez, R E Woods, “Digital Image Processing”, 3rd Edition Pearson, Prentice Hall, 2008.
2. R C Gonzalez, R E Woods, Eddins, “Digital Image Processing using MatLab”, 2nd Edition, Pearson Prentice Hall, 2004.

**MCA 0416 Network Security 4 Hrs**

**OBJECTIVE:**

The aim of the course is to make the students to learn various level securities available in networks, mobile ad-hoc, wireless sensor network and Lifi technology

**UNIT I**

Introduction attacks and mechanisms – security attacks-security services - a model for internet work security - internet standards and RFCS – conventional encryption and message confidentially - Conventional encryption principles conventional encryption algorithms - cipher block modes of operation – location of encryption devices – key distribution.

**UNIT II**

Public –Key Cryptography and Message Authentication: Approaches to Message Authentication – Secure Hash Function and HMAC - Public Key Cryptography Principles Public Key Cryptography Algorithm-Digital Signature- Key Management - Authentication Application Kerberos – x.509 Directory Authentication Services

**UNIT III**

Electronic Mail Security: Pretty Good Privacy - S/Mime – Data Compression Using Zip Radix - 64 Conversion - PGP Random Number Generation - IP Security: IP Security Overview- IP Security Architecture- Authentication Header - Encapsulating Security Payload - Combing Security Association – Key Management – Internetworking And Internet Protocols

**UNIT IV**

Web Security: Web Security Requirement - Secure Sockets Layers (SSL) and Transport Layers - Secure Electronic Transaction Network Management Security: Basic Concepts of SNMP – SNMPVL Communication Facility - Snmpv3 - Intruders and Virus: Intruders – Viruses and Related Threads Problems Firewalls: Firewall Design Principles – Trusted Systems – Problems

**REFERENCE**:

1. Willams Staling, “Network Security Essentials Application And Standards”, Pearson Education Ltd, 4th Indian Reprint, 2003
2. Eric Maiwald, “Network security a beginner’s guide”, 2ndEdition, Tata McGraw Hill, 2003.
3. Chris Brenton, Cameron Hunt, “Mastering Network Security”, 2nd Edition, Sybex, 2003.

**MCA 0417 Artificial Intelligence and Expert System 4 Hrs**

**OBJECTIVE:**

The aim of the course is to introduce the fundamental concepts of artificial intelligence, Expert systems, and the problem areas of AI and Expert systems and gives a detail discussion on planning and its classifications along with Learning and its types.

**UNIT I**

Introduction and applications of artificial intelligence, Problem solving: Defining the problem as state space search, Production system, Problem characteristics, Problem system characteristics, Search techniques: Generate and test, Hill climbing, Best first search, A\* algorithm, Problem reduction, Expert system: Definition, Role of knowledge in expert system, Architecture of expert system.

**UNIT II**

Planning – Planning problem - Planning with state space search – Partial order planning – Planning graphs – Planning with proposition logic – Analysis of planning approaches – Planning and acting in the real world- hierarchical task in the network planning – Planning and acting in the non deterministic domains – Conditional Planning – Execution monitor and re-planning – Multi agent planning.

**UNIT III**

Learning- Forms of learning – Learning decision trees – Ensemble learning – Why learning works – Knowledge in learning- Explanation-based learning – Learning using relevance – Inductive logic programming- Statistical learning methods – Reinforcement learning.

**UNIT IV**

Expert system development life cycle: Problem selection, Prototype construction, Formalization, Implementation, Evaluation, Knowledge acquisition: Knowledge engineer, Cognitive behaviour, Acquisition techniques, Knowledge representation: Level of representation, Knowledge representation schemes, Formal logic, Inference Engine, Semantic net, Frame, Scripts.

**REFERENCE**:

1. Stuart Russel and Peter Norvig, “Artificial Intelligence – A Modern Approach”, Pearson Education, 2010.
2. David W. Rolston, “Principles of Artificial Intelligence and Expert System Development”, McGraw Hill Book Company, 1988.
3. Elaine rich, Kevin Knight, “Artificial Intelligence”, Tata McGraw Hill.
4. Carl Townsend, “Introduction to Turbo Prolog”, 2nd Edition, Sybex Inc, 1987.
5. Stamations V. Kartalopous, “Understanding Neural Networks and Fuzzy Logic”, Wiley Press, 1995.

#### MCA0418 Compiler Design 4 Hrs

**OBJECTIVE:**

The aim of the course is to enable the students to understand the basic concepts in compiler construction. Fundamental concepts in compilers, structure of the compiler and the tools to write compilers are introduced. Internal process mechanism in a compiler is included. Parsing techniques and Translation schemes are introduced.

**UNIT I**

Introduction To Compilers – Translators – Structure of a Compiler – Compiler Writing Tools - Role Of Lexical Analyzer – Design Of Lexical Analyzers – Regular Expressions – Finite Automata – Minimizing the Number of States of a DFA – Language For Specifying Lexical Analyzers – CFG – Derivations And Parse Trees – Capabilities Of Context-Free Grammars

**UNIT II**

Parsers – Shift-reduce parsing – Operator-precedence parsing – Top-down parsing – Predictive parsers – LR Parsers – The canonical collection of LR (0) items- Constructing SLR parsing tables – Constructing canonical LR parsing tables – Constructing LALR parsing tables – Using ambiguous grammars – An automatic parser generator – Implementation of LR parsing tables – Constructing LALR sets of items.

**UNIT III**

Syntax-directed translation schemes – Implementation of syntax-directed translators – Intermediate code – Postfix notation – Three-addresses code, quadruples and triples – Postfix translations – The contents of a symbol table – Data structures for symbol tables – Representing scope information

**UNIT IV**

Errors – Lexical-phase errors – Syntactic-phase errors – Semantic errors – The principal sources of optimisation – Loop optimization – The DAG representation of basic blocks – Object programs – Problems in code generation – A simple code generator – peephole optimization

**REFERENCE:**

1. Aho AV, Ullman JD, Principles of Compiler Design, Narosha Publications, 1999.
2. William A Bar, RM Bates, DA Gustaf, John D. Couch, “Compiler Construction”, Galgotia Publications.

**MCA 0419 Data analytics and Big data 4Hrs**

**OBJECTIVE:**

The aim of the course is to explore the fundamental concepts of Big Data Analytics, and enable them to analysis the big data using intelligent techniques, and facilitates them to understand various search methods and visualization techniques, and help them to employ the various techniques for mining data stream, and understand the applications using Map Reducing Concepts.

**UNIT I**

Introduction to Big Data Platform – Challenges of Conventional Systems - Intelligent data analysis –Nature of Data - Analytic Processes and Tools - Analysis vs Reporting - Modern Data Analytic Tools -Statistical Concepts: Sampling Distributions - Re-Sampling - Statistical Inference - Prediction Error.

**UNIT II**

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 III**

History of Hadoop - The Hadoop Distributed File System – Components of Hadoop - Analyzing the Data with Hadoop - Scaling Out - Hadoop Streaming- Design of HDFS - Java interfaces to HDFS Basics - Developing a Map Reduce Application-How Map Reduce Works - Anatomy of a Map Reduce Job run - Failures - Ob Scheduling - Shuffle and Sort – Task execution - Map Reduce Types and Formats - Map Reduce Features

Setting up a Hadoop Cluster - Cluster specification - Cluster Setup and Installation – Hadoop Configuration-Security in Hadoop - Administering Hadoop – HDFS - Monitoring-maintenance - Hadoop benchmarks - Hadoop in the cloud

**UNIT V**

Applications on Big Data Using Pig and Hive – Data processing operators in Pig – Hive services –HiveQL – Querying Data in Hive - fundamentals of HBase and ZooKeeper - IBM Info sphere Big Insights and Streams - Visualizations - Visual data analysis techniques, interaction techniques - Systems and applications

**REFERENCE**:

1. Michael Berthold, David J. Hand, “Intelligent Data Analysis”, Springer, 2007.
2. Tom White, “Hadoop: The Definitive Guide”, 3rd Edition, O’reilly Media, 2012.
3. Chris Eaton, Dirk DeRoos, Tom Deutsch, George Lapis, Paul Zikopoulos, “Understanding Big Data: Analytics for Enterprise Class Hadoop and Streaming Data”, 1st Edition, Tata McGrawHill, 2012.
4. Anand Rajaraman, Jeffrey David Ullman, “Mining of Massive Datasets”, Cambridge University Press, 2012.
5. Bill Franks, “Taming the Big Data Tidal Wave: Finding Opportunities in Huge Data Streams with Advanced Analytics”, John Wiley & sons, 2012.
6. Glenn J. Myatt, “Making Sense of Data”, John Wiley & Sons, 2007.
7. Pete Warden, “Big Data Glossary”, O’Reilly, 2011.
8. Jiawei Han, Micheline Kamber, “Data Mining Concepts and Techniques”, 2nd Edition, Elsevier, Reprinted 2008.
9. Da Ruan, Guoquing Chen, Etienne E.Kerre, Geert Wets, “Intelligent Data Mining”, Springer, 2007.
10. Paul Zikopoulos, Dirk de Roos, Krishnan Parasuraman, Thomas Deutsch, James Giles, David Corrigan, “Harness the Power of Big Data The IBM Big Data Platform”, Tata McGraw Hill, 2012.
11. Michael Minelli (Author), Michele Chambers (Author), Ambiga Dhiraj (Author), Big Data, “Big Analytics: Emerging Business Intelligence and Analytic Trends for Today's Businesses”, Wiley Publications, 2013.
12. Zikopoulos, Paul, Chris Eaton, “Understanding Big Data: Analytics for Enterprise Class Hadoop and Streaming Data”, Tata McGrawHill, 2011.

**MCA 0420 Mobile Computing 4 Hrs**

**OBJECTIVE:**

The aim of this course is to introduce the wireless communication and WAP architecture and to develop wireless applications using WML, and to understand the concepts of mobile operating systems, and employ them to develop Android Applications.

**UNIT I**

Overview of the WAP – Components of WAP standard – WAP architecture – Design principles – WML – Markup Basics – events, tasks, and bindings – variables – Other contents – Controls – Document type declaration – Errors and Browser limitations. Wireless Binary Extensible Markup Language-WML script – Language Basics – Standard Libraries – Binary WML script – Data base connectivity

**UNIT II**

Introduction to Platform/Operating Systems for mobile application development –IOS -Palm OS - Windows CE - Embedded Linux -J2ME - Symbian – Android - Android application development: Overview of Android -Devices running android - Features of android - Architecture of Android, Libraries - Software development kit - Starting with Application Coding: Intents - Adapters - Internet Resources - Dialogs -Capturing Date and Time - Validating and Handling Input data

**UNIT III**

Accessing Location Based Services Application: Selecting Location Provider - Finding your location - Creating map based activities -Data Storage, retrieval and Sharing -File system in android - Internal and external storage - Saving and loading files - File Management tools -SQLite - Creating SQLite database - Editing Tasks with SQLite - Cursors and content values -Working with Android database - Peer to peer to communication - Accessing Telephony Hardware - Android Instant Messaging

**UNIT IV**

G Talk Service : Using, binding & Making connection -Managing chat Sessions -Sending and receiving Data messages - SMS - Using, sending & Listening SMS Messages -Accessing Android Hardware -Audio, Video and Using the camera - Sensor Manager - Android Telephony - Using Bluetooth -Manage network and Wi-Fi connections

**REFERENCE**:

1. Charles Arehart et al, “The Professional WAP”, Wrex Publications, 2001.
2. Dale Browk, “WAP - Beginners Guide”, Tata McGrawHill Publications, 2008.
3. Kris Jamsa, “WML and WML Script A Beginners Guide”, Tata McGrawHill Publications, 2001.
4. James Keogh, “J2ME Complete Reference”, Osborne Publications, 2001.
5. Schiller.J, “Mobile Communications”, 2nd Edition, Addison Wesley, 2003.
6. Reto Meier, “Professional Android™ Application Development”, Wrox, 2008.
7. Ed Burnette, “Hello Android, Introducing Google’s Mobile Development Platform”, 3rd Edition, Pragmatic Programmers, 2010.
8. Lauren Dercy and Shande Conder, “Sams teach yourself Android application development”, Sams publishing, 2011.

**MCA 0421 Organizational Behaviour 4Hrs**

**OBJECTIVE:**

To impart conceptual Understanding to the students and to expose them to the development in these areas

**UNIT I**

Organizational Behavior – Definition and Historical overview of the filed – Elton Mayo and the Hawthorne Studies

**UNIT II**

Individual Behavior – personality – determinants of personality , theories of personality and measuring personality , perception – perceptual process, selective perception and social perception -Learning – theories of Learning –reinforcement and punishment

Attitudes – nature and components attitudes, function of attitudes and changing attitudes - Motivation – content and process theories of work motivation

**UNIT III**

Group Behavior – Dynamics of Group Formation – Types Of Groups – Reasons For Group Formation - Leadership – Leadership Styles – Difference Between a Leader And Manager - Stress – Definition - Causes of Stress - Managing Stress - Emotional Intelligence

**UNIT IV**

Organizational – Organizational Change –Types Of Change - Process Of Change, Resistance To Change And Overcoming Resistance to Change - Organizational Development – Od Interventions - Organizational Culture

**REFERENCE**:

1. Fred Luthans, “Organization Behaviour”, McGraw Hill International Edition, 10th Edition, 2009.
2. Stephen P.Robbins, “Organization Behaviour”, 10th Edition, PHI, 2008.
3. Koith Davis and John W. Newstron, “Human Behaviour at work”, McGraw Hill International Edition, 2010.
4. Khanka, “Organization Behaviour”, McGraw Hill, 10th Edition, 2009.

**MCA 0422 Multimedia and Applications 4Hrs**

**OBJECTIVE:**

This course gives a detailed study of the multimedia systems and the technologies that support the components of multimedia. Hands on training will be given on multimedia applications with the help of Sound Forge, Movie Maker and macro media FlashMX. Advanced concepts of action script in flash will be implemented.

**UNIT I**

Uses of multimedia information – Architectures and issues for distributed multimedia systems – Digital Audio representation and processing - Video Technology - Digital video and Image Compression - Time based media representation and delivery

**UNIT II**

Operating System support for continuous media applications – Middleware system services - Architecture - Multimedia file systems and information models - Multimedia services over the public network – Knowledge based Multimedia systems.

**UNIT III**

Introduction to Sound Forge - Non-linear editing: meaning and process -sequencing -Audio Editing Tools - Process of equalization -Applying effects to sound - Audio Mixing - Introduction to Movie maker- Design, create and edit a movie using Movie maker - import audio clips into Movie Maker

**UNIT IV**

Introduction to Flash MX - Animation Techniques in Flash MX - Action Scripts - constructs – Functions - Objects – Understanding Text usage - Predefined objects – Using and building Components – Data driven Flash solutions – scrolling, dragging, making menus, dynamic drawing, Using Forms

**REFERENCE**:

1. John F Koegel Buford, “Muiltimedia Systems”, Pearson Education, 2001.
2. James E Shuman, “Multimedia in Action”, Vikas Publications, 2001.
3. Robert Reinhardt and Joey Lott, “Flash Action Script Programming Bible”, John Willey Dream Tech Publications, 2002.
4. “Macro Media Director 8.5 Shockwave studio user manual”, Macromedia Publications, 2002.
5. Derek Franklin and Jobe Makar, “Flash MX Action scripting training from the source”, Macromedia Press, 2003.
6. Colin Moock, “Action Script for Flash MX”, Oreilly publications 2nd Edition, 2002.
7. Gary Rosenweig, “Special Edition Using Macromedia Director MX”, QUE Publications, 2003.

**MCA 0423 ERP 4Hrs**

**OBJECTIVE:**

The aim of the course is to provide management with relevant information about the entire organizational process to help planning and administration.

**UNIT I**

Introduction to ERP- Its Evolution, its Growth, Its Advantages, Its need - Integrated Management information - Business Modelling - Integrated Data Model - Chain – Supply and demand chain-Extended Supply chain

**UNIT II**

ERP and Related Technologies- BPR, MIS, DSS, EIS - Data Warehousing - Data Mining - OLAP - A Manufacturing Perspective-MRP - BOM, Closed Loop MRP, MRP-II, DRP, JIT and Kanban - CAD/CAM, PDM, Data Management - Benefits of PDM, MTO and MTS, ATO, CRM -Benefits of ERP, ERP Modules – Finance, Plant Maintenance - Quality Management - Materials Management - ERP Market: SAP AG, People Soft, BAAN and ORACLE, JD Edwards.

**UNIT III**

ERP Implementation Life Cycle – Pro-evaluation Screening, package Evaluation, Project planning phase, Gap – Analysis, reengineering, Configuration, implementation team-Training, Testing ,Going Live, END-User Training .Post implementation, Business Models and BAPIs. Convergence on Windows NT, Application platforms, New Business segment and Features

**UNIT IV**

ERP Procurement Issues – Market Trends – Outsourcing ERP – Economics – Hidden Cost Issues – ROI – Analysis of cases from five companies

**REFERENCE**:

Alexis Leon, “Enterprise Resource Planning”, Tata McGrawHill, New Delhi, 2004

Alexis Leon, “Enterprise Resource Planning Demystified”, Tata McGraw-Hill, New Delhi, 2006.

**MCA 0424 Software Testing 4Hrs**

**OBJECTIVE**: The aim of this course is to expose the students to the various software

Testing principles and models so as to Verify and Validate the software.

**UNIT I**

Software Testing Terminology and Methodology Software Testing Terminology, Software Testing Life Cycle, Writing a Policy for Software Testing, Economics of Testing, Testing – An organizational Issue, Management Support for Software Testing, Fig. of Software Testing Methodology, Risk associated with not meeting customer needs, Developing Test Strategy - Overview of Software Testing Process Advantages of Following a Process, The Cost of Computer Testing, The Seven-Step Software Testing Process

**UNIT II**

Verification and Validation Verification and Validation (V&V) Activities, Verification, Verification of Requirements, Verification of High –level Design, Verification of Low –level Design, How to Verify Code? ,Validation - Static Testing Inspections, Structured Walkthroughs, Technical Reviews - Validation Activities Unit Validation Testing, Integration Testing, Function Testing, System Testing , Acceptance Testing - Regression Testing Progressive vs. Regressive Testing, Regression Testing Produces Quality Software, Regression Testability, Objectives of Regression Testing, When is Regression Testing Done? , Regression Testing Types, Defining Regression Test Problem, Regression Testing Techniques

**UNIT III**

Test Management Test Organization, Structure of Testing Group, Test Planning, Detailed Test Design and Test Specifications - Software Metrics Need for Software Management, Definition of Software Metrics, Classification of Software Metrics, Entities to be Measured, Size Metrics - Testing Metrics for Monitoring and Controlling the Testing Process Measurement Objectives for Testing, Attributes and Corresponding Metrics in Software Testing, Attributes, Estimation Models for Estimating Testing Efforts (include only topic Halstead Metrics), Test Point Analysis (TPA) – introduction only

**UNIT IV**

Testing Process Maturity Models Need for Test Process Maturity, Measurement and Improvement of a Test Process, Test Process Maturity Models - Automation and Testing Tools Need for Automation, Categorization of Testing Tools, Selection of Testing Tools, Cost Incurred in Testing Tools, Guidelines for Automated Testing, Overview of Some Commercial Testing Tools - Testing Object Oriented Software Object-Oriented Testing - Using Agile Methods to Improve Software Testing The importance of Agility, Building an Agile Testing Process, Agility Inhibitors, Is Improvement Necessary, Compressing Time, Challenges, Solutions , Measuring Readiness , The Seven-Step

**REFERENCE:**

* + - 1. Naresh Chauhan, “Software Testing Principles and Practices”, Oxford, 2010.
      2. William E Perry, “Effective Methods of Software Testing”, 3rd Edition, Wiley India, 2006.
      3. Srinivasan Desikan, Gopalaswamy Ramesh, “Software Testing principles and practices”, Pearson, 2007.
      4. Ron Patton, “Software testing”, 2nd Edition, Pearson Education , 2008.
      5. Elfriede Dustin, “Effective Software Testing 50 specific ways to improve you’re testing”, Pearson Edu, 2003.

**MCA 0425 Distributed Systems 4 Hrs**

**OBJECTIVES:**

Aim of the Course is to enable the student to understand the concept of distributed Operating Systems.

**UNIT I**

Definition of distributed computing system – evolution – models-issues in designing a distributed Operating System - Introduction to Distributed Computing Environment – Introduction to Network types - LAN,WAN technologies - Communication Protocols - ATM technologies.

**UNIT II**

Message Passing : Features of good message passing systems, Issues in IPC, Synchronization, Buffering, Multi datagram Messages, Encoding, Decoding of message data, Process addressing, Failure Handling, group communication, case study - Remote procedure calls : RPC Model, Transparency, Implementation, Stub Generation, RPC messages, Marshalling Arguments and results, Server management, parameter passing semantic, calls semantic, communication protocols for RPC, Complicated RPC, client/server binding, Exception handling, security, special types, RPC in heterogeneous Environment, Lightweight RPC, Optimization for better performance and case studies

**UNIT III**

Distributed Shared Memory : General architecture of DSM systems, Design and Implementation issues, Granularity, Structure of shared Memory space, consistency models, replacement strategy, thrashing, other approaches to DSM, Heterogeneous DSM and Advantages-Synchronization : Clock Synchronization , event ordering ,mutual exclusion, Deadlock, Election algorithms - resource Management : Desirable features of good global scheduling algorithms -task assignment approach - load balancing approach-load sharing approach

**UNITIV**

Process Management: process migration-threads - Distributed file systems: Desirable features of good DFS - File models - file accessing models - file sharing – semantics -file caching schemes -file replication - fault tolerance - atomic transactions - design principles –Security

**REFERENCE:**

1. Sinha, Pradeep k, “Distributed Operating System Concepts and Design”, IEEE Press, PHI 1998.
2. Calories, George, “Distributed Systems”, 4th Edition, Addison Wesley, 2005.

**MCA 0426 Distributed Database Design 4 Hrs**

**OBJECTIVE:**

The aim of the course is to equip the students with the fundamental concepts of Distributed Database that would be necessary for better understanding of the concepts in distributed environments.

**UNIT I**

Introduction - Distributed data processing - Promises of DDBS – Distributed Database Design – Distributed Query Processing – Distributed Directory Management – Distributed Concurrency Control – Distributed Deadlock Management –Reliability of distributed DBMS – Operating System Support – Heterogeneous databases

**UNIT II**

Overview of Relational DBMS (Relational Database Concepts, Normalization, Integrity rules Relational data languages, Relational DBMS) – Review of computer Networks (Data communication Concepts, Types of Networks Protocol standards, Broadband Networks, Wireless Networks, Internet) – Distribute DBMS architecture (DBMS Standardization, Architectural model for DDBMSs, Distributed DBMS architecture , Global Directory issues)

Distributed Database Design (Alternative Design Strategies, Distributed Design issues, Fragmentation, Allocation) – Semantic Data Control (View Management, Data Security, Semantic integrity control)

**UNIT III**

Over View of Query Processing (Query Processing problem, Complexity of Relation Algebra operations, Characterization of Query processors, Layers of query processing) – Query decomposition and data localization(query decomposition, localization of Distributed data) – Optimization of Distributed Queries(Query optimization ,centralized query optimization, Join ordering in fragment queries, Distributed query optimization algorithms)

**UNITIV**

Introduction to Transaction Management(Definition of a Transaction, Properties of Transaction, Types of transaction, Architecture Revisited) – Distributed Concurrency control (Serialability Theory, Taxonomy of concurrency control mechanisms, locking based, timestamp-based and optimistic concurrency control Algorithms, Deadlock management, Relaxed concurrency control) – Distributed DBMS Reliability (Reliability concepts and measures, failure and fault tolerance in distributed systems, Failure in Distributed DBMS, Local Reliability Protocols, Distributed Reliability protocols, Dealing with site Failures ,Networks Partitioning, Architectural considerations)

**REFERENCE:**

1. Tamer Ozsu and Patrick Valduriez, “Principles of Distributed Systems”, 3rd Edition, Prentice Hall2011.
2. Stefano Ceri and Guiseppe Pelagatti, “Distributed Database Principles and Systems”, Mc Graw Hill, 2008.
3. Forth and Stilberschatz, “Database System Concepts”, Tata Mcgraw Hill, 2010.
4. J.D. Ullan, “Principles of Database Systems”, 3rd Edition Galgotia Publishers, 2008.

**MCA 0427 Robotics 4Hrs**

**OBJECTIVE:**

The aim of the course is to enable the students to design, organize and implement artificial intelligent through Robotics. Making them to understand how human relevant work could be accomplished through robot.

**UNIT I**

Historical developments - robot arm kinematics – direct –kinematics problem – invoke Kinematic Solution – robot arm dynamics – langrage – Euler formulation – Newton – Euler formulation – generalized D’Alembertls – equation of motion

**UNIT II**

Planning of manipulator trajectories – general considerations – joint – interpolated trajectories – Cartesian path rajectories – control of robot manipulators – control of the puma robot arm – computed torque technique – near – minimum – time control – variable structure control – non linear decoupled feedback control – resolved motion control – adaptive control

**UNIT III**

Sensing – range sensing – proximity sensing – touch sensors – force and torque sensing – low level vision – image acquisition – illumination prescription – recognition – interpretation

**UNIT IV**

Robot programming language – characteristics of robot level languages – characteristics of task level languages - robot intelligence and task planning – state space search – problem reduction – use of predicate logic – means – ends analysis – robot learning and task planning

**REFERENCE**:

1. R.D .Klaster, T.A Chmiele Wski and Michael Negin, “Robotic Engineering – an integrated approach”, Prentice Hall int.
2. E.L hall and B.C hall, Holt Saunders, “Robotics - A user friendly introduction”, International editions.

**MCA 0428 Computer Hardware Components 4hrs**

**OBJECTIVE:**

The aim of the course is to identify each sub-assembly, expansion boards, and connectors. Get some insights into CPU evolution and capabilities. The principles of PC-TV boards - Upgrading a PC

This course will enable students to gain confidence with the PC hardware by way of assembling, disassembling, installing both the hardware and software and upgrading and thereby help them to cut a better edge over others.

**UNIT I**

Enclosure: Layout of a typical desktop PC – Layout of typical tower PC. Switching Power Supplies: Connecting the Power Supply: AT-style power connections – Drive power connections – ATX/NLX style power connections – Voltage tolerances - Motherboard: Socket 7, Socket 8, or Slot 1. AT, ATX, and NLX – Layout and Connector pin-outs of Intel motherboard – Connector layout of a typical back panel - Intel Pentium Chipsets - The Intel CPU’s

**UNIT II**

Floppy Drives: Magnetic-Storage Concepts – Media – Data and disk organization – Drive electronics – Physical Interface. Hard Drives: Platters and media – Airflow and head flight – Tracks, sectors, and cylinders. IDE/EIDE features and architecture – Drive electronics – Read / Write Heads - CD-ROM and CD-R Drives: CD Media – CD data EFM and data storage – CD-ROM standards – CD-ROM mechanics – CD-ROM electronics - DVD Drives: Specifications and Standards – DVD Media – Inside the DVD Drive

**UNIT III**

Essential Memory Concepts – Memory signals – Memory Package styles and structures – Memory Types – Memory Techniques: Memory Installation and Options VIRUS- Firewalls

**UNIT IV**

Basic Modem Construction and Operation: The internal modem - The external modem – Advanced modem features – Understanding Signal Modulation – Signalling Standards - Sound Boards: Recording and Playback process – MIDI - Video Capture / PC-TV Boards: Understanding PC-TV Boards

**REFERENCE:**

1. Stephen J Bigelow, “Troubleshooting, Maintaining & Repairing PCs”, Tata McGraw Hill, Second Edition, 2004.
2. Craig Zacker & John Rourke, “PC Hardware: The Complete Reference”, Tata McGraw-Hill, 2001.
3. Govindarajalu B, “IBM PC and Clones: Troubleshooting and Maintenance”, Tata McGraw Hill, 2002.