NORTH MAHARASHTRA UNIVERSITY, JALGAON – 425 001

SYLLABUS for Master of Computer Application (MCA)
(With Effect from June-2014)

Semester- I

CA-101 Computer Organization & Architecture

CA-102 Database Management System (DBMS)

CA-103 Mathematical Foundations of Computer Science

CA-104 C++ Programming

CA-105 System Programming

CA-Lab-I Lab on C++ Programming

CA-Lab-II Lab on DBMS

Semester- II

CA-201 Object Oriented Analysis and Design (OOAD)

CA-202 Data Structures and Algorithms

CA-203 Operating Systems

CA-204 Linux Operating System

CA-205 Computer Networks

CA-Lab-III Lab on Data Structures

CA-Lab-IV Lab on Linux Operating System

Semester- III

CA-301 Accounting and Management Control

CA-302 Design and Analysis of Algorithms

CA-303 Automata Theory and Computability

CA-304 Artificial Intelligence

CA-305 Java Programming

CA-Lab-V Lab on Design and Analysis of Algorithm

CA-Lab-VI Lab on JAVA Programming

Semester-IV

CA-401 Software Engineering Methodologies

CA-402 Internet Computing - I

CA-403 Network Programming

CA-404 Computer Graphics

CA-405 Optimization Algorithms

CA-Lab-VII Lab on Computer Graphics & Internet Computing -I

CA-Lab-VIII Lab on Linux Socket Programming

Semester –V

CA-501 Compiler Construction

CA-502 Cloud Computing

CA-503 Internet Computing -II

CA-504 Visual C++ Programming

CA-505 Natural Language Processing

CA-Lab-IX Lab on Visual C++ Programming

CA-Lab-X Lab on Internet Computing -II

Semester-VI

CA-601 Full time Industrial Training

Career Opportunities

The career opportunities after M.C.A. are quite huge. Many major national and multinational firms take in aspirants who have accomplished their graduation in these fields. The top IT firms such as Microsoft, Google, Yahoo, Rediff, Wipro, TCS, Infosys, Accenture, Capgemini etc. offer aspirants very attractive packages. Jobs for professionals in these fields can also be got with management consultancy organizations, Government organizations, Banks, Educational Institutions, Research Organizations and other organizations that use computers and computer-aided systems are but not limited to:

Programmer or Software Engineer
Computer Engineer
Web Designer
Hardware Designer/Engineer
Systems Engineer
System integrator
System Administration
Technical Support
Support Engineer
Technical Writer
Consultant
Management
Administration
IT Sales and Marketing
IT Officer
Computer Scientist
Professor
Research Staff Member
Systems Analyst
Logic Designer
Computer Scientist

Semester- I

CA-101 Computer Organization and Architecture

UNIT - 1   Introduction to Digital Logic: [8][10]

Functions and Block Diagram of Computer, Types of Software – System Software ,Application Software, Utility Software. Compilers, Interpreters, Assemblers, Linker, Loader Number System- Binary, Octal, HEX, BCD and their inter-conversion 1's and 2's Complement., Binary Arithmetic. Logic Gates- NOT, AND, OR, NAND, NOR, XOR, XNOR Boolean Algebra, De-Morgan's Theorem, Duality Theorem

UNIT – 2 Combinational Circuits: [8][10]

Half Adder, Full Adder, Decoder / Encoder, Multiplexer / De-multiplexer, Flip Flops - SR, D, JK, T Flip-Flop, Master – Slave, Level Triggered, Edge Triggered Shift Registers: Unidirectional , Bi-directional serial Shift Register Counters- Synchronous Counter, Asynchronous Counter

UNIT – 3 Memory Organization: [8][15]

Memory Hierarchy Primary Memory – DRAM, SRAM, DDR, RDRAM. ROM, PROM, EPROM, EPROM Concepts of Auxiliary, Associative, Cache and Virtual Memory Direct Memory Access: Block diagram, DMA Transfer modes, Concepts- cycle stealing, example of DMA Controller

UNIT – 4 CPU Organization: [8][10]

CPU Building Blocks CPU Registers and System Bus Characteristics. Addressing Modes Interrupts: Concepts and types, Instruction and Execution Interrupt cycle Hardwired and Micro Program control RISC and CISC Pipelining: Arithmetic Pipelining, RISC Pipelining

UNIT – 5 Processor Architecture: [10][15]

Components of Microprocessor, I/O Ports Microprocessor 8086: Block Diagram, Pin architecture Instruction set of Simple Instructions, Simple Assembly Language Programs of 8086 MP 16-Bit (80286) Architecture 32-Bit (80486) Architecture Super scalar Architecture in Pentium Processors 64-Bit (Pentium Dual-Core) Architecture

UNIT – 6 Multi-Processor Organization: [8][15]

Parallel Processing Concept and Block Diagram Types (SISD, SIMD, MIMD, MISD) Future Directions for Parallel Processors Introduction to Cluster and Cloud: Concepts only

REFERENCES:

1. Morris Mano , Computer System Architecture, 3rd Edition, Prentice Hall.

2. Barry B. Brey ,The Intel Microprocessors, (8th Edition)

3. Albert P. Malvino , Jerald A Brown ,Digital Computer Electronics , 3rd Edition, Career Education,ISBN-13: 978-0028005942

4. Pal Chaudhary ,Computer Organization & Design, 3rd Edition, PHI publisher

5. William Stallings ,Computer Organization and Architecture Designing for Performance, PHI, 2004

6.   John P.Hayes ,Computer Architecture and Organization, 3rd Edition, McGraw Hill International Editions,1998

7. Carl Hamacher ,Computer Organization, Fifth Edition,McGrawHill International Edition, 2002

8. Morris Mano .Digital Logic and Computer Design, Publisher: Prentice Hall

9. A.K.Ray, K.M. Bhurchandi ,Advanced Microprocessor and Peripherals, Tata McGraw Hill.

10. Yu-Cheng Liu & Glenn A Gibson,   Microcomputer systems 8086/8088 family, Architecture, Programming and Design, 2nd Edition- July 2003, Prentice Hall of India

CA-102 Database Management System (DBMS)

UNIT – 1 Introduction: **[06][10]**

Database –System Application, Purpose of Database Systems, View of data, Database Languages, Relational databases, Database design, Object-Based and Semi structured Databases, Data Storage and Querying, Transaction Management, Data mining and Analysis, Database architecture, Database Users.

UNIT – 2 Relational Model: **[5][10]**

Structure of relational databases, Fundamental of relational algebra operations, Additional relational algebra operations, extended relational algebra operations.

UNIT – 3 SQL: **[6][10]**

Background, Data definition, Basic structure of SQL queries, Set operators, Aggregate functions, Null values, Nested sub queries, Complex queries, Views, Modifications of the database, Joined Relations.

UNIT – 4 Advanced SQL: **[3][5]**

SQL Data Types and Schemas, Integrity Constraints, Authorizations, Functions and Procedural Constructs.

UNIT – 5 Database Design And The E-R Model: **[5][5]**

Overview of the Design Process, the Entity-Relationship Model, Constraints, Entity Relationship Diagrams, Entity Relationship design Issues, Weak entity Sets, Extended ER Features, Database Design for Banking Enterprise, Reduction to Relational Schemas.

UNIT – 6 Relational Database Design: **[6][5]**

Features of Good Relational Designs, Normal Forms, Decomposition Using Function al Dependencies, Functional Dependency Theory.

UNIT – 7 Transactions: **[7][10]**
 Transaction Concept, Transaction State, Implementation of Atomicity and Durability, Concurrent Executions, Serializability, Recoverability, Implementation of Isolation, Testing for Serializability.

UNIT - 8 Concurrency Control: **[5][10]**

Lock-Based Protocols, Timestamp Based Protocols Validation Based Protocols, Multiple Granularity, Deadlock handling, Insert and delete operation.

UNIT-9 Recovery System: **[5][5]**

Failure Classification, Storage Structure, Recovery and Atomicity, Log-based Recovery.

UNIT-10 Data Mining And Information Retrieval: **[2][5]**

Decision Support System, Data Analysis and OLAP, Data Warehousing, Data Mining,

REFERENCES:

1. Abraham Siberschatz, Henry Korth, S.Sudarshan, Database System Concepts (Fifth Edition),.Mc Graw-Hill International Edition, ISBN 007-124476-X

2. Elmasri, Navathe, Fundamentals of Database Systems (Third Edition). Pearson Education, 2004.

3. J. Ullman, Principles of Database Systems, Galgotia Publications, 2010.

4. S. K. Singh, Database Systems: Concepts, Design and Applications, Pearson Education, ISBN 978-81-317-6092-5 .

CA-103 Mathematical Foundations of Computer Science

UNIT - 1 Logic: [10][15]

Prepositional Equivalences, Truth tables, Predicates and Quantifiers, Nested Quantifiers, Rules of Inference, Introduction to Proofs, Proof Methods and Strategy.

UNIT - 2 Relations: [4][5]

Relations and Their Properties, n-ary Relations and Their Applications, Representing Relations, Closures of Relations, Equivalence Relations, Partial Orderings.

UNIT - 3 Functions: [4][5]

One-to One and Onto Functions, Inverse Functions and Compositions of Functions, Graphs of Functions, Some Important Functions.

UNIT - 4 Graphs: [12][20]

Introduction to Graphs and Graph Models, Terminology and Special Types of Graphs, Representations of Graphs, Isomorphism, Connectivity, Euler and Hamiltonian Paths - Shortest Path problems- Planar Graphs- Graph Coloring.

UNIT - 5 Trees: [12][20]

Introduction to Trees, Applications of Trees, Traversals, Spanning Trees, Minimum Spanning Trees.

UNIT - 6 Algebraic Structures: [8][10]

N-ary Operation, Binary Operation, Tables of Operations, Properties of Binary Operations, Semigroup, Subsemigroup, Free Semigroup, Congruence Relation, Group, Subgroup, Abelian Group, Group Codes.

REFERENCES :

1. Keneth. H. Rosen, Discrete mathematics and its applications, Tata McGraw-Hill Publishing Company, Sixth Ed., New Delhi.

2. Joe L. Mott, Abraham Kandel & T. P. Baker, Discrete Mathematics for Computer Scientists & Mathematicians, Prentice Hall of India Ltd, New Delhi.
3. Richard Johnsonbaug, Discrete mathematics, Pearson Education, New Delhi.

CA-104 C++ Programming

UNIT - 1. Introduction: **[5][5]**

Introduction to Object Oriented Paradigm, Need Object-Oriented Programming, Characteristics of Object-Oriented Programming. Difference of Structured Vs OOPs
Basics of C++: Input/ Output in C++, Data Types, Operators, Control & Conditional Statements, Type conversions.

UNIT - 2. Functions: **[4][5]**

Function and its components, Different types of parameter passing mechanisms, Overloaded Function, Inline Function.

UNIT - 3. Object and Classes: **[6][10]**

Making sense of core object concepts (Encapsulation Abstraction, Polymorphism, Classes, Messages,) Implementation of Class in C++, C++ Objects, and Constructors, The Default Copy Constructor, Object as Function Arguments, Returning Object from Function. Structures and Classes, Static Data members & functions, Structures & Unions. Difference between class, structures and unions.

UNIT - 4. Arrays and String: **[4][5]**

Arrays Fundamentals. Arrays as a Member Data. Arrays of Object, Strings, Array of String, The Standard C++ String Class.

UNIT - 5. Operator Overloading: **[5][5]**

Overloading Unary Operators., Overloading. Binary Operators. Data Conversion. Disadvantages & Advantages of Operators Overloading.

UNIT - 6. Inheritance: **[10][10]**

Concept of Inheritance, Derived Class and Base Class, Derived Class Constructors, Overriding Member Function, Class Hierarchies, Public and Private Inheritance, Levels of Inheritance, Multiple Inheritance, Ambiguity in Multiply Inheritance
 Aggregation: Classes within Classes, Inheritance and program Development.

UNIT - 7. Pointer: **[6][5]**

Addresses and pointers, The Address-Of Operator, Pointer and Arrays, Pointer and Function, Pointer and Strings, Memory Management: New and Delete, Pointers to Objects.

UNIT - 8. Virtual Functions: **[4][5]**

Difference between Static & Dynamic binding, Virtual Function, Friend Function & class, Static Function, Pure Virtual Functions, Abstract classes, and methods This Pointer.

UNIT - 9. Streams and Files: **[4][5]**

Streams Classes, Stream Errors. Disk File I/O with Streams, File Pointers, Error Handling in File I/O File I/O with Member Function, Overloading the Extraction and Insertion Operators Memory as a Stream Object, Command line Arguments

UNIT - 10. Templates and Exceptions: **[4][5]**

Function Templates, Class Templates.
Exceptions: difference between exception and error, basics of exception handling in C++

UNIT - 11. The Standard Template Library: **[2][5]**

Introduction to STL Algorithms: binary search, max, max_heap, dequeue.
Overview to STL Containers, Iterators, Specialized Iterators, Storing User- Defined Objects.

REFERENCES :

1. Venugopal , Mastering C++ , Tata Mc Graw Hill Publication

2. A. N. Kamthane,Object Oriented Programming with ANSI and Turbo C++, Pearson Education, 2009.

3. Robert Lafore ,Object Oriented Programming in-C++ , Techmedia Publication.

4.   Herbert Sehlidt , The Complete Reference C++ Tata Mcgraw-hill publication.

5. Saurav Sahay ,Object Oriented Programming in C++, Oxford University Press.

6. Cay Horstman ,OOPS C++ Big C++, Wiley Publication

CA-105 System Programming

UNIT - 1 Introduction to System Programming: [3][5]

Types of Softwares, Components of System Software, Comparison of System and Application Software

UNIT - 2 Assembly Language Programming: [6][15]

Introduction to Assembly Language Programming - Introduction to Instruction Formats, Data formats - Role of Base Register, Index Register

UNIT - 3 Assembler: [10][10]

Introduction to Assembler, Databases used in Assembler Design, Design of Assembler - Single Pass & Double Pass.

UNIT- 4 Macro Processor: [10][15]

Introduction to Macros, Various types of Macros, Design of Macro Processor - Single Pass & Double Pass.

UNIT - 5 Loaders: [6][10]

Introduction to Loaders, Functions of a Loader, Types of Loaders, Databases used in Loaders, Design of Loaders - Absolute & DLL.

UNIT - 6 Grammars: [2][5]

Introduction to grammars, Languages, Finite State Machines

UNIT -7 Compilers: [9][10]

Introduction to compilers: Brief discussion on various Phases of Compilers. Applications of FSM and Grammars in compiler design

UNIT - 8 Software Tools: [4][5]

Introduction to Software Tools, Text Editors, Interpreters, Program Generators, Debug Monitors.

REFERENCES:

1. Dhamdhere D.M., System Programming, (IInd Revised Edition), Tata McGraw Hill

2. Donovan, Systems Programming, Tata McGraw Hill

3. Leland. L. Beck, System Software, Pearson Education.

4. Adam Hoover, System Programming with C and Unix, Pearson Education, 2010

CA-Lab-I   Lab on C++ Programming

1. Write a program to demonstrate encapsulation using of class

2. Write a program to demonstrate use of constructor, constructor overloading and destructor.

3. Write a program to demonstrate use of array manipulations , using addition or multiplication of matrices

4. Write a program to demonstrate use of string manipulations. Demonstrate standard C++ String class.

5. Write a program to demonstrate use of function overloading using shapes Class

6. Write a program to demonstrate use of operator overloading using unary, binary Operator. For Ex… Addition of Complex Nos etc...

7. Write a program to demonstrate use of friend class.

8. Write a program to demonstrate use of friend function

9. Write a program to demonstrate use of recursive function

10. Write a program to demonstrate use of array of objects for Student's class

11. Write a program to demonstrate use of pointers

12. Write a program to demonstrate use of pointer arithmetic

13. Write a program to demonstrate use of all types of inheritance

14. Write a program to demonstrate use of function templates

15. Write a program to demonstrate use of class templates

16. Write a program to demonstrate use of formatted I/O operation

17. Write a program to demonstrate use of unformatted I/O operation

18. Write a program to demonstrate use of Exception handling.

CA-Lab-II Lab on DBMS

Course Description: This course explores database programming using both native and embedded ANSI-standard Structured Query Language (SQL). Topics include enterprise database management systems, database middleware, data definition language, data manipulation language, data control language, database queries reporting, query optimization, and database views. Student assignments include database creation, query design and programming, and database manipulation via embedded SQL calls from a programming language.

Representative List:
1. Creating database tables and using data types.
• Create table
• Modify table
• Drop table

2. Practical Based on Data Manipulation.
• Adding data with Insert
• Modify data with Update
• Deleting records with Delete

3. Practical Based on Implementing the Constraints.
• NULL and NOT NULL
• Primary Key Constraint
• Foreign Key Constraint
• Unique Constraint
• Check Constraint
• Default Constraint

4. Practical for Retrieving Data Using following clauses.
• Simple select clause
• Accessing specific data with Where
• Ordered By
• Distinct
• Group By

5. Practical Based on Aggregate Functions.
• AVG
• COUNT
• MAX
• MIN
• SUM
• CUBE

6. Practical Based on implementing all String functions.

7. Practical Based on implementing Date and Time Functions.

8. Practical Based on implementing use of UNION, INTERSECTION, SET DIFFERENCE.

9. Implement Nested Queries & all types of JOIN operation.

10. Practical Based on performing different operations on a view.

Semester- II

CA-201 Object Oriented Analysis and Design (OOAD)

UNIT - 1. Introduction: **[8][10]**

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

UNIT - 2. Methodology and UML: **[10][15]**

Introduction – Survey – Rumbugh, Booch, Jacobson methods – Patterns – Frameworks – Unified approach – Unified modeling language – Static and Dynamic models – UML diagrams – Class diagram – Usecase diagrams – Dynamic modeling – Model organization – Extensibility.

UNIT - 3. Object Oriented Analysis: **[12]20]**

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

UNIT - 4. Object Oriented Design: **[12][20]**

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

UNIT - 5. Software Quality: **[8][10]**

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

REFERENCES :

1. Ali Bahrami, Object Oriented System Development, McGraw Hill International Edition, 1999.

2. Booch, Jacobson, Rumbaugh, Object Oriented Analysis and Design with Applications, Third Ed., Pearson Education, 2010

CA-202 Data Structures and Algorithms

Unit – 1. Introduction to Data Structure: [8][10]

Concepts, Data types, ADT (Abstract Data Type), Types of data structure, **Algorithm Analysis:** Space complexity, Time complexity, Asymptotic Notations (Big O, Omega, Theta), **Linear data structure :** Array as linear data structure, Representation of array in memory, Strings as ADT, structure and pointer in C/C++.

Unit – 2. Linked List and Queues: [9][15]

Linked list: Introduction, Types – Singly, doubly, singly circular, doubly circular, Dynamic representation, Operations on linked list **Queues:** Introduction, Representation: static and dynamic, Operations on queue, Circular queue, priority queue.

Unit – 3. Stack: [4][10]

Introduction, Representation : static and dynamic, Operations on stack, Applications- Infix to Postfix, Evaluation of Postfix expression.

Unit – 4. Tree: [10][15]

Concept & terminologies, Binary tree - Representation: static and dynamic, Types: full, complete, skewed. Traversal: inorder, preorder, postorder. Binary Search Tree - Concept & Operations: create, insert, delete. Height balanced tree – AVL tree, Application - Heap Sort, Expression tree

Unit – 5. Graph: [8][10]

Concept & terminologies, Representation: Adjacency matrix, Adjacency list. Traversal: DFS, BFS, Spanning tree, minimum spanning tree, Prim's Algorithm.

.**Unit – 6. Hashing:**   [3][5]

Hash table concepts, Hash functions, Overflow handling techniques

Unit – 7. Sorting and Searching: [8][10]

Sorting: General Background, bubble sort, Selection sort, Insertion Sorts, Quick sort, Merge and Radix Sorts. **Searching:** Linear and Binary search.

REFERENCES:

1. Horowitz, Sahni, Mehta, Fundamentals of Data Structures in C++, Universities Press.

2. Tenenbaum, Langsam, Augenstein, Data Structures using 'C' , Pearson Education.

3. Bala Guruswamy, Data Structures Using 'C' TMH

4. Weiss, Data Structures Using 'C' Pearson Education.

CA-203 Operating Systems

UNIT – 1. Introduction to Operating System: [3][5]

What is an Operating System? What are the components of an OS? Functions of OS? Short History of OS, Different types of OS.

UNIT – 2. Computer System Structures: [7][10]

Computer System Operation, I/O Structure, Storage Structure, Storage Hierarchy, Hardware Protection, General System Architecture. Operating System Structures, System Components, Operating System Services, System Calls, System Programs, System Structure, Virtual Machines, System Design and Implementation.

UNIT – 3. Processes: [4][10]

Process Concept, Process Scheduling, Operations on Processes, Cooperating Processes, Inter-process Communication, Communication in Client-Server Systems.

UNIT – 4. Threads: [2][2]

Overview, Multithreading Models, Thread Libraries, Thread Pools.

UNIT – 5. CPU Scheduling: [4][10]

Basic Concepts, Scheduling Criteria, Scheduling Algorithms, Multiple-Processor Scheduling, Real-Time Scheduling, Algorithm Evaluation.

UNIT – 6. Process Synchronization: [5][5]

Background, The Critical-Section Problem, Synchronization Hardware, Semaphores, Classical Problems of Synchronization, Critical Regions, Monitors.

UNIT – 7. Deadlocks: [4][10]

System Model, Deadlock Characterization, Methods for Handling Deadlocks, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection, Recovery from Deadlock, Combined Approach to Deadlock Handling.

UNIT – 8. Memory Management: [8][10]

Background, Address Binding - Linking and Loading, Swapping, Contiguous Allocation Paging, Segmentation, Segmentation with Paging, Virtual Memory, Background, Demand Paging, Process Creation, Page Replacement, Allocation of Frames, Thrashing.

UNIT – 9. File System: [7][5]

File Concept, Access Methods, Directory Structure, File-System Mounting, File Sharing,Protection, Security Protection Mechanism, File System Structure,

File structure, Logical storage unit-Collection of related information, File system resides on secondary storage (disks), File system organized into layers, File control block – storage Structure consisting of information about a file.

UNIT – 10. Mass Storage: [3][5]

Overview of Mass Storage, Disk Mechanism, Disk Structure, Disk Scheduling.

UNIT – 11. Comparative Study of: [3][3]

Windows OS, Linux OS, Android OS

REFERENCES:

1. Nutt, Chaki, Neogy, Operating Systems, Pearson Education, Third Ed., 2009.

2. Peterson Silberschats, Operating System Concepts, Addition Wesley Publication.

3. Achut Godbole, Operating System, TMH.

4. Andrew s. Tenenbaum, A.S. Woodhill, Operating Systems Design & Implementation, Pearson Education.

5. B. Mohamed Ibrahim, Linux A Practical Approach, Firewall Media.

CA-204 Linux Operating System

UNIT – 1 History and Development of Linux: [5][5]

A Brief History of Linux, Benefits of Linux, Acquiring and Using Linux, Examining Linux Distributions, Logging In and Using the Linux System, Linux Commands, Logging in and Using Remote Linux Systems.

UNIT – 2 User Accounts: [3][5]

Creating Additional User Accounts, Creating & Managing Groups, Managing Users.

UNIT – 3 Introduction to the File system& Linux Permissions: [7][10]

File system Navigation, Managing the File system, Performing File system Maintenance and Locating Files. Understanding Permissions, Changing File and Directory Permissions, Changing Default Permissions and Ownership, Setting Daemon and Process Permissions, Evaluating System Security.

UNIT – 4 Advance File Subsystem: [7][5]

Internal representation of files: Inodes – Structure of a regular file (algorithm: bmap)– Directories – Conversion of a path name to an Inode (algorithm: namei) – Super block – Inode assignment to a new file (algorithm: ialloc) – Allocation of disk blocks.

UNIT – 5 Creating and Viewing Files & Archiving Files: [8][15]

Using the vi Editor, Using Other Editors, Examining File Contents, Redirection. Archiving Files with tar, Archiving Files with *cpio*, Archiving Files with Other Utilities, Zipping Files, Examining Backup Issues.

UNIT – 6 Working in X Windows: [8][10]

Introduction to X Windows and GNOME, Managing Files and File systems, Customizing X Windows, Configuring X Windows, Choosing and Changing Window Managers and Desktops, Remote X Window Access.

UNIT – 7 Printing Files: [3][10]

Configuring a Local Printer, Printing, Managing Print Spools and Queues, Configuring Remote Printers.

UNIT – 8 Package Management & Configuring the Linux Environment: [6][10]

Examining Package Solutions, Managing Packages with RPM, Verifying and Repairing Applications, Upgrading and Freshening Packages. Examining Shells, Using Variables, Examining Linux Configuration Script Files, Examining System Startup Files, Examining the /etc/fstab File, Examining the cron System, Creating a Shell Scripts.

UNIT – 9 Multitasking: [3][5]

Managing Jobs and Background Processes, Using the Process Table to Manage Processes, Introducing Delayed and Detached Jobs.

REFERENCES:

1. E. Nemeth, G. Snyder, T. Hein, Linux Administration Handbook, Pearson Education, 2009.

2. McCallister, Suse Linus-10, Pearson Education, 2006.

3. Ball, Using Linux, PHI, 1998.

4. Das, Unix: Concepts and Applications (4th Ed), TMH, 2006.

5. Foster Johnson, Welch, Anderson, Beginning Shell Scripting, Wiley India (Wrox), 2006.

6. Neil Mathew, Richard Stones, Beginning Linux Programming (3rd Ed), Wiley India (Wrox), 2006.

7. Peterson, Linux: Complete Reference (5th Ed), TMH.

8. Maurice J. Bach, The Design of the Unix Operating System, Pearson Education.

CA-205 Computer Networks

UNIT - 1   Introduction: [4][5]

Data communications, Networks, The Internet, Protocol & Standards

UNIT - 2   Network Models: [4][5]

Layered tasks, Internet model, OSI model

UNIT - 3   Physical Layer: [10][20]

Signals: Analog and digital signals, data rate limits, Transmission impairment, Signal measurements like throughput, propagation speed and time, wave length .**Digital Transmission**: Line coding, block coding, sampling, transmission mode. **Analog Transmission**: Modulation digital data, telephone modem, Modulation analog signals. Multiplexing: FDM, WDM, TDM. Transmission Media: Guided media, unguided media.

UNIT - 4   Data Link Layer: [10][25]

Error detection and Correction: Type of errors, detection and correction of errors. Data Link Control & Protocol: Flow & error control, Stop-And-Wait ARQ, Go-Back-N ARQ, Select Repeat ARQ, and HDLC. Point-To-Point Access: Point-to-point protocol, PPP stacks. Local Area Network: Traditional Ethernet, fast and gigabit Ethernets. Connecting LANs, Backbone Networks and Virtual LANs: Connecting devices, Backbone networks, Virtual LANs.

UNIT - 5   Network Layer: 10][10]

Internetworks, Addressing, Routing. Network Layer Protocols: ARP, IP, ICMP, IPV6. Unicast routing, Unicast routing protocols, Multi routing, Multicast routing protocols.

UNIT - 6   Transport Layer: [6][5]

Process-To-Process delivery, user data gram, Transmission control protocol.

UNIT - 7   Application Layer: [6][5]

Client-Server Model: Client-Server model, Socket interface. A brief introduction to DNS, SMTP, FTP.

REFERENCES :

1. Behrouz A. Forouzan ,Data Communications and Networking, 3rd Edition, Tata McGraw-Hill Publishing Co.

2. A. S. Tanenbaum, Computer Networks, Pearson Education.

3. William A Shay, Understanding Data Communications and Networks, 2nd Edition, Vikas Publishing House.

CA-Lab-III Lab on Data Structures

1..Implementation of Stacks, Queues (Static and dynamic), types of queue.

2.Applications of Stack : Infix to Postfix Conversion, evaluation of postfix expression.

3.Polynomial arithmetic using linked list.

4.Implementation of Linear and Binary Search .

5.Implementation of bubble sort, Selection sort, Insertion Sorts, Quick sort, Merge Radix Sorts, and Heap sort.

6.Implementation of Binary Tree and Traversals on Binary Trees.

7.Implementation of Binary search Tree.

8.Implementation of operations on AVL Trees.

9.Implementation of graph Traversal and Prim's algorithm.

CA – Lab IV Lab on Linux Operating System

1. **Instructor should ask students to give live demonstrations on:**

2. **System Access**: Logging In, Linux Commands, Getting Help, Obtaining Information about Your System, Logging In and Using Remote Linux Systems.

3. **Starting and Stopping Linux**: Shutting Down a Linux System, Booting a Linux System, Other Boot Methods.

4. **User Accounts**: Creating Additional User Accounts, Groups, Managing Users and Groups.

5. **File system**: File system Navigation, Managing the File system, Performing File system Maintenance, Locating Files.

6. **Working with Linux Permissions**: Understanding Permissions, Changing File and Directory Permissions, Changing Default Permissions and Ownership, Setting Daemon and Process Permissions, Evaluating System Security.

7. **Creating and Viewing Files**: Using the *vi* Editor, Using Other Editors, Examining File Contents Redirection.

8. **Archiving Files**: Archiving Files with tar, Archiving Files with cpio, Archiving Files with Other Utilities, Zipping Files, Examining Backup Issues.

9. **Shell Scripts:** Creating a Shell Scripts (Create at least ten shell scripts).

10. **Working in X Windows**: Managing Files and File systems, Customizing X Windows, Configuring X Windows, Choosing and Changing Window Managers and Desktops, Remote X Window Access.

11. **Printing Files**: Configuring a Local Printer, Printing, Managing Print Spools and Queues Configuring Remote Printers.

12. **Configuring the Linux Environment**: Examining Shells, Using Variables, Examining Linux Configuration Script Files, Examining System Startup Files, Examining the /etc/fstab File, Examining the cron System,

13. **Multitasking**: Managing Jobs and Background Processes, Using the Process Table to Manage Processes, Delayed and Detached Jobs.

Semester- III

CA-301 Accounting and Management Control

UNIT - 1 Accounting: [14] [20]

Principles, concepts and conventions, double entry systems of accounting, introduction to basic books of accounts of sole proprietary concern, closing of books of accounts and preparation of trial balance. Final accounts, training, Profit and Loss accounts and balance sheet of sole proprietary concern (without adjustment).

UNIT - 2 Financial management: [12][20]

Meaning, scope and role, a brief study of functional areas of financial management. Introduction to various FM tools: ratio analysis, fund flow statement, cash flow statement.

UNIT - 3 Costing: [12][20]

Importance and basic principles, a brief introduction to methods of costing and elements of cost. Marginal costing, nature, scope and importance, Break-even analysis, its use and limitations, construction of break even chart. Standard costing, nature and scope, computation and analysis of variances with reference to material cost, labour cost and overhead cost, interpretation of the variances.

UNIT - 4 Introduction to Management Control System: [12][15]

Goals, strategies, key variables, performance measures, responsibility centers and transfer price, investment center, reporting systems, management by objectives, budgeting and control, strategic and long range planning.

REFERENCES :

1. Chandwick, The Essence of Financial Accounting, Prentice Hall of India Pvt. Ltd, New Delhi.

2. Bhattacharya S.K. and Dearden John, Accounting for Management , Prentice Hall of India Pvt. Ltd, New Delhi.

3. Welch, Hilton and Gordon, Budgeting Profit Planning Control, Prentice Hall of India Pvt. Ltd, New Delhi.

4. Homgren, Sundem and Selto, Introduction to Management Accounting, Prentice Hall of India Pvt. Ltd, New Delhi.

CA-302 Design and Analysis of Algorithms

UNIT – 1 Introduction: **[8][10]**

Problem, Instance, Asymptotic complexity, Some Stylistic Issues, Analysis of Algorithms, Principles of Algorithm Design, Recurrence, Rules of Removal of Recursion, Binary trees, Heap Tree and Heap sort, Sets and Disjoint Set Union, Graphs.

UNIT – 2 Divide and conquer: **[6][10]**

Introduction, Binary Search, MaxMin, MergeSort, QuickSort, Median Finding, Strassen's Matrix multiplication.

UNIT – 3 Greedy Algorithms: **[6][10]**

Introduction, Fractional Knapsack, Huffman Coding, Minimum spanning trees: Prims and Kruskal, Dijakstra's Algorithm for Single Source Shortest Path.

UNIT – 4 Dynamic Programming: **[10][15]**

Introduction, DP1: Knapsack (0/1)DP 2: Longest common subsequence DP 3: Matrix chain multiplication DP 4: Job scheduling problem DP 5: Topological sort DP 6: All Pair Shortest Path

UNIT – 5 Basic Search and Traversal Techniques: **[6][10]**

Introduction, Binary Tree Traversal, Search and Traversal Techniques for Graphs, Code Optimization.

UNIT – 6 Backtracking: **[6][10]**

Introduction, N-queen problem: 4 queen, 8 queen, Graph coloring problem, Branch and bound technique, LC-search

UNIT – 7 NP-Completeness: **[8][10]**

Non deterministic algorithms: searching, sorting, Introduction to NP-Complete, Search/Decision, SAT, Independent Set, 3VC, Subset Sum & Partition, Hamiltonian Circuit.

REFERENCES:

1. Horowitz and Sahni, Fundamentals of Computer Algorithms, Galgothia publications.

2. Cormen, Leiserson and Rivest, Introduction to Algorithms, Prentice Hall of India.

3. Anany Levitin Introduction to the design and analysis of Algorithms, Pearson Education.

4. P. Dave, H. Dave, Design and Analysis of Algorithms, Pearson Education, 2008.

5. Sanjay Dasgupta, Christos Papadimitriou and Umesh Vazirani, Algorithms, Tata McGraw-Hill Edition.

6. Aho, Hopcroft and Ullman, The Design and Analysis of Algorithms, Addision-Wesley Publication, 2000

7. Simon Harison, James ross, Algorithms, Wiley India, 2006.

CA-303 Automata Theory and Computability

Unit - 1 Finite Automata: **[12][15]**

Sets, relations, functions, graphs, trees, mathematical induction, Finite Automata(FA), definition, description, transition systems, acceptability of a string, NFA, DFA, equivalence of DFA and NFA, Melay Moore model, minimization of automaton, Applications.

Unit – 2 Formal Languages: **[4][10]**

Formal languages, Chomsky classification of languages, languages, their relation and automaton.

Unit - 3 Regular Expressions: **[14][15]**

Regular expressions, FA and regular expressions, pumping lemma for regular sets, applications of pumping lemma, closure properties of regular sets, regular sets and regular grammars.

Unit - 4 Context Free Languages: **[10][15]**

CFLs and derivation trees, ambiguity in Context-Free Grammars (CFGs), simplification of CFGs, Normal Forms for CFGs(CNF and GNF), pumping lemma for CFLs, decision algorithms for CFLs.

Unit - 5 Push Down Automata: **[6][10]**

Pushdown Automaton (PDA), informal description, basic definitions, acceptance by a PDA, PDA and CFLs.

Unit - 6 Turing Machine: **[6][10]**

Turing Machine, Model, computable languages and function, representation of TMs, Language Acceptability by TMs, Design of TM, Halting Problem of TMs.

REFERENCES:

1. Smita Rajpal, Theory of Automata and Formal Languages, GALGOTIA Publications.

2. J.E.Hopcraft, R. Motwani and J.D.Ullman, Introduction to Automata Theory languages & Computation, Pearson Education Asia.

3. K.L.P.Mishra, N. Chandrashekharan, Theory of Computer Science, PHI.

4. Martin John C., Introduction to Language & Theory of computation(TMH).

CA-304 Artificial Intelligence

UNIT - 1. Introduction: **[4][5]**

What is Artificial Intelligence?, The AI Problems,The Underlying Assumption, What is an AI Technique, The Level of the Model, Criteria for Success, Some General References, One Final Word.

UNIT - 2. Problems, Problem Spaces, and Search: **[4][5]**

Defining the Problem as a State Space Search, Production systems, Problem Characteristics, Production System Characteristics, Issues in the Design of Search Programs, Additional Problems.

UNIT - 3. Heuristic Search Techniques: **[4][5]**

Generate-and- Test, Hill Climbing, Best-First Search, Problem Reduction, Constraint Satisfaction, Means-Ends Analysis.

UNIT - 4. Knowledge Representation: **[4][10]**

Knowledge Representation Issues, Representations and Mappings, Approaches to knowledge Representation, Issues in Knowledge Representation, The Frame Problem.

UNIT - 5. Using Predicate Logic: **[6][5]**

Representing Instance and Isa Relationships, Computable Functions and Predicates, Resolution, Natural Deduction.

UNIT - 6. Representing Knowledge Using Rules: **[4][10]**

Procedural Versus Declarative knowledge, Logic Programming, Forward versus Back ward Reasoning, Matching, Control Knowledge.

UNIT - 7. Symbolic Reasoning under Uncertainty: **[4][10]**

Introduction to Nonmonotonic Reasoning, Logics for Nonmonotonic Reasoning, Implementation Issues, Augmenting a Problem solver, Implementation:Depth-First Search, Implementation: Breadth_First Search.

UNIT - 8. Statstical Reasoning: **[10][10]**

Probability and Baye‟s Theorem, CertaintyFactors and Rule-Based Systems, Bayesian Networks, Dempster-Shafer Theory, Fuzzy Logic.

UNIT - 9. Weak Slot-and-Filler Structures: **[4][5]**

Semantic Nets, Frames.

UNIT - 10. Strong Slot-and Filler Structures: **[4][5]**

Conceptual Dependency, Scripts, CYC.

UNIT - 11. Knowledge Representation Summary: **[2][5]**

Syntactic-Semantic Spectrum of Representation, Logic and Slot-and-Filler Structures, Other Representational Techniques, Summary of the Role of Knowledge.

REFERENCES :

1. Elaine Rich, Kevin Knight, Artificial Intelligence, Tata McGrawHill.

2. Stuart Russel, Peter Norwig, Artificial Intelligence – A Modern Approach , Pearosn Education.

CA-305 Java Programming

UNIT -1. An Introduction to Java: [4][5]

Java As a Programming Platform, The Java "White Paper" Buzzwords, Java Applets and the Internet, A Simple Java Program, Comments, Data Types, Variables, Operators, Strings, Input and Output Control Flow

UNIT -2. Objects and Classes: [6][5]

Introduction to Object-Oriented Programming, Using Predefined Classes, Defining Your Own Classes, Static Fields and Methods, Method Parameters, Object Construction, Packages

UNIT -3. Inheritance, Interfaces and Inner Classes: [8][10]

Classes, Super classes, and Subclasses, Object: The Cosmic Super class, Generic Array Lists, Object Wrappers and Auto boxing, Methods with a Variable Number of Parameters, Enumeration Classes, Reflection, Interfaces, Object Cloning, Inner Classes.

UNIT -4. Graphics Programming: [8][5]

Introducing Swing, Creating a Frame, Positioning a Frame, Displaying Information in a Component, Working with 2D Shapes, Color, Special Fonts for Text, Displaying Images

UNIT -5. Event Handling and User Interface Components with Swing: [10][15]

Basics of Event Handling, Actions, Mouse Events, the AWT Event Hierarchy, Swing and the Model-View-Controller Design Pattern, Introduction to Layout Management, Text Input Choice Components, Menus, Sophisticated Layout Management, Dialog Boxes.

UNIT -6. Deploying Applications and Applets: [4][5]

JAR Files, Java Web Start, Applets, Storage of Application Preferences

UNIT -7. Exceptions, Logging and Assertions: [4][5]

Dealing with Errors, Catching Exceptions, Tips for Using Exceptions,

UNIT -8. Multithreading: [4][5]

What Are Threads?, Interrupting Threads, Thread States, Thread Properties, Synchronization, Blocking Queues, Thread-Safe Collections, Executors, Synchronizers, Threads and Swing

UNIT -9. Streams, Files: [4][5]

Streams, Text Input and Output, Reading and Writing Binary Data, ZIP Archives, Object Streams and Serialization, File Management, New I/O Regular Expressions

UNIT -10. JDBC: [4][10]

 The Design of JDBC, JDBC Configuration, Executing SQL Statements , Query Execution
Scrollable and Updatable Result Sets, Row Sets, Metadata, Transactions.

UNIT -11. Sockets & Networking in Java :   [4][5]

 Client server architecture, Java API for creating sockets, developing a simple client sever
interface using sockets in java

REFERENCES:

1. Horstman Cay, Cornell Gary, Core JavaTM2, Vol.1&2, Seventh Edition, Pearson
education.

2. Herbert Schildt, The Complete Reference, Seventh Edition, Tata McGraw-Hill.

3. Steven Holzner, JAVA 2 Programming Black Book, Wiley India.

CA-Lab-V Lab on Design and Analysis of Algorithm

1. Write a program to implement removal of recursion for

   - Finding maximum from array

   - Binomial coefficient B(n,m)= B(n-1, m-1)+B(n-1,m), B(n,n)=B(n,0)=1

   - Searching element from array

2. Write a program for creating max. /min. heap using

   - INSERT

   - ADJUST/HEAPIFY

3. Write a program to implement weighted union and collapsing find operations.

4. Write a program for searching element form given array using binary search for

   n=1000,2000,3000 find exact time of execution.

5. Write a program to find minimum and maximum form a given array (use D and C).

6. Write a program for sorting given array in ascending/descending order with

   n=1000,2000,3000 find exact time of execution using

   - Heap sort

   - Merge sort

   - Quick sort

7. Write a program for matrix multiplication using Strassen"s matrix multiplication.

8. Write a program to find solution of Fractional Knapsack instant.

9. Write a program to find minimum spanning tree using Prim's.

10. Write a program to find minimum spanning tree using Kruskal's algorithm.

11. Write a program to find single source shortest path using Dijkstra's Algorithm.

12. Write a program to find solution of Knapsack instant (0/1).

13. Write a program to find solution of LCS.

14. Write a program to find solution of Matrix Chain Multiplication.

15. Write a program to implement topological sort.

16. Write a program to find shortest path using all pair path.

17. Write a program to implement CODE1.

18. Write a program to implement CODE2.

19. Write a program to find all solutions for N-queen problem using backtracking.

20. Write a program to find only in-equivalent solutions for N-queen problem using backtracking.

21. Write a program for graph coloring using backtracking.

CA-Lab-VI Lab on JAVA Programming

1. Write a program that demonstrates program structure of java.
2. Write a program that demonstrates string operations.
3. Write a program that demonstrate package creation and use in program.
4. Write a program that demonstrates inner class.
5. Write a program that demonstrates inheritance.
6. Write a program that demonstrates 2D shapes on frames.
7. Write a program that demonstrates text and fonts.
8. Write a program that demonstrates event handling for various types of events.
9. Write a program to illustrate multicasting.
10. Write a program to illustrate use of various swing components.
11. Write a program that demonstrates use of dialog box.
12. Write a program to create own dialog box.
13. Write a program to create toolbar, menu & popup menu.
14. Write a program to implement file handlings.
15. Write a program that demonstrates Applet programming.
16. Write a program to implement generic programming.
17. Write a program that demonstrates JDBC on applet/application.
18. Write a program that demonstrates multithreading.

Semester- IV

CA- 401 Software Engineering Methodologies

UNIT – 1 System concepts and Information system environment: [10][10]

The system concept, characteristics of system, elements of system, The System Development Life Cycle, The Role of System Analyst. Introduction system planning & initial investigation, various information gathering tools, feasibility study, What is software engineering ,Terminologies in software engineering, Role of management in software development, Requirement specification, Software crisis & software scope.

UNIT – 2 Software Process, Product and Project: [08][10]

The Product: Software, Software Myths, The process: Software Engineering: A Layered Technology, Software Process Models, The Linear Sequential Model, The Prototyping Model, The RAD Model, Evolutionary Software Process Models, WebE Process, Component – Based Development, Fourth Generation Techniques.

UNIT- 3 Software Project Management, Planning and Design: [12][20]

Software Project Management: Cost estimation, Project scheduling, Staffing.
Software Project Planning: Project planning objectives, Decomposition Techniques, Empirical estimation models, The Make/Buy Decision., Risk analysis.
Software Design: Design Principles, Cohesion & Coupling, Design notation and specification, structure design methodology. Data Flow Diagrams (DFDs)

UNIT- 4 Software Quality Assurance and Testing: [15][25]
Software Quality Assurance: Quality Concepts, Software Quality Assurance, Software Reviews, Formal Technical Reviews, Formal Approaches to SQA, Statistical Software Quality Assurance, Software Reliability, Mistake Proofing for Software, Introduction to ISO standard.
Software Testing Fundamentals, Software testing strategies: Black Box Testing, White Box Testing, System Testing, Object Orientation Testing, State based Testing, Testing Tools, Test Case Management, Software Maintenance Organization, Maintenance Report, Types of Maintenance

UNIT- 5 Software Configuration Management (SCM) & Web Engineering: [05][10]

Need for SCM, Version Control, SCM process, Software Configuration Items, Taxonomy, Web Engineering: The attribute of Web based application, Framework for WebE Design and Testing for Web based application.

REFERENCES:

1. R. S. Pressman, Software Engineering – A practitioner's approach, 6th ed., McGraw Hill Int. Ed. 2002.

2. Ali Behforroz, Frederick J. Hudson, Software Engineering Fundamentals, Oxford Indian Reprint, 2012.

3. Richard Fairley, Software Engineering Concepts, Tata McGraw Hill Edition, 2008.

4. Rajib Mall, Fundamentals of Software Engineering, PHI Learning Pvt. Ltd. 2009

CA-402 Internet Computing - I

UNIT – 1 Introduction to the Web: [12][15]

WWW, Web Browser, Web Server, Web Development Cycle, Web publishing, Static Web contents, Dynamic Web contents,

UNIT – 2 Web UI Design: [12][15]

HTML & CSS–Introduction to Html, html controls, Formatting tags , Commenting Code, Anchors, Backgrounds, Images, Lists ,Tables, Frames , HTML Forms. The need for CSS, Introduction to CSS, Basic syntax and structure ,Inline Styles , Embedding Style Sheets , Linking External Style Sheets, Backgrounds, Manipulating text, Margins and Padding , Positioning using CSS.

UNIT – 3 Introduction to Scripting: [12][20]

Javascript-Concept of script, Types of Scripts, Introduction to javascript,Variables, identifiers constants in javascript and examples of each.Operators in javascripts, various types of javascript operators, Control and looping structure, Concept of array, how to use it in javascript , types of an array, examples and Methods of an array. Event handling, Math and date object, String object, Form validators.

UNIT – 4 Introduction to Advance Scripting: [14][25]

JQuery & AJAX-Introduction to jQuery, Syntax Overview, Anatomy of a jQuery Script, Creating first jQuery script Selecting Elements with jQuery, Refining & Filtering Selections, Selecting Form Elements Working with Selections - Chaining, Getters & Setters , CSS, Styling, & Dimensions Manipulating Elements - Getting and Setting Information about Elements, Moving, Copying, and Removing Elements, Creating New Elements , Manipulating Attributes, Utility Methods   Events - Connecting Event to Elements, Namespacing Events, Event handling, Triggering Event handlers, Event Delegation AJAX Overview, jQuery's AJAX related methods, Ajax and Forms, Ajax Events

REFERENCES:

  1. Thomas A. Powell, Complete reference HTML, 4th Edi., TMH.

  2. Danny Good Man, JavaScript Bible, Wiley publications.

  3. Jonathan Chaffer, Karl Swedberg, Learning jQuery,3rd Edi Packed publications

  4. Professional Ajax, 2nd Edition, Wrox Press

. 5. David Hunter, Beginning XML, 4th Edition, Wrox Publication

  6. Robert W. Sebesta, Programming the World Wide Web, 4th Edi., Pearson.

  7. Ivan Bayross , Web Enabled Commercial Application Development using HTML, DHTML, JavaScript, PERL-CGI, 3rd Edi., BPB Publications.

CA-403 Network Programming

UNIT – 1 Internet Basics: [6][10]

What Is Internet, What Special About Internet? Dial Up Connection/Direct Connection; Slip Or PPPWWW: The Client Site, Server Site, Web Pages In HTML, CGI Programming Overview, Environment Variables, Difference Between HTML And DHTML, ECOM And Portals.

UNIT – 2 Internet Internals: [6][10]

Transmission Control Protocol/Internet Protocol (TCP/IP), FTP, HTTP, WAIS (Wide Area Information Service) TELNET, Domain Name System: Name for Machine, Flat Name Space, Hierarchical Names Internet Domain Names, Domain Name Resolution.

UNIT – 3 Network Addressing: [7][10]

IP address, Physical address, Port address, Concepts & examples. IP Address, Electronic Mail Address, URL, E-Mail Basic, SMTP IPv4 , IPv6 addressing Concepts & examples, Differences ARP, RARP, BOOTP, DHCP

UNIT – 4 Client Server Software Issues: [8][15]

The Client Server Model and Software design, Socket Interface, Concurrent Processing in Client-Server Software , Program Interface to Protocol, Algorithms and Issues in Client Software design, example Client Software,

UNIT – 5 Server Programming: [8][10]

Algorithms & Issues in Server Software Design, Iterative Connectionless Server, Iterative Connection Oriented Server, Single Process Concurrent Server , Concurrent Connection Oriented Server, Multiprotocol Server , Multi-Service Server, Super Server, Chat Server.

UNIT – 6 Remote Procedure Call: [8][10]

External Data Representation, Remote Procedure Call concept, RPCgen concept, Network File System (NFS).

UNIT – 7 Basics of Socket Programming in JAVA: [7][10]

Creating Socket, Sending & Receiving Data through a Socket, using Socket for Client Server , TCP Server, UDP Server.

REFERENCES

1. Douglas E. Corner, David Stevens ,Intranetworking with TCP/IP volume III Client Server Programming and Applications, ISBN-81-7808-488-0 PHI.

2. Douglas E. Corner, David Stevens ,Internetworking with TCP/IP volume I, Principles protocols & Architecture, (3rd edition), ISBN - 81-203-1053-5, PHI.

3. Internetworking with TCP/IP volume II Design Implementation, and internals, (3rd edition), Douglas E. Corner, David StevensISBN -81-203-0927-8, PHI.

4. Scringer LaSalle, Parihar Gupta TCP/IP Bible. (1st edition), Hungry Minds IDG Looks India (P) Ltd

5. TCP/IP Tutorial and Technical Overview, Lydia Parziale,David T. Britt, Chuck Davis, IBM Redbooks, 8th edition December 2006.

6. TCP/IP Sockets in Java: Practical Guide for Programmers, Kenneth L. Calvert and Michael J. Donahoo The Morgan Kaufmann Practical Guides Series

CA-404 Computer Graphics

UNIT – 1 Introduction to Computer Graphics: [4][5]

Overview of Computer Graphics, Computer Graphics Application and Software, Description of some graphics devices, Input Devices for Operator Interaction, Active and Passive Graphics Devices, Display Technologies, Storage Tube Graphics Displays, Calligraphic Refresh Graphics Displays, Raster Refresh (Raster-Scan) Graphics Displays, Cathode Ray Tube Basics, Color CRT Raster Scan Basics, Video Basics, The Video Controller, Random-Scan Display Processor, LCD displays.

UNIT – 2 Scan Conversion: [12][20]

Scan Converting Lines, Mid-point criteria, Problems of Aliasing, end-point ordering and clipping lines, Scan Converting Circles, Scan Converting Ellipses, Filling Polygons, edge data structure, Clipping Lines algorithms– Cyrus-Beck, Cohen-Sutherland and Liang-Barsky, Clipping Polygons, problem with multiple components.

UNIT – 3 Two-Dimensional Transformations: [6][10]

Transformations and Matrices, Transformation Conventions, 2D Transformations, Homogeneous Coordinates and Matrix Representation of 2D Transformations, Translations and Homogeneous Coordinates, Rotation, Reflection, Scaling, Combined Transformation, Transformation of Points, Transformation of The Unit Square, Rotation About an Arbitrary Point, Reflection through an Arbitrary Line, A Geometric Interpretation of Homogeneous Coordinates, The Window-to-Viewport Transformations.

UNIT – 4 Three-Dimensional Transformations: [6][10]

Introduction, Three-Dimensional Scaling, Three-Dimensional Shearing, Three-Dimensional Rotation, Three-Dimensional Reflection, Three-Dimensional Translation, Multiple Transformation, Rotation about an Arbitrary Axis in Space, Reflection through an Arbitrary Plane, Matrix Representation of 3D Transformations, Composition of 3D Transformations, Affine and Perspective Geometry, Perspective Transformations, Techniques for Generating Perspective Views, Vanishing Points, the Perspective Geometry and camera models, Orthographic Projections, Axonometric Projections, Oblique Projections, View volumes for projections.

UNIT – 5 Viewing in 3D: [4][5]

Stages in 3D viewing, Canonical View Volume (CVV), Specifying an Arbitrary 3D View, Examples of 3D Viewing, The Mathematics of Planar Geometric Projections, Combined transformation matrices for projections and viewing, Coordinate Systems and matrices, camera model and viewing pyramid.

UNIT – 6 Visible-Surface Determination: [6][5]

Techniques for efficient Visible-Surface Algorithms, Categories of algorithms, Back face removal, The z-Buffer Algorithm, Scan-line method, Painter"s algorithms (depth sorting),

Area sub-division method, BSP trees, Visible-Surface Ray Tracing, comparison of the methods.

UNIT – 7 Illumination and Shading: [6][10]

Illumination and Shading Models for Polygons, Reflectance properties of surfaces, Ambient, Specular and Diffuse reflections, Atmospheric attenutation, Phong"s model, Gouraud shading, some examples.

UNIT – 8 Plane Curves and Surfaces: [6][10]

Curve Representation, Nonparametric Curves, Parametric Curves, Parametric Representation of a Circle, Parametric Representation of an Ellipse, Parametric Representation of a Parabola, Parametric Representation of a Hyperbola, A Procedure for using Conic Sections, The General Conic Equation; Representation of Space Curves, Cubic Splines, , Bezier Curves, B-spline Curves, B-spline Curve Fit, B-spline Curve Subdivision, Parametric Cubic Curves, Quadric Surfaces. Bezier Surfaces.

REFERENCES:

1. J. D. Foley, A. Van Dam, S. K. Feiner and J. F. Hughes, Computer Graphics - Principles and Practice, Second Edition in C, Pearson Education.

2. D. Hearn and M. Pauline Baker, Computer Graphics (C Version), Pearson Education, 2nd Edition.

3. D. F. Rogers and J. A. Adams, Mathematical Elements for Computer Graphics, 2nd Edition, McGraw-Hill International Edition.

CA-405 Optimization Algorithms

UNIT - 1   Overview of operations Research: [2][5]

OR models – OR Techniques

UNIT - 2   Linear Programming: [10][20]

Introduction – Graphical solution; Graphical sensitivity analysis– The standard form of linear programming problems – Basic feasible solutions -unrestricted variables – simplex algorithm – artificial variables – Big M and two phase method – Degeneracy - alternative optima – unbounded solutions – infeasible solutions.

UNIT - 3   Dual problems: [8][10]

Relation between primal and dual problems – Dual simplex method

UNIT - 4   Transportation model: [10][15]

Starting solutions. North West corner Rule - lowest cost method–Vogels approximation method Optimal solutions techniques : MODI, Stepping stone method –Assignment problem

UNIT - 5   Network Models :   [7] [10]

Definitions – CPM and PERT – Their Algorithms, Critical path computation: Construction of time schedule, crashing of project duration.

UNIT - 6   Game theory: [7][10]

Two person Zero Sum Games – Mixed strategy games and their algorithms.

UNIT - 7   Queuing Theory: [6] [5]

Elements of Queuing Model, Classification of Queues and their problems, Queue Models – MM1:(∞/FIFO), MM1:(N/FIFO)

REFERENCES :

1. L.C. Jhamb, Quantitative Techniques, Everest Publishing house.

2. Handy A Taha, Operations Research – An Introduction, Pearson Education.

3. Panneer Selvan, Operations Research, Prentice Hall of India.

CA-Lab-VII Lab on Computer Graphics & Internet Computing - I

Computer Graphics:

Implement following algorithms (Representative List):

1. Line drawing algorithm

      1.1   DDA Line algorithm

      1.2   Bresenham's Line algorithm

2. Circle drawing algorithm

      2.1   DDA Circle algorithm

      2.2   Bresenham's Circle algorithm

      2.3   Mid Point Circle algorithm

3. Ellipse drawing algorithm

4. Polygon filling algorithm

      4.1   Seed Fill algorithms

      4.2   Scan Line Fill algorithm

5. Windowing and clipping algorithm

      5.1   Point clipping algorithm

      5.2   Line clipping algorithms

      5.3   Polygon clipping algorithm

      5.4   Window to Viewport Transformation.

6. Composite 2-D transformation

      6.1   2-D Translation

      6.2   2-D Rotation

      6.3   2-D Scaling

      6.4   2-D Reflection

      6.5   2-D Shearing

7. 3-D geometric transformation

      7.1   3-D Translation

      7.2   3-D Rotation

      7.3   3-D Scaling

      7.4   3-D Reflection

8. 3-D Curve and surface representation i.e. B-spline curves and Surfaces, polynomial curves and surfaces, Bezier curves and Surfaces.

      8.1   Bezier curve using periodic cubic polynomial function

      8.2   Bezier curve using Midpoint / Sub division method.

      8.3   Curve using B-Spline basis function (use open uniform knot vector)

9. Determination of visible surfaces and lines. (Any one algorithm)

Internet Computing - I

1. Create a simple web page using various HTML tags

2. Create a web Application which demonstrate various HTML controls

3. Create a web Application with

    a. Inline Cascading style sheets.

    b. Internal Cascading style sheets.

    c. External Cascading style sheets.

4. Write Client Side Scripts for demonstrating Looping and Control Structure

5. Write Client Side Scripts for Validating Web Form Controls using JavaScript.

6. Write a JavaScript program to show use of Popup Boxes (Alert, Confirm, and Prompt).

7. Demonstrate Event Handling using Jquery.

8. Write a Script to demonstrate Ajax Object.

9. Write an Ajax program to implement AutoComplete functionality for Textbox.

CA-Lab-VIII Lab on Linux Socket Programming

Note-
  i.   All assignments are to be implemented using C language in Linux.
  ii.   Install Ubantu /Fedora/ Red hat Linux
  iii.   Encourage students to demonstrate the experiments using networking between two separate machines for Client-Server programs.
  iv.   Encourage students to do at least one simple assignment using JAVA on Linux.

1. Implement TCP and UDP Client-Server programs for following services:

  a. Echo Service
  b. Day Time Service
  c. Chargen Service
  d. Mathematical Operation on numbers
  e. Checking number for prime, palindrome etc.
  f. Calculating factorial
  g. Calculating Fibonacci series
  h. Case conversion in given string

2. Implement Client-Server programs for demonstrating working of Concurrent Connection Oriented Servers using single process.

3. Implement Client-Server programs for demonstrating working of Concurrent Connection Oriented Servers using multiple processes.

4. Implement Telnet Server program for providing different types of Telnet Services.

5. Demonstrate and implement the file transfer using FTP.

6. Demonstrate and implement Multiprotocol server.

7. Demonstrate and implement multiservice server.

8. Develop the Chat server program. The Server should be concurrent such as to provide intercommunication between multiple clients with following feature

  i) Minimum 2 clients communicate with each other through chat server

  ii) Each client makes registration, sending its name to server

  iii)Client sends "Who" message to server to receive list of Active Clients.

  iv)Sends "Hello to Client_Name", from the active client list to initiate the chatting.

  v) Both clients communicate with each other.

  vi) Terminates chat with "good bye" message.

Semester- V

CA-501 Compiler Construction

UNIT – 1 Introduction to Compilation: [5][10]

Compiler Basics, Issues in Compilation, Phases of Compilation: the Analysis – Synthesis Model, Compiler Construction Tools.

UNIT – 2 Designing a Lexical Analyzer Relations: [10][15]

Role of Lexical Analysis, Input Buffering, Specification of Tokens, Recognition of Tokens, Finite automata, Conversion from regular expression to NFA, Deterministic finite automata, Conversion from NFA to DFA, Minimization of DFA.

UNIT – 3 Designing Syntax Analyzer: [20][25]

Role of Syntax Analyzer, Classification of parsers, Top-Down Parsing: Introduction, Problems in top-down parsing, Recursive Parsing, Problems in Recursive Procedures, Predictive Parsing, Error Handling in Predictive Parsers, Bottom Up Parsing: Shift Reduce Parser, Actions of shift reduce parser, Construction of parse tree, Operator Precedence Parsing, Components of operator precedence parsers, Parsing action, Construction of operator precedence parsers, Advantages and disadvantages of operator precedence Parsing. LR Parsing: Simple LR parser, LR(1) parser, LALR parser.

UNIT – 4 Intermediate Code Generation: [5][10]

Need For Intermediate Code Generation, Intermediate Forms: Polish Notation, Quadruples, Triples, Indirect Triples & Blocks.

UNIT – 5 Code Optimization: [5][10]

Introduction, need for code optimization, Classification of code optimization techniques: Optimization techniques that work on machine code, Optimization techniques that work on intermediate forms of source code i.e. Optimization with in Basic Blocks: Folding, Redundant operation elimination, Optimization with in Loop: Strength Reduction, Dead code elimination, Moving operation within block out of block.

UNIT – 6 Symbol Table Organization: [5][5]

Introduction, Methods of organizing a symbol table: Unsorted, sorted symbol tables, binary search, hashing, its advantages, disadvantages, Collision, collision resolution techniques: Rehashing, Chaining.

REFERENCES:

1. Aho A.V., R. Sethi and J.D. Ullman ,Compiler Principle, Techniques and Tools, Addison

Wesley.

2. Barret, Couch, Compiler Construction Theory and Practice, Computer Science series, Asian Student Edition.

3. Dhamdhere D.M Compiler Construction Principle and Practice, McMillan India.

4. Gres D., Wiley ,Compiler Construction for Digital Computer

5. David Galles ,Modern Compiler Design, Pearson Education, 2009

CA-502 Cloud Computing

UNIT – 1 Introduction to Cloud Computing: [10][15]

Historical development, Vision of Cloud Computing, Characteristics of cloud Computing as per NIST , Cloud computing reference model ,Cloud computing environments, Cloud services requirements, Cloud and dynamic infrastructure, Roots of Cloud Computing, Layers and Types of Clouds, Features of a Cloud, Cloud Infrastructure Management, Infrastructure as a Service Providers, Platform as a Service Providers.

UNIT – 2 Cloud Computing Architecture: [8][10]

Cloud Benefits and Challenges, Market-Oriented Cloud Architecture, SLA-oriented Resource Allocation, Global Cloud Exchange; Emerging Cloud Platforms, Federation of Clouds

UNIT – 3 Cloud Management & Virtualization Technology: [12][20]

Introduction and Inspiration, Virtual Machines (VM), VM Provisioning and Manageability, VM Migration Services, VM Provisioning in the Cloud Context, and Future Research Directions. Resiliency, Provisioning, Asset management, Concepts of Map reduce, Cloud Governance, High Availability and Disaster Recovery. Virtualization: Fundamental concepts of compute ,storage, networking, desktop and application virtualization .Virtualization benefits, server virtualization, Block and file level storage virtualization, Infrastructure Requirements , Virtual LAN(VLAN) and Virtual SAN(VSAN) and their benefits

UNIT – 4 Cloud Security: [10][15]

Cloud Information security fundamentals, Cloud security services, Design principles, Secure Cloud Software Requirements, Policy Implementation, Cloud Computing Security Challenges, Virtualization security Management, Cloud Computing Security Architecture

UNIT – 5 Advanced Topics and Cloud Applications: [10][15]

Integration of Private and Public Clouds, Cloud Best Practices, the Web on Amazon Cloud, Hosting Massively Multiplayer Games on Cloud, Content Delivery Networks Using Clouds and Hosting Twitter and Facebook on Cloud

REFERENCES:

1. Rajkumar Buyya, Christian Vecchiola, and Thamarai Selvi, Mastering Cloud Computing, Tata McGraw Hill, New Delhi, India, 2013.

2. Buyya, James Broberg , Andrzej M. Goscinski , Cloud Computing: Principles and Paradigms, Rajkumar, ISBN: 978-0-470-88799-8, Wiley India Publication.

3. Toby Velte, Anthony Velte, Robert Elsenpeter ,Cloud Computing-A Practical Approach, ISBN :0071626948 / 9780071626941 Tata McGraw Hill Publication.

4. Barrie Sosinsky, Cloud Computing bible, Wiley India Pvt Ltd (2011)

5. Kumar Saurabh, ,Cloud Computing, Wiley Publication.

6. Krutz ,Vines, Cloud Security ,Wiley Publication.

CA-503 Internet Computing - II

UNIT – 1 [14][25]

Application and Page Frameworks , Asp .Net Server Controls and Client Side Scripts, Asp .Net Web Server Controls., Validation Server Control, Working with Master Pages, Themes and Skins.

UNIT – 2 [22][25]

Data Binding in Asp .Net 3.5, Data Management with ADO .Net, Querying with LINQ, Site Navigation, Personalization, Membership and Role Management, Portal Framework with Web Parts.

UNIT – 3 [14][25]

Asp .Net Ajax, Security, State Management, Caching, User and Server Controls, File I/O and Streams, Building and Consuming Services, Packing and Deploying Asp .Net Application.

REFERENCES:

1. Bill Evjen ,Scott Hanselman, Devin Rader, Professional Asp .Net 3.5 in C# and VB ,Wiley Publishing Inc. ISBN:978-0-470-18757-9.

2. Dino Esposito, Programming Microsoft ASP.NET 3.5, Microsoft Press, 2008.

CA-504 Visual C++ Programming

UNIT – 1 Visual C++ Programming – Introduction: [15][20]

Application Framework – MFC library – Visual C++ Components – Event Handling – Mapping modes – colors – fonts – modal and modeless dialog – windows common controls – bitmaps.

UNIT – 2 The Document and View Architecture: [15][25]

Menus – Keyboard accelerators – rich edit control – toolbars – status bars – reusable frame window base class – separating document from its view – reading and writing SDI and MDI documents – splitter window and multiple views – creating DLLs – dialog based applications.

UNIT – 3 Active X and Object Linking and Embedding (OLE): [10][15]

ActiveX controls Vs. Ordinary Windows Controls – Installing ActiveX controls – Calendar Control – ActiveX control container programming – create ActiveX control at runtime – Component Object Model (COM) – containment and aggregation Vs. inheritance – OLE drag and drop – OLE embedded component and containers – sample applications.

UNIT – 4 Advanced Concepts: [10][15]

Introduction to Graphs and Graph Models, Terminology and Special Types of Graphs, Representations of Graphs, Isomorphism, Connectivity, Euler and Hamiltonian Paths - Shortest Path problems- Planar Graphs- Graph Coloring.

REFERENCES:

1. David J.Kruglinski, George Shepherd and Scot Wingo ,"Programming Visual C++", Microsoft press, Fifth Ed., 2006 (Unit II – V)

2. Steve Holtzner ,"Visual C++ 6 Programming", Wiley Dreamtech India Pvt. Ltd., 2003

CA-505 Natural Language Processing

Unit-1   [05][5]

Introduction to NLP, Brief History, challenges/Open Problems, Natural Language (NL) Characteristics and NL computing techniques, NL tasks: Segmentation, Chunking, tagging, NER, Parsing, Word Sense Disambiguation, NL Generation,

Unit-2   [05][10]

Natural Language Processing Applications: Speech to text, story understanding, QA system, Machine Translation, Text summarization, text classification, sentiment analysis, chatterbox, Web 2.0 Applications : Sentiment Analysis; Text Entailment; Cross Lingual Information Retrieval (CLIR).

Unit-3   [05][10]

ML basics, algorithms, Naïve Bayes, Bayesian Statistics, HMM, CRF

Unit-4   [15][20]

Word Forms, **POS tagging and Chunking**: Morphology fundamentals; Morphological Diversity of Indian Languages; Morphology Paradigms; Finite State Machine Based Morphology; Automatic Morphology Learning; Shallow Parsing; Named Entities; Maximum Entropy Models; Random Fields, POS tagging techniques, Chunking techniques: CRF.

Unit-5   [10][15]

Structures : Theories of Parsing, Parsing Algorithms; Robust and Scalable Parsing on Noisy Text as in Web documents; dependency parsing; Hybrid of Rule Based and Probabilistic Parsing: MST, MALT parser; Scope Ambiguity and Attachment Ambiguity resolution.

Unit-6   [10][15]

Meaning : Lexical Knowledge Networks, Wordnet Theory; Indian Language Wordnets and Multilingual Dictionaries; Semantic Roles; Word Sense Disambiguation; WSD and Multilinguality; Metaphors; Coreferences.

REFERENCES :

1. Allen, James, Natural Language Understanding, Second Edition,Benjamin/Cumming, 1995.

2. Charniack, Eugene, Statistical Language Learning, MIT Press, 1993.

3. Jurafsky, Dan and Martin, James, Speech and Language Processing , Second Edition, Prentice Hall, 2008.

4. Manning, Christopher and Heinrich, Schutze, Foundations of StatisticalNatural Language Processing, MIT Press, 1999.

5. AksharBharti, VineetChaitanya, Rajeev Sangal, Natural Language Processing: An Paninian perspective.

CA-Lab-IX Lab on Visual C++ Programming

1. Create a SDI application to display size of window & total number of Left clicks, right clicks and double clicks in the center of the client area.

2. Create a SDI application that displays a dialog box with two field"s viz. User name, Password and two push buttons. The dialog box is invoked as the user starts the application. After user pressed on 'OK' button display the contents of username and password in the client area& the password should be in the form of sequences of *.

3. Create a SDI application, which invokes a dialog box from a menu option. The dialog box has three scroll bars called red scroll, blue scroll, green scroll and a multiline edit box. As the user scrolls through these scroll bars the background color of the edit box changes.

4. Create a SDI application that displays a dialog box with five fields: Name, Age (Spinner control.), Qualification it has three check boxes-for MCA. M.Sc., M.Sc.-IT, Radio buttons for Sex & drop down combo box for Designation. As the user fills this information in this dialog box & pressed the 'OK' button. The information is display on the client area. The dialog should be invoked through a Menu option.

5. Create A SDI Application that invokes a dialog box from a menu called Dialog. The dialog has a track bar slider control, progress bar control and spinner control. As the slides through slider control the progress bar and spinner control should set the status. Display the value of current position set in trace bar.

6. Create a SDI application and implement modeless dialog box; data of one dialog box should be display in another dialog box when ok button of first dialog is press.

Note: - Both dialogs should be visible at same time.

7. Create a SDI application to create a dialog box with Multi column list control & display the student information in different columns. Student information: name, seat no, and class, rank should be considered.

8. Demonstrate splitter window, take Form view and simple view. The data entered in form should be displayed in the sample view.

9. Create an SDI application that contains an edit box; two buttons viz. Add, Remove & a list box. Whenever user enters a string in the edit box & presses the Add button data should be added to the List box & when remove button is pressed data should be removed.

10. Write a Program that capture Home, Page Up, Page Down, End & all arrows keys as user presses these keys. Program should display appropriate message in the client window.

11. Write a SDI application to draw sine wave.

12. Create a SDI application and create a dialog box with Single Column list box & a tree control. List contains family name and tree control contains family hierarchy. As the user selects an item from the list, selected item of list control entered into the tree control.

13. Create SDI application to Demonstrate Bitmaps. Also change the background color and icon of your application

14. Create a SDI application. Create a access database with a single table of your choice. Fill at least five six records in it. Display the contents of table in the multi column list view.

15. Create a SDI application with the following menu options. Display the selected menu item in the client area. Menu item should have check marks on it when selected.

Cricket ------------ Football

One run ----------Corner

Four run----------Goal, Sixer------------Penalty Kick

16. Create User defined ActiceX Control and use it in any one application.

17. Create User defined DLL in VC++ and use it in any one application.

CA-Lab-X Lab on Internet Computing – II

1. Create an ASP .NET application using Web server controls apply appropriate validation to it.

2. Create an ASP .NET application using Master Pages and Themes and Skins

3. Create an ASP .NET application to demonstrate binding of GridView, DataList, Repeater, DropDownList, RadioButtonList, CheckBoxList Control using ADO .NET

4. Create an ASP .NET application to demonstrate LINQ to XML, LINQ to Objects, LINQ to SQL

5. Create an ASP .NET application to demonstrate Navigation controls

6. Create an ASP .NET application to demonstrate User and Role management.

7. Create an ASP .NET application to demonstrate User controls

8. Create an ASP .NET application to demonstrate Web parts

9. Create an ASP .NET application to demonstrate various type of Caching (Data Caching, Output Caching, and SQL Server Cache Dependency).

10. Create an ASP .NET application using Ajax

11. Create an ASP .NET application using Web Service.

12. Create a Sequential Workflow.

13. Create a Conditional Workflow.

14. Create a State Machine Workflow.

Semester- VI

CA-601 Full Time Industrial Training

Three hundred marks shall be awarded to the Industrial Training/Project course, which will commence in VI Semester and the final work and report will be completed at the end of VI Semester for MCA. The marks will be allotted at the end of VI for MCA.