

NORTH MAHARASHTRA UNIVERSITY, JALGAON
Proposed SYLLABUS for (M.C.A.- Master of Computer Application)
(With Effect From June, 2007)

Semester:- I

CA-101	Computer Organization & Architecture
CA-102	Linux Operating System
CA-103	Mathematical Foundation
CA-104	C++ Programming
CA-105	System Programming
CA-Lab-I	Lab on C++ Programming
CA-Lab-II	Lab on Linux Operating System

Semester- II

CA-201	Object Oriented Analysis and Design (OOAD)
CA-202	Data and File Structures
CA-203	Operating Systems
CA-204	Database Management System (DBMS)
CA-205	Computer Networks
CA-Lab-III	Lab on Data Structures
CA-Lab-IV	Lab on DBMS

Semester- III

CA-301	Accounting and Management Control
CA-302	Design and Analysis of Algorithms
CA-303	Theoretical Computer Science
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	Distributed Computing
CA-402	Internet Computing
CA-403	Network Programming
CA-404	Computer Graphics
CA-405	Optimization Techniques
CA-Lab-VII	Lab on Computer Graphics & Internet Computing
CA-Lab-VIII	Lab on Linux Socket Programming

Semester –V

CA-501	Compiler Construction
CA-502	Software Engineering
CA-503	Current Computing Trends
CA-504	Visual C++ Programming
CA-505	Device Application Development
CA-Lab-IX	Lab on Visual C++ & DAD
CA-Lab-X	Lab on Current Computing

Semester-VI

CA-601	Full time Industrial Training
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Course Code: CA-101

Title: Computer Organization and Architecture

Unit-I

Data Representation

Number System, Binary, Octal, Decimal, Hexadecimal and BCD, 1's & 2's compliment, arithmetic manipulation, addition, subtraction, Multiplication, Division, Fixed point representation, Floating point representation.

[10]

Unit-II

Digital Logic Circuit

Logic gates, AND, OR, NOT, NOR, XOR, NAND, Boolean Algebra map simplification, Combinational circuit, sequential circuit, flip flop.

[10]

Unit-III

Principles of Computer Design

Software, Hardware layers in computer system, Machine language instruction, Addressing modes, and types of instruction. Instruction Cycle and execution cycle, Micro programming Vs hardwired control, RISC Vs CISCs, Superscalar processor, Arithmetic and logic unit, Introduction to array processor and its application, Central processing unit, Interrupt control unit.

[15]

Unit-IV

Memory Organization

Memory system, storage Technologies, Memory array organization, Memory hierarchy, Memory interleaving, cache and virtual memories.

[10]

Unit-V

I/O Devices

Input output devices and characteristic, Input-Output processing, Bus interface, Data transfer techniques, I/O Interrupt, Channels.

[07]

References:-

- 1) Mano M., Computer System Architecture, (3rd Edition), Prentice Hall of India, New Delhi, 1994.
- 2) Pal Chaudhari p., Computer Organization and Design, Prentice Hall of India Delhi, 1994.
- 3) Digital Electronics by A.P Malvino..
- 4) S. P. Dandamudi, Fundamentals of Computer Organization & Design, Springer International Edition, 2006.
- 5) C. Hamacher Z. Vranesic, S.Zaky, Computer Organization (5th Ed), McGraw Hill, 2002.

Course Code: CA-102
Title: Linux Operating System

Unit-I

History and Development of Linux

A Brief History of Linux, Benefits of Linux, Acquiring and Using Linux, Examining Linux Distributions. **[03]**

Unit-II

System Access

Logging In and Using the Linux System, Linux Commands, Logging In and Using Remote Linux Systems. **[04]**

Unit-III

User Accounts

Creating Additional User Accounts, Creating & Managing Groups, Managing Users. **[02]**

Unit-IV

Introduction to the Filesystem

Filesystem Navigation, Managing the Filesystem, Performing Filesystem Maintenance and Locating Files. **[02]**

Unit-V

Working with Linux Permissions

Understanding Permissions, Changing File and Directory Permissions, Changing Default Permissions and Ownership, Setting Daemon and Process Permissions, Evaluating System Security. **[03]**

Unit-VI

Creating and Viewing Files

Using the *vi* Editor, Using Other Editors, Examining File Contents, Redirection. **[03]**

Unit-VII

Archiving Files

Archiving Files with tar, Archiving Files with *cpio*, Archiving Files with Other Utilities, Zipping Files, Examining Backup Issues **[03]**

Unit-VIII

Working in X Windows

Introduction to X Windows and GNOME, Managing Files and Filesystems, Customizing X Windows, Configuring X Windows, Choosing and Changing Window Managers and Desktops, Remote X Window Access. **[04]**

Unit-IX

Printing Files

Configuring a Local Printer, Printing, Managing Print Spools and Queues, Configuring Remote Printers. **[03]**

Unit-X

Package Management

Examining Package Solutions, Managing Packages with RPM, Verifying and Repairing Applications, Upgrading and Freshening Packages. **[04]**

Unit-XI

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, Creating a Shell Scripts. **[10]**

Unit-XII

Multitasking

Managing Jobs and Background Processes, Using the Process Table to Manage Processes, Introducing Delayed and Detached Jobs. **[03]**

Unit-XIII

Configuring and Managing Services

Starting and Stopping Services, Identifying Core and Non-critical Services, Configuring Basic Client Services, Configuring Basic Internet Services, Working with Modules. **[04]**

Unit-XIV

Managing Network Services

Identifying Networking Concepts, Configuring Basic Network Services and Settings, Managing Network Services, Managing Remote Network Services. **[04]**

References:-

1. McCallister, Suse Linus-10, Pearson Education, 2006.
2. Ball, Using Linux, PHI, 1998.
3. Das, Unix: Concepts and Applications (4th Ed), TMH, 2006.
4. Foster Johnson, Welch, Anderson, Beginning Shell Scripting, Wiley India (Wrox), 2006.
5. Neil Mathew, Richard Stones, Beginning Linux Programming (3rd Ed), Wiley India (Wrox), 2006.
6. Peterson, Linux: Complete Reference (5th Ed), Peterson, TMH.

Course Code:CA-103
Title: Mathematical Foundations

Unit-I

Mathematical Logic:

Connectives, Normal Forms, Theory of Inference for Statement Calculus, Predicate Calculus, Inference Theory of the Predicate Calculus. Applications to Computer Science.

[15]

Unit-II

Relations and Ordering:

Functions, Recursion. Algebraic Structures: Groups, Application of Residue Arithmetic to Computers, Group Codes, Applications to Computer Science.

[15]

Unit-III

Graph Theory:

Definition, Paths, Reachability, Connectedness, Matrix Representation of Graphs, Trees, Applications to Computer Science.

[12]

Unit-IV

Storage Representation and Manipulation of Graphs:

Trees, List Structures and Graphs, PERT and Related Techniques, Applications to Computer Science.

[10]

References:-

1. Tremblay J. P., Discrete Mathematical Structures with Applications to Computer Science, Tata McGraw Hill, 1987.
2. Liu C. L., Elements of Discrete Mathematics, McGraw Hill.
3. Kolman B. and Busby R., Discrete Mathematical Structures for Computer Science, PHI, 1987.
4. Johnsonbaugh, Discrete Mathematics, Pearson Education.
5. R. Parthasarathy, Basic Graph Theory, Tata McGraw Hill.

Course Code:CA – 104
Title: C++ Programming

Unit-I

Introduction:

Structured verses Object Oriented Development, Objects, Classes, Encapsulation ,and data abstraction, Inheritance, Delegation, Polymorphism, Message Communication, Merits and Demerits of Object Oriented Methodology. [03]

Unit-II

Data types , operators , expression and control structure:

Character set, tokens, identifiers , keywords ,variables , operators,Control flow statements, expressions and qualifiers, operator precedence and associativity [03]

Unit-III

Array , strings , structure , Unions:

Arrays, strings, multidimensional array, array of string, structure declaration and definition, use of structure and union, difference between structure and unions [05]

Unit-IV

Function and Pointers:

Function component, parameter passing – pass by value, pass by address, pass by reference ,inline function ,function overloading, scope and extent of variables, recursive function pointer variables, address operator & Runtime memory management , pointer to pointer, array of pointer , pointer constant, pointer arithmetic, pointer to function, pointer to objects, array of object, this pointer, self referential classes. [12]

Unit-V

Classes and Objects:

Class specification, defining members, objects, accessing members, data hiding, constructors, parameterized constructor, copy constructor, constructor overloading, destructors, empty class, friend function, friend classes, virtual function, pure virtual function, abstract class. [10]

Unit-VI

Inheritance:

Forms of Inheritance, members accessibility, visibility modes, abstract classes , Virtual base classes ,benefits of Inheritance [06]

Unit –VII

Operator overloading:

Overloading - unary operator, binary operator, type conversion from one type to another [04]

Unit-VIII

Templates and Exception handling:

Introduction to template, function and class template, exception handling constructs. [05]

Unit-IX

Stream Computation:

Stream Computation with console, streams computation with files. [04]

References:-

- 1 K.R. Venugopal, Rajkumar, T. Ravishankar, Mastering C++, TMH.
- 2 W.Balguruswamy, Object Oriented Programming C++, TMH
- 3 Herbert Schildt's, C++ Programming, 2nd Edi. Willy India
- 4 Tony Gaddis, Judy Walter, Starting out with Object Oriented Programming in C++, 3rd Alternate Edi, Willy India.
- 5 A.L.Stevens, C++ Programming (7th Ed), Wiley-dreamtech India, 2006.

Course Code: CA-105

Title: System Programming

Unit-I

Introduction

Definition, Components of System Software, Evolution of System Software, The model of Computer System, Introduction to software processors, Translators and Loaders [06]

Unit-II

Assembler

Elements of Assembly Language programming, Overview of Assembly Process, Design of Two Pass Assembler, Macros and Marco Processors. [12]

Unit-III

Compiler

Aspect of Compilation, Overview of compilation process, Lexical analysis, Syntax analysis, Memory Allocations, Compilation of expression, Intermediate code for expression, Compilation of control structures, Code optimization. [12]

Unit-IV

Interpreters

Pure and Impure Interpreters, Advantages of Interpreters.

[04]

Unit-V

Linkers and Loaders

Loading, Linking and Relocation, Linking and Loading Scheme, Program Revocability, Loader Scheme, Compile and go loader, General loader scheme, Absolute loaders, Relocation loader, Direct linking loader, Other loader schemes: Binders, Linking loader, Overlays, Dynamic Binders.

[14]

Unit-VI

Software Tools

Introduction, Spectrum of software tools, Text Editors, Program Generators, Debug Monitors, Programming Environment. Lex and YACC packages.

[04]

References:-

- 1) System Programming and Operating Systems, D. M. Dhamdhare, Tata McGraw-Hill Publication, Second Edition,
- 2) System Programming , John Donovan, Tata McGraw-Hill Publication, Second Edition,
- 3) System Software-An introduction to System Programming, Leland Beck, Addison-Wesley Publishing, Second Edition.

Course Code: CA-Lab – I
Title: 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
- 4 Write a program to demonstrate use of string manipulations
- 5 Write a program to demonstrate use of function overloading
- 6 Write a program to demonstrate use of operator overloading
- 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
- 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 operator overloading
- 14 Write a program to demonstrate use of all types of inheritance
- 15 Write a program to demonstrate use of function templates
- 16 Write a program to demonstrate use of class templates
- 17 Write a program to demonstrate use of formatted I/O operation
- 18 Write a program to demonstrate use of unformatted I/O operation

Course Code: CA LAB-II
Title: Lab. on Linux Operating System

Instructor should ask students to give live demonstrations on:

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

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

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

Filesystem: Filesystem Navigation, Managing the Filesystem, Performing Filesystem Maintenance, Locating Files.

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

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

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

Working in X Windows: Managing Files and Filesystems, Customizing X Windows, Configuring X Windows, Choosing and Changing Window Managers and Desktops, Remote X Window Access.

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

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, Creating a Shell Scripts (Create at least five shell scripts).

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

Configuring and Managing Services: Starting and Stopping Services, Identifying Core and Non-critical Services, Configuring Basic Client Services, Configuring Basic Internet Services Working with Modules.

Managing Network Services: Identifying Networking Concepts, Configuring Basic Network Services and Settings, Managing Network Services, Managing Remote Network Serv.

Preparing for a Linux Installation: Gathering Installation Information, Creating Installation Disks, Partitioning the Disk.

Installing Red Hat Linux (or any other distribution)
Installing Red Hat Linux, Configuring Linux.

References:-

1. Beginning Unix (1st Ed), P. Love, J. Merlino, J.C.Reed, C. Zimmerman, P. Weinstein, Wiley-dreamtech (Wrox), 2005.
2. McCallister, Suse Linus-10, Pearson Education, 2006.
3. Das, Unix: Concepts and Applications (4th Ed), TMH, 2006.
4. Foster Johnson, Welch, Anderson, Beginning Shell Scripting, Wiley India (Wrox), 2006.
5. M.G.Venkateshmurthy, Introduction to Unix & Shell Programming, Perason Edication, 2005.
6. Neil Mathew, Richard Stones, Beginning Linux Programming (3rd Ed), Wiley India (Wrox), 2006.
7. Peterson, Linux: Complete Reference (5th Ed), Peterson, TMH.

Course Code: CA-201

Title: Object Oriented Analysis and Design

Unit –I

Introduction, Object Oriented development, Object Oriented themes, modeling, Object Modeling Technique. **[04]**

Unit –II

Object Modeling, Objects, Classes, links and associations, advance concept, generalization and inheritance, grouping constructs, aggregation, abstract classes, generalization as an extension and restriction, multiple inheritance, metadata, candidate keys, constraints. **[10]**

Unit –III

Dynamic modeling, Events and States, operations, nested state diagram, concurrency, advance concepts, relation with object model. **[10]**

Unit –IV

Functional modeling, Data flow diagram, specifying operations, constraints, relation to object and dynamic model. **[08]**

Unit –V

Analysis, overview, object modeling, dynamic modeling, functional modeling, adding operations, iterating the analysis. **[07]**

Unit –VI

System Design, overview, breaking the system into subsystem, Identify concurrency, allocating subsystem to processors and tasks, management of data stores, handling global recourses, choosing software control implementations, boundary conditions, trade off priorities. **[07]**

Unit –VII

Object Design, overview, combining three models, designing algorithms, design optimizations, implementation of control, adjustment of inheritance, design of associations. **[02]**

Unit –VIII

Implementation, Using a programming language, Using a database, reusability, extensibility, Robustness, Programming in the large. **[02]**

Unit –IX

Comparison of methodology, Structured Analysis/Structured Design (SA/SD), Jackson Structured Development (JSD). **[02]**

References:-

- 1) Object Oriented Modeling and Design, James L. Rumbaugh, Blaha, PHI
- 2) Object Oriented Analysis and Design, Booch G, second Edition, Benjamin/Cummins Publishing Co.
- 3) Object Oriented Analysis and Design: Understanding System Development with UML 2.0, Mike O'Docherty, Wiley India Pvt. Ltd.

Course Code: CA – 202

Title: Data and File Structures

- Unit-I: Linear data structures [08]**
- Stack, Queue, Circular Queue, Link list, Circular Link list, Doubly Link list,
 - Presentation using static and dynamic memory allocation
 - Operations performed.
- Unit-II: Non linear data structures [16]**
- General Trees, Binary Trees, BST, Heap
 - Applications of trees
 - Operations, Trees traversals
 - Operations on binary trees
 - Graphs
 - Representations
 - Graph traversals
 - Applications of graphs
 - Spanning trees
- Unit-III: Sorting [08]**
- Insertion sort
 - Selection sort
 - Merge sort
 - Bubble sort
 - Quick sort
 - Heap sort
 - Radix Sort
- Unit-IV: Searching [12]**
- Sequential search
 - Binary search

- Search trees traversals
- Binary trees
- Threaded binary search trees
- Inserting and deleting nodes in a binary search tree
- Balancing binary search tree
- Height balanced(AVL) tree: Concept and construction.
- Hashing Techniques
- Hash function
- Address calculation techniques, common hashing functions.
- Collision resolution.
- Linear probing, Quadratic
- Double hashing.
- Bucket addressing.
- Deletion and rehashing.

Unit-V: File Structures [08]

- File systems organization :Sequential, Relative, Indexed and Random access
- Sequential organization and access.
- Relative file organization
- files(ISAM)
- Concept of index
- Levels of index
- Binary search trees as indexes
- m-way search tree
- Overview of B Trees and B+Trees

References:-

"An introduction to data structures with applications"-Trembley and Manohar.

"Data Structure using C" AM Tanenbaum, Y Langsam and MJ Augenstein, Prentice- Hall, India, 1991.

"Data Structures with C++", John R. Hubbard, Schaum's Outline, Tata McGraw Hill

"Data structures, Algorithms, and Applications in Java", Sahani, McGraw Hill

"Data Structure and Program Design in C" . RL Kruse, BP Leung and CL Tondo, Prentice Hall, 1991.

"Data Structures and Algorithm Analysis in C" . Weiss, Mark Allen, Addison Wesley

Course Code: CA –203
Title: Operating System

Unit-I

Introduction

Introduction to operating System, operating system need and services, O.S. Classification, single user, multi user, simple batch processing, multi programming, multitasking, Parallel system, Distributed system, Real time system, Embedded Operating system. [10]

Unit-II

Process Management

Process concept, process scheduling thread, overview of Inter – process communication, CPU scheduling –Basic concept scheduling criteria, multiple processor scheduling, scheduling Algorithm, the critical section problem, semaphores. [11]

Unit-III

Memory Management

Single partition allocation, multiple partition allocation, Logical versus physical address space, swapping, partitioning, paging and segmentation, virtual memory, Demand paging, page replacement algorithm, allocation algorithm, thrashing. [11]

Unit-IV

File and Device management

File Concept, file protection, allocation methods, configuration, linked and index allocation. Directory structure – single level, two level, tree structure, cyclic graph and general graph directory, Free space management, device management, Disk structure, disk scheduling, FCFS scheduling SSTF scheduling, SCAN scheduling, C-SCAN scheduling, Look scheduling, C-LOOK scheduling, disk scheduling algorithms. [10]

Unit-IV Dead Locks

Deadlock characteristics, prevention, avoidance, detection and Recovery, Synchronization hardware, combine approach deadlock handling, safe and unsafe state, Banker's Algorithm. Resource management, security mechanism and policy, domain protection, access matrix, security and authentication program, threads, Encryption. [10]

References:-

- 1) Peterson silberschats OP. System Concepts, 2nd Edition, addition Wesley publication co. 1985.
- 2) Andrew s. Tenenbaum, A.S. Woodhill, Operating Systems Design & Implementation (3rd Ed), Pearson Education, 2006.
- 3) Operating system By Achut Godbole.
- 3) 4) Davis, Rajkumar, Operating Systems A systematic view, sixth editon,), Pearson Education, 2006.

Course Code: CA–204
Title: Database Management Systems

Unit-I

Basic concepts, Database & Database Users, Characteristics of the database, Database concepts an architecture, Data Modals, Schemas and instances, DBMS architectures and Data Independence, Database languages and Interface, Data modeling using the relationship approach. What is Hierarchical and Network Model? [10]

Unit-II

Relational Model, Languages & systems, Relational Data Model, Relational algebra, Relational Model Concepts, Relational Model Constraints, SQL: A Relational database language, DDL, DCL, DML, Specifying constraints and indexes. [10]

Unit-III

Security and Integrity: Domain Constraints, Referential Integrity, Assertions, Triggers, Type of Authorization, Views, Encryptions and Authentication. [06]

Unit-IV

Relational Database Design, Functional Dependency, Normal Forms (1NF, 2NF, 3NF, 4NF, 5NF, BCNF), Comparison between various normal forms.

Decomposition: Lossless, dependency preservation, Repetition of Information, Closure and Canonical Cover. [06]

Unit-V

Transactions, ACID Property of Transactions, Transactions state diagram, Database Recovery, Crash and recovery classifications, Recovery techniques – Log based recovery, shadow paging, Database buffering, Log buffering, OS rule in buffering. [10]

Unit VI

Concurrency control, Serial Schedule, Concurrent Schedule, View Serializability, conflict Serializability, Recoverable schedule and Cascade Less schedule.

Concurrency Handling Protocols – Locking protocol: 2PC, Variation of 2PC, Graph Based Protocol, Timestamp Protocol, Multiple Granularity protocol, Validation Based Protocol, Deadlock Handling. [10]

References:-

1. Silberschatz Korth and Sudarshan, Database System Concepts, (4th Edition), McGraw Hill.
2. Ramez Elmasri & Shamkant Navathe, Fundamentals of Database Systems, (3rd Edition), Pearson Education.
3. An Introduction to Database, Desai Galgotia Publications.
4. Principles of Database Systems, Galgotia Publications.
5. Ramakrishnan, Gehrke, Database Management Systems, (3rd Edition), McGraw Hill.

Course Code: CA-205
Title: Computer Networks

Unit-I

Introduction

Uses, Hardware, Software, Reference Models, Standardization. [06]

Unit-II

Physical Layer

Theoretical Basis for Data Communication, Guided Transmission Media, Wireless Communication. [06]

Unit-III

Data Link Layer

Design Issues, Error Detection and Correction, Elementary Data Link Protocols, Sliding Window Protocols. [08]

Unit-IV

MAC Sub layer

Channel Allocation Problem, Multiple Access Protocols, Ethernet, Bluetooth: Architecture and Applications. [08]

Unit-V

Network Layer

Design Issues, Routing Algorithms, Congestion Control. [09]

Unit-VI

Network Security

Cryptography, Symmetric Key Algorithms, Public Key Algorithms, Digital Signatures, Management of Public Keys, Communication Security, Authentication Protocols, E-mail Security, Web Security, Social Issues. [15]

References:-

1. A. S. Tanenbaum, Computer Networks (4th Ed), Pearson Education, 2004.
2. B. A. Forouzan, Data Communications and Networking (4th Ed), TMH, 2007.
3. Dieter Gollmann, Computer Security (2nd Ed), Wiley India, 2006.
4. Willium Stallings, Cryptography and Network security (4th Ed), Pearson Education, 2006.

Course Code: CA- Lab III
Title: Lab on Data Structures

Implementation of application programs based on

- Arrays
- Records, Structure
- Pointers
- Multidimensional Arrays, Matrices,
- Stacks, Polish Notation
- Queues
- Deques
- Linked List, Circular Link List, Doubly Link List

Implementation of programs for sorting techniques

- Bubble sort
- Selection sort
- Insertion sort
- Radix sort
- Quick sort
- Merge sort
- Heap sort

Implementation of programs based on Trees

- Binary Search Tree
- Heap Tree
- Balanced Binary Tree
- m-way search tree

Implementation of programs based on Graphs

- Depth First Traversal
- Breadth First Traversal
- Obtaining Shortest Path
- Minimum spanning tree

Course Code: CA – Lab IV
Title: Database Management Systems Laboratory

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.
11. Practical Based on implementing use of Procedures.
12. Practical Based on implementing use of Triggers
13. Practical Based on implementing Cursor.
14. Make a Database connectivity with front end tools like – VB, VC++,D2K.
15. Practical based on creating Data Reports.

Apply all this concepts to some sample applications which may programmed are given below:

- Accounting for a shop.
- Database Manager for a magazine agency or newspaper agency.
- Ticket booking for performances.
- Personal Bank Account.

Course Code: CA-301
Title: Accounting and Management Control

Unit-I

Accounting: 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). [16]

Unit-II

Financial management: 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. [12]

Unit-III

Costing, nature: 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. [12]

Unit-IV

Introduction to management control system: 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. [12]

Reference:-

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, (5th edition), Prentice Hall of India Pvt. Ltd, New Delhi.
4. Homgren, Sundem and Selto, Introduction to Management Accounting, (5th edition), Prentice Hall of India Pvt. Ltd, New Delhi.

Course Code: CA-302

Title: Design and Analysis of Algorithms

Unit-I

Algorithms properties, areas of studies, recursion, analyzing algorithms, recurrence, binary trees, heaps and heapsort, sets and disjoint set union, graphs.

[06]

Unit-II

Divide and conquer, binary search with its variants, Maxmin, mergesort, quicksort, selection, Strassen's matrix multiplication.

[08]

Unit-III

Greedy method, optimal storage on tapes, knapsack problem, single source shortest path, minimum spanning trees.

[08]

Unit-IV

Dynamic programming, graphs and its variants, breadth first search, depth first search, code optimization, topological sort.

[10]

Unit-V

Backtracking, queen problem, N-queen problem, graph coloring problem, branch and bound technique, LC-search.

[10]

Unit-VI

Non deterministic algorithms, searching, sorting, classes: NP hard and NP complete, approximation algorithms, job scheduling, minimum degree of spanning tree.

[10]

Reference:-

1. E Horowitz and S. Sahani, Fundamentals of Computer Algorithm, Galgotia Publications, 1991.
2. Sanjay Dasgupta, Christos Papadimitriou and Umesh Vazirani, Algorithms, Tata McGraw-Hill Edition.
3. Aho, Hopcroft and Ullman, The Design and Analysis of Algorithms, Addison-Wesley Publication, 2000
4. Simon Harison, James ross, Algorithms, Wiley India, 2006
5. Jon Kleinberg and Eva tardos, Algorithm Design, Pearson education, 2006

Course Code: CA-303
Title: Theoretical Computer Science (TCS)

Unit-I

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, Mealy Moore model, minimization of automaton, Applications. [12]

Unit-II

Formal languages, Chomsky classification of languages, languages, their relation and automaton. [04]

Unit-III

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. [14]

Unit-IV

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. [10]

Unit-V

Pushdown Automaton (PDA), informal description, basic definitions, acceptance by a PDA, PDA and CFLs. [06]

Unit-VI

Turing Machine, Model, computable languages and function, representation of TMs, Language Acceptability by TMs, Design of TM, Halting Problem of TMs. [06]

Reference:-

1. J.E. Hopcraft, R. Motwani and J.D. Ullman, Introduction to Automata Theory languages & Computation, Pearson Education Asia, 2003.
2. K.L.P. Mishra, N. Chandrashekhara, Theory of Computer Science, PHI, 2001.
3. Martin John C., Introduction to Language & Theory of computation (TMH), 2004.

Course Code: CA-304
Title : Artificial Intelligence

Unit-I

Introduction

What is AI?, The Foundations of AI, History of AI, The State of Art. [03]

Unit-II

Intelligent Agents

Introduction, How Agents should Act, Structure, Environments. [03]

Unit-III

Searching

Problem Solving Agents, Formulating Problems, Example Problems, Searching for Solutions, Uninformed and Informed Search Strategies. [06]

Unit-IV

Agents that Reason Logically

A Knowledge-based Agent, The Wumpus World Environment, Representation Reasoning Logic, Propositional Logic, An Agent for the Wumpus World. [04]

Unit-V

First Order Logic

Syntax and Semantics, Extensions and Notational Variations, Using First Order Logic. [02]

Unit-VI

Inference in First-Order Logic

Inference Rules Involving Quantifiers, Generalized Modus Ponens, Forward and Backward Chaining, Completeness, Resolution, Completeness of Resolution. [08]

Unit-VII

Uncertainty

Acting Under Uncertainty, Basic Probability Notation, The Axioms of Probability, Bayes' Rule and its Use. [06]

Unit-VIII

Probabilistic Reasoning Systems

Representing Knowledge in an Uncertain Environment, The Semantics of Belief Networks, Inference in Belief Networks, Knowledge Engineering for Uncertain Reasoning, Other Approaches to Uncertain Reasoning. [06]

Unit-IX

Learning from Observations

A General Model of Learning Agents, Inductive Learning, Learning Decision Trees, Using Information Theory, Learning General Logical Descriptions, Why Learning Works: Computational Learning Theory. [06]

Unit-X

Learning in Neural and Belief Networks

How Brain Works, Introduction to Neural Networks, Perceptrons, Multilayer Feed-Forward Networks, Applications of Neural Networks, Bayesian Methods for Learning Belief Networks. [06]

Unit-XI

AI: Present and Future

[02]

References:-

- 1) S. Russell, P. Norvig, Artificial Intelligence: A Modern Approach, Pearson Education Asia, 2002.
- 2) E. Rich and K. Knight, Artificial Intelligence, TMH, 2002.
- 3) D. W. Patterson, Introduction to AI and Expert Systems, Prentice Hall of India, 2001.
- 4) Kumar Satish, Neural Networks: A Classroom Approach, TMH, 2004.

Course Code: CA-305

Title: JAVA Programming

Unit-I

Introduction, Buzzwords, data types, variables, operators, strings, input and output, control flow, arrays, objects, classes, predefined classes, own classes, static fields and methods, method parameters, object construction, packages. [06]

Unit-II

Inheritance, super class, sub class, class Object, Array Lists, wrappers, auto boxing, reflection, environment classes, interfaces, cloning, callbacks, inner classes, proxies. [10]

Unit-III

Swings, Frame, Panel, 2D shapes, colors, fonts, images, event handlings, semantic events, low-level events, actions, multicasting, implementing sources. [08]

Unit-IV

MVC design pattern, layout management, text input, choice components, menus, dialog boxes, Applet basics, multimedia, applet context, jar files, packaging, web start, storage preferences. [10]

Unit-V

Exceptions, classification, declaring, throwing, catching, creating exceptions, logging, generic programming, generic methods, type variables, generic code, restrictions, limitations, inheritance rules, wild card types, reflection and generics. [08]

Unit-VI

Streams, stream hierarchy, zip streams, use of streams, object streams, file management. [04]

Unit-VII

JDBC, design, programming concepts, query execution, result sets, meta data, transactions, Multithreading, threads, states, interrupting, properties, synchronization. [06]

Reference:-

1. Horstman Cay, Cornell Gary, Core Java™2, 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.
4. Ivor Horton, Beginning Java 2, JDK 5 Ed, Wiley India.

Course Code: CA LAB-V

Title: Lab on Design and Analysis of Algorithms (DAA)

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 union and find operation.
4. Write a program to find minimum and maximum form a given array.
5. Write a program for searching element form given array using binary search for n=1000,2000,3000 find exact time of execution.

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 Knapsack instant.
9. Write a program to find minimum spanning tree using prim's/kruskal's algorithm.
10. Write a program to find shortest path using single source shortest path.
11. Write a program to find shortest path using all pair path.
12. Write a program to implement breadth first and depth first traversal.
13. Write a program to implement topological sort.
14. Write a program to implement breadth first and depth first traversal.
15. Write a program to implement CODE1.
16. Write a program to implement CODE2.
17. Write a program to find all solutions for 8-queen problem using backtracking.
18. Write a program to find only inequivalent solutions for 8-queen problem using backtracking.
19. Write a program for graph coloring using backtracking.

Course Code: CA LAB-VI
Title: Lab. on JAVA Programming

1. Write a program that demonstrate program structure of java.
2. Write a program that demonstrate string operations.
3. Write a program that demonstrate package creation and use in program.
4. Write a program that demonstrate inner class.
5. Write a program that demonstrate inheritance.
6. Write a program that demonstrate 2D shapes on frames.
7. Write a program that demonstrate text and fonts.
8. Write a program that demonstrate 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 demonstrate 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 demonstrate Applet programming.
16. Write a program to implement generic programming.
17. Write a program that demonstrate JDBC on applet/application.
18. Write a program that demonstrate multithreading.

Course Code: CA-401

Title: Distributed Computing

Unit-I

Introduction

Definition, Motivation, Goals, Hardware Concept, Software Concept,
Client Server Model.

[10]

Unit-II

Communication Mechanism

Communication Protocol, RPC, ROI, Message Oriented Invocation, RMI, Stream
Oriented Communication

[12]

Unit-III

Naming

Naming, Locating Mobile Entities, Removing Unreferenced Entities.

[12]

Unit-IV

Synchronization

Clock Synchronization, Logical Clocks, Global State, Election Algorithm.,
Mutual Exclusion , Distributed Transaction, Introduction to Consistency and
Replication

[10]

Unit-V

Fault Tolerance

Introduction, Process Resilience, Reliable Client and Server Communication,
Reliable Group Communication, Distributed Commit, Recovery.

[08]

References:-

- 1) Distributed Systems: Principles and Paradigm, Andrew S Tanenbaum and Marteen Van Steen ,Pearson Education, Low Price Edition.
- 2) Distributed Systems-Concepts and Design (4th Ed), George Coulouris, Jean Dollimore, Tim Kindberg, Third Edition, Low Price Edition, Pearson Education Asia, 2006.
- 3) Distributed Systems and Networks, William Buchanan, Tata McGraw-Hill Edition.

Course Code: CA-402
Title: Internet Computing

Unit-I

Introduction

Introduction to Internet, Web Client/Server Model, Protocols for Web Client/Server communication, Components of .NET Framework, Overview of IIS, ISAPI Extensions, ISAPI Filters. [05]

Unit-II

Overview of .NET Framework

Web Forms, Common Language Runtime and Class Library, Managed Components, Web Services, COM+ Component services. [06]

Unit-III

Crash Course in VB.NET

Data Types, Arrays, Functions, Flow Control, Exception Handling, Constructors and Destructors, Class Properties, Inheritance, Polymorphism, Interfaces, Implementing polymorphism using Interfaces, Multithreaded Programming. [10]

Unit-IV

Essentials ASP.NET

History of ASP.NET, Introduction to ASP.NET, Working with web forms, Directory structure in ASP.NET, ASP.NET Compilation Model, Code Behind Model, Working with Web form controls, HTML Server Controls, Validation Controls, Validation Groups, Calendar and Ad Rotator control. [15]

Unit-V

ASP.NET Intrinsic Objects

HttpRequest Object, HttpResponse Object, HttpServerUtility Object, HttpSessionState Object, HttpContext Object [06]

Unit-VI

Data Access with ADO.NET

What are Databases? Working with ADO.NET, Overview of ADO.NET Objects, Using Basic SQL, Working with Connection Object, Command Object, DataAdapter Object, DataSet Object, DataReader Object, DataTable Object, DataRow Object, DataColumn Object, DataRelation Object. [10]

References:-

- 1 ASP.NET and VB.NET Web Programming, by Crouch Matt J, Addison Wesley 2002.
- 2 Visual Basic Programming 2005 Black Book, Steven Holzner et al, Dreamtech Press.
3. Programming ASP.NET, J.Liberty, D.Hurwitz, (3rdEd), O'REILLY, 2006.

Course Code: CA – 403
Title: Network Programming

Unit-I

Introduction

Layered architecture, Advantages and disadvantages of layered architecture, TCP/IP model layers and their functionalities, network topologies, networking devices, IP Addressing, broadcasting and multicasting. [06]

Unit-II

Protocols

Ethernet, Internet protocol, Address resolution protocol, reverse address resolution protocol, Transmission control protocol, user datagram protocol, TCP connection establishment and termination, Domain name systems, file transfer protocol, web servers, simple mail transfer protocol, telnet. [20]

Unit-III

Client Server Programming using Sockets:

Client – server model (terminology and concepts), program interface to protocols, socket interface, algorithms and issues in client s/w design and server s/w design. [06]

Unit-IV

Server Designs

Iterative connection oriented, iterative connection less, multiprocess concurrent connection oriented, single process concurrent connection oriented, multiprotocol, multiservice, super server, concurrency in clients, external data representation, remote procedure call concepts, network file system concepts [20]

References:-

1. Douglas E. Comer, “Internetworking with TCP/IP - Principles, Protocols & Architecture”, vol.1, (3rd edition), ISBN- 81-203-1053-5, PHI.

2. W. Richard Stevens, "TCP/IP Illustrated : The Protocols", volume 1, ISBN-81-7808-101-6, Pearson Education
3. Douglas E. Comer, David Stevens, "Internetworking with TCP/IP – Client Server Programming and Applications", volume 3, ISBN- 81-7808-488-0 PHI.
4. W. Richard Stevens, "Unix Network Programming", vol.1 (second edition), ISBN-81-203-2061-1,PHI

Course Code:CA-404
Title: Computer Graphics

Unit-I Introduction

Introduction of computer Graphics and its applications, Overview of Graphics systems, Video display devices, Raster scan display, Raster scan systems, video controller, Raster scan display processor, Random scan display, random scan systems, color CRT monitor, Flat panel display, Interactive input devices, Logical classification of input devices, Keyboard, mouse, Trackball and spaceball, Joysticks, Image scanner, Light pens, Graphics software, Coordinates representations, Graphics functions, PHIGS workstations. [10]

Unit-II Algorithms

Line drawing algorithms, DDA, Bresenham's, Circle generating, Mid-point circle algorithm, Ellipse generating, Polynomials, Scan-line polygon fill, Boundary fill. [10]

Unit-III Two dimensional transformation

Basic transformation's, Translation, Rotation, Scaling, Matrix representation's & homogeneous co-ordinates, Composite transformation's, Reflection, Two dimensional viewing, Two dimensional clipping, Line, Polygon, Curve, Text. [08]

Unit-IV

Three dimensional transformation

3D-transformation, Projection, Viewing, Clipping.. [06]

Unit-V Curve & Surfaces

Spline representation, Cubic spline, Bezier curve, Bezier surfaces, Beta spline, B-spline surfaces, B-spline curve, Hidden surfaces, Hidden lines, Z-buffer. [06]

Unit-VI Fractal's geometry

Fractal generation procedure, Classification of Fractal, Fractal dimension, Fractal construction methods. [04]

Unit-VII Light, color & shading

Color models, XYZ, RGB, YIQ, CMY & HSV, Shading algorithms, Shading model, Illumination model, Gouraud shading, Phong shading. [08]

References :-

1. Computer Graphics by M. Pauline Baker, Donald Hearn, 2nd Edition PHI..

2. Mathematical Element for Computer Graphics By. David F. Roger., J. Alan Adams, 2nd Edition, Tata McGHill.
3. Principles of Interactive Computer Graphics By. William. M. Newmann. 2nd Edition Mc. Graw Hill.
4. Procedural Element for Computer Graphics By. David F. Roger. Mc. Graw Hill.
5. Computer Graphics By A.P. Godse, 2nd Editio TPPublication,
6. Computer Graphics By V.K. Pachghare, 2nd Edition, Laxmi Publication.

Course Code: CA – 405
Title: Optimization Techniques

Unit 1. Introduction to Operational Research

Introduction to O.R., Necessity of OR in Business and Industry, Scope of OR in modern management, OR and Decision Making. [04]

Unit 2. Linear programming

Formulation, Identification of decision variables, Constructing Objective Functions and Constraints, Assumptions, Methods of Solution: Graphical Method, Simplex method. [12]

Unit 3. Duality theory and Sensitivity Analysis

Duality theory: Existence of Dual of a LP problem, Primal Dual relationships in formulation and their solutions. Sensitivity analyses or Post Optimality Analysis: Dual Simplex Method, Changes affecting feasibility, Changes affecting optimality. [10]

Unit 4. Transportation and Assignment problems

The transportation algorithm: Formulation as a LP problem, Determination of Initial solutions, Stepwise Improvement to obtain optimal solution, Special cases Such as Multiple, Unbalanced, Degeneracy etc., The assignment model: Formulation as TP, The Hungarian method of solution. [10]

Unit 5. Network models

Critical Path Analysis (CAP): Network representation of simple projects., Critical path computation: Construction of time schedule, Crashing of project duration. [08]

Unit 6. Game theory

Formulation of Two-person Zero-sum game: Solution of simple games, Mixed strategy games, Solving using Graphical Method, Solving Using LP, Saddle point Condition. [08]

Reference:-

1. Introduction to Operations Research (Frederick S.Hiller, Gerald J.Lieberman), McGraw-Hill Companies
2. Operations Research An introduction (Hamdy A. Taha), Prentice-Hall
3. Quantitative Technoques, L.C. Jhamb, Everest Publishing house.

Course Code: CA-Lab-VII
Title: Lab on Computer Graphics

1. Line drawing algorithm
2. Circle drawing algorithm
3. Ellipse drawing algorithm
4. Polygon filling algorithm
5. Windowing and clipping algorithm (Point, line and polygon
6. clipping)
7. Composite 2-D transformation, (rotation, scaling & reflection)
8. 3-D geometric transformation (rotation, scaling & reflection)
9. 3-D Curve and surface representation i.e. B-spline curves and Surfaces, polynomial curves and surfaces, Bezier curves and Surfaces.
10. Determination of visible surfaces and lines,
11. Combining all modules to form a single graphics package

Course Code: CA-Lab-VIII
Title: Lab on Linux Socket Programming

1. Implement client server programs to demonstrate working of TCP iterative server.
2. Implement client server programs to demonstrate working of UDP iterative server
3. Implement Client - Server programs for demonstrating working of Concurrent Connection Oriented Servers using multiple processes.

4. Implement Client - Server programs for demonstrating working of Concurrent Connection Oriented Servers using single process.
5. Implement and demonstrate the multiprotocol server.
6. Implement and demonstrate the multiservice server.
7. Implement and demonstrate the super server.
8. Implement Telnet Server program for providing different types of services.
9. Demonstrate and implement the file transfer using FTP.
10. Develop a simple web server capable of accepting request from standard clients like IE, Netscape, Opera etc. (Use standard protocol HTTP).

Course Code: CA – 501
Title: Compiler Construction

Unit-I

Introduction to Compiler

Translation issues : why to write compiler, compilation process in brief, compiler construction tools, Interpreter and related issues. **[04]**

Unit-II

Lexical Analysis

Introduction to Lexical Analysis – alphabet, token, lexical error, Block schematic of lexical analyzer, Explanation of NFA, DFA, Conversion from NFA to DFA, R E to optimized DFA, time vs. space complexity.

Construction of Lexical Analyzer – Automatic construction of Lexical Analyzer (LEX), LEX specification details. **[06]**

Unit-III

Syntax Analysis

Introduction – Role of parsers and issues of separating lexical and syntax analysis, Types of grammar, CFG introduction, Expressing language through CFG.

Basic concepts in parsing – leftmost derivation, rightmost derivation, derivation tree, sentence, sentential form, language, derivation, parse tree, Ambiguous grammar.

Representation of CFG – Tree Backous Naur Form, recursive rules, etc., Precedence and associativity, Disambiguous grammar.

Parsing technique – Top down – Recursive decent parser, Predictive or LL (1) parser, Bottom up : - Shift – Reduce, OPP, SLR, LR (1), LALR, etc. (I/P, O/P,

data structures required, block schematic, algorithm, limitations, efficiency to be covered about all above parsers).

Automatic construction of parser (YACC), YACC specifications file details, error detection and recovery in YACC. [25]

Unit-IV

Symbol Table Organization

Comparison of different intermediate code forms, Intermediate code generation for declaration, assignment, iterative statements, case statements, arrays, structures, conditional statements, Boolean expressions, procedure / function definition and call. [05]

Unit-V

Intermediate forms of Codes

Polish notation, Quadruples, triples, Indirect triples, Blocks. [06]

Unit-VI

Code Optimization

Introduction, Principle sources of optimization, machine dependent optimization, machine independent optimization, Optimizing transformation, compile time evaluation, Common expression evaluation, value propagation, code movement and loop invariant computation, strength reduction, loop test replacement, dead code elimination. [06]

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. Dhamdhare D.M, "Compiler Construction Principle and Practice", McMillan India.
4. Gres D., "Compiler Construction for Digital Computer", Wiley.
5. Holub A.J., "Compiler Design in C", Prentice Hall.
6. Tremblay, Sorenson, "Theory and Practice of Compilers".
7. "LEX and YACC", O'relly.
8. Muchnik, "Advanced Compiler Design and Implementation".

Course Code: CA-502
Title: Software Engineering

Unit-I

Introduction

Software Engineering, Software Characteristics, Software Crisis & Myths, Software Application, The Evolving role of Software. [04]

Unit-II

The Product & The Process

A layered Technology, The Software Process, Software Process Models, Linear Sequential Model, The Prototype model, RAD Model, Spiral Model, Evolutionary Software Process model, Basic Web process Model, Modified Waterfall Model, Joint Application Development model, Fourth generation Techniques. [10]

Unit-III

Analysis Concept and Principle

Requirement Analysis, Analysis principle, Software prototyping, specification review, Analysis Modeling, The Elements of analysis model, Data Modeling, Functions modeling and information flow, Behavioral modeling, the mechanics of structured Analysis, The Data Dictionary. [06]

Unit-IV

Design Concepts and Principle

Project planning, cost estimation model, Software Design and software Engineering, Design process, Design principles, Design concepts, effective modular design, Design Heuristics for Effective modularity, The Design model, Design Documentation, Architectural Design, Software architecture, Data design, User Interface Design, Elements of good Design, Design Issues, Feature of modern GUI, software metrics. [10]

Unit-V

Software Quality Assurance

Quality Concept, SQA, Software Reviews, FTR, Formal approaches to SQA, Statistical SQA, Software reliability, The ISO 9000 Quality Standards, The SQA Plan. [08]

Unit-VI

Software Configuration Management

SCM, SCM Process, Identification of Objects in Software Configuration, Version Control, Change Control, Configuration Audit, Status Reporting, SCM standards. [04]

Unit-VII

Client- Server Software Engineering

The Structure of C-S Systems, Software Engineering for C/S systems, Analysis model Issues, Design for C/S systems, Testing Issues, software maintenance. [06]

Unit-VIII

Web Engineering

The attribute of Web based application, The WebE Process, Framework for WebE Design and Testing for Web based application [04]

References :-

- 2) Software Engineering : A Practitioner's Approach, Roger S Pressman 7th Edition McGraw Hill International Publication.
- 3) The Complete Reference : Web Design, Thomas A Powell. McGraw Hill International Publication.
- 4) S. Mantel, J. Meredith, S. Shafer, M. S. Sutton, M. Gopalan, Project Management, Wiley India, 2006.
- 5) K. V. K. K-Prasad, Software Testing Tools, dreamtech Press, 2006.

Course Code: CA-503

Title: Current Computing Trends

The objective of this course is to teach the latest technology in demand by the market/IT industry. As this course will have to be taught after two years from today(30/03/2007), hence the detailed syllabus of this course would be framed at the relevant time by the BOS and would be circulated to the affiliated Colleges/ Institutes.

Course Code : - CA - 504
Title : Visual C++ Programming

Unit-I

Introduction :

Windows difference, Windows Architecture, General structure of writing, Windows program Programming Hurdles. [02]

Painting with text & GDI :

Painting and repainting logic, Introduction to GDI, Scroll bar logic, Keyboard, Mouse and timer messages, Various API function for drawing different simple graphics objects, GDI Objects. [02]

Unit-II

Windows, Visual C++ and Application Frameworks Fundamental.

Microsoft Windows and Visual C++

Windows Programming Model, Visual C++ Components. [02]

The Microsoft Foundation Class Library Application Framework :

Use of Application Framework, Application Framework, MFC Library Message Mapping , Documents & Views. [02]

Unit-III

The MFC Library View Class :

Getting Started with App Wizard – “Hello World”.

Single document Interface Vs. Multiple document Interface, The “Do-Nothing” Application, The Cex03 a View Class, Drawing Inside the View Window – The Windows Graphics Device Interface, Preview of the Resource Editors, Win 32 Debug Target Vs. Win 32 Release Target, Enabling the Diagnostic Macros, Understanding Precompiled Headers, Two way to Run a Program. [04]

Basic Event Handling, Mapping Modes and a Scrolling View :

Getting User Input – Message Map Function, Mapping Modes, A Scrolling View Window, Other Windows Messages. [02]

The Graphics Device Interface, Colors and Fonts:

The Device context Classes, GDI Objects, Windows color Mapping, Fonts. [02]

The Modal Dialog and Windows Common Controls:

Modal Vs. Modeless Dialogs, Resources and Controls, Programming a Model Dialog, The Dialog That Ate Cincinnati, Enhancing the Dialog program, Identifying Control: CWnd Pointers & Controls IDS, Setting the Color for dialog Background and For controls, Painting Inside the Dialog Window, Adding Dialog controls at Runtime, Other Control Features, Windows Common Controls. [04]

The Modeless Dialog and Windows Common Dialogs:

Modeless Dialogs, Cform View Class, Windows Common Dialogs. [02]

Using ActiveX Controls:

ActiveX Controls Vs. Ordinary Windows Controls, Installing ActiveX Controls, Calendar Control, ActiveX Control Container Programming, ActiveX Control in HTML Files, Creating ActiveX Controls, Picture Properties, Bindable Properties. [04]

Bitmaps:

GDI Bitmaps and Device Independent Bitmaps, Using GDI bitmaps, Using Bitmaps to Screen Display, DIBS and Cdib Class, Putting Bitmaps on Pushbuttons. [04]

Unit-IV**The Document – View Architecture:****Menus, Keyboards Accelerators, the Rich Edit Controls & Property Sheets:**

Main Frame Window and Document Classes, Windows Menus, Keyboard Accelerators, Common Processing, Application Frame Work Built – In Items, MFC text Editing Options, Property Sheets, Cmenu Class, Creating Floating Pop-up Menus, Extended Command Processing. [04]

Toolbars and Status Bars:

Controls bars and Applications Frameworks, Toolbars, Tool tips, Locating the Main Frame Window, Status bar. [02]

A Reusable Frame Window Base Class:

Cpersistent Frame Class, CFrameWnd Class and Activate Frame Member Function, PreCreate Window Member Function, Windows Registry, Static data Member, Default Window Rectangle, Persistent Frames in MDI Applications. [03]

Separating the Document From its View:

Document – View Interaction Function, View Application, CFromView Class, Cobject Class, View Interaction, Cdocument :: Delete Contents Function, CobList Collection Class. [03]

Splitter Windows and Multiple Views:

The splitter window, View options, Dynamic and static splitter windows, A single view class SDI dynamic splitter, A Double View class SDI static splitter, Switching view classes without a splitter, A multiple view class MDI application. [02]

Unit-V

Reading & Writing documents SDI & MDI Application:

MFC Program without Document or view Classes:

A Dialog based application, An SDI application, An MDI application. [01]

Database Management:

Advantage of Database Management, SQL, ODBC Standard, MFC ODBC Classes – Crecordset and Cdatabase, The Student Registration Database, Filter and Sort Strings, Joining two Database Tables, Multiple Recordset, ODBC Multithreading, Bulk Row Fetches, Use of Recordset Without binding. [03]

Database Management With Microsoft Data Access Objects:

DAO COM and the Microsoft jet Database Engine, DAO and VBA, DAO and MFC, Using DAO in ODBC mode, DAO Table – Type Recordset, DAO Query Defs and Table Defs, DAO Multithreading, Displaying Database Rows in Scrolling Window, Programming Dynamic Recordset. [02]

WinInet:

Introducing WinInet, WinInet classes, Writing an HTTP application. [02]

Reference:-

1. Charles Petzold, Windows Programming, Microsoft Press.
2. David J. Kruglinkski, Programming Microsoft VC++, Microsoft Press.
3. Kate Gregory, Special Edition Using Visual C++, PHI.
4. Clayton Walnum, Windows 98 Programming Secrets, IDG Books.
5. Horton Ivor, Beginning Visual C++ 2005, Wiley India.
6. Holzner steve, Professional Visual C++ 6 Programming, Wiley India.

Course Code: CA-505
Title: Device Application Development

Unit-I

Introduction to handheld devices (Palm, Pocket Pc, Symbian OS smart phones, MS windows based smart phones, BlackBerry), features of handheld devices, Characteristics of Device Application, Device Applications Vs Desktop application, overview of application development platforms (Devices OS-Palm OS, Symbian Series60, UIQ, BlackBerry, Windows CE), Programming Languages (C/C++, JAVA), IDE tools(Metroworks, Visual Studio wirh appropriate Symbian Series 60 SDK) **[04]**

Unit-II

System Structure- hardware resources, software basics, processes, threads and context switching, executable programs, power management, Kernel & E32, Device Drivers, timers, memory, files, event handling, perspectives on event handling, active objects, multitasking and preemption, servers.
C++ and object oriented- fundamental types, naming conventions, functions, APIs, templates, casting, classes, design patterns, class diagrams and UML
Graphics Application- graphics architecture, graphical “Hello World” program, resource file, launching the application. **[10]**

Unit-III

String and description- String and memory, modifying strings, standard descriptor functions, Text APIs, Unicode character conversion, binary data.
Error handling- kinds of errors, handling out-of-memory errors, cleanup rules, C&T classes, R Classes, user errors, panics, testing engines and libraries, Symbian specific resource compiler. **[12]**

Unit-IV

Basic APIs – Examples of APIs, C standard library.
Stand Alone Applications- Overview, Engine Classes, the View class, scaling and zooming, the controller, the App UI, persistence, two player battleships.
Dialog and Concrete Controls- Introduction to Dialogs, Simple dialog, dialog APIs, Stock controls for dialogs, standard dialogs. **[12]**

Unit-V

Graphics for Display- Drawing basics, the CGContext API, drawing and redrawing, Flicker free redraw, Sharing the screen,CCoeControl’s support for drawing, special effects.
Files, Streams and Store- File based applications, introduction to APIs, the file server, the ‘streams’ program, Streams, Stores, types of store, dictionary stores and .ini files, the UIQ application architecture.
Finishing touches- Adding buttons, adding application icons, making your application installable, designing applications for UIQ, handling data. **[14]**

References:-

1. Richard Harison, "Symbian OS C++ for mobile phones", Volume 1, Symbian press (Wiley India), 2006
2. Richard Harrison, Mark Shackman, "Symbian OS C++ for Mobile Phones", Volume 3, Symbian press (Wiley India), 2007
3. Richard Harrison, "Advanced Symbian OS C++ Programming for mobile phones", Volume 2, Symbian press (Wiley India), 2007

Course Code : CA LAB IX
Title : LAB on VC++ and DAD

DAD Assignments:

1. Write Symbian text based and dialog based program, "Hello world" program.
2. Write Symbian program for drawing various graphical shapes.
3. Write Symbian program to demonstrate various UI elements like List Box, Progress bar, Slider control, Popup List, buttons etc.
4. Develop menu based application in Symbian.
5. Develop form based application in Symbian.
6. Write a program to store retrieve employee information using CFIL.

WP/VC++ Assignments:

Windows Programming:

1. Write a Window program to demonstrate line drawing with right mouse button. The color & width of line should change with every new line.
2. Write a Window program that display small rectangles with every left mouse click, double clicking on existing rectangle should erase the rectangle.
3. Write a Window program to display size of window and no.of left button clicks, no of right button clicks and no. of double clicks. This data should be displayed on two separate lines. Size should be updated when user resizes the window object.
4. Write a Window Program to draw Sine Wave on client area.
5. Write a Window program to create filled rectangles and circles on alternate left click. New figure should not erase the previous one.
6. Write a Window program to change background color of the window after every 2 seconds. And at each mouse click the fill pattern should change.

7. Write a Window program to create a window object. Drag the left mouse button & display rectangle for which dragged line is a diagonal. Also demonstrate mouse capturing.
8. Write a Window Program to draw following shapes on client area when the user presses the keys : C – Circle, R-Rectangle, E-Ellipse, L-Line, G-Round Rectangle.

Visual Programming:

1. Create a SDI application that displays a dialog box with two fields viz. User name, password & two push buttons. The dialog box is invoked when user start the application. After user presses on 'ok' button display the contents of user name and password in the client area.
2. Create SDI application to display the dialog box through menu. The dialog box should contain three scroll bars(red, green, blue) and an edit box. The color of the edit box should change when user drags the scrollbar.
3. Create a SDI application that displays a dialog box by clicking mouse left button with five fields : Name, age(spinner control), check boxes for qualification, Radio buttons for sex & drop down combo box for designation. As the user fills in this information in the dialog box & press 'OK' button display the data entered by the user in the client window.
4. Create a SDI application to place a slider, progress bar control on client area and as user moves slider control, set the value of the progress bar accordingly.
5. Create SDI application to Demonstrate Calendar ActiveX control. Implement at least any four methods of calendar control.
6. Create a SDI Application to display a dialog box through toolbar. The dialog box should contain an edit box, two buttons: Add, Remove and a List box. Whenever user enter a string in the edit box and presses the Add button data should be added to the list box. If user select some item in the list box and press the remove button, that item should be deleted from the list box.
7. Write a SDI Application to the fill client area by creating your own bitmap file.
8. Write a SDI Application to demonstrate the use of CFileDialog, CColorDialog, CFontDialog base classes.
9. Create a SDI application with following menu options. Display the selected menu items in the client window. Menu Item should have check marks on it when selected. Color : Red ,Green, Blue, Black, White.Change the background color of client area accordingly use ON_COMMAND_RANGE macro.
10. Write a SDI Application that should display a dialog box on left click. The dialog box should contain one tree control, three edit boxes for entering

class name, and names of two students, and button Add. When user fills the data and clicks Add button, the data should be added to the tree in proper hierarchy. E.g.

M.Sc

Student1

Student2

11. Create a SDI application with splitter window, it splits in two horizontal panes. The upper pane is data entry area for entering the person information. When user enters this information and click Ok, it should be displayed in lower pane.
12. Create A SDI application . Create property sheet with three pages:
Page1: contains one edit box for entering a name.
Page2: contains one radio button for sex
Page3: contains list box for designation.
If ok is pressed then entered information is display on client area.
13. Create SDI application to Demonstrate RichEdit Control on client area. Take three buttons (Bold, Italic, Underline) on toolbar. Apply proper formatting to the text in RichEdit control.
14. Create SDI application to Demonstrate Doc-View Architecture for the following: Take any two data members in Document class, update and retrieve those data members from view class. Note: Use Dialog box for updation.
15. Create your own class CMessage having data members
CString : Name;
CString : Address;
int : Phone number. Make it Serialiazable.
16. 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.
17. Create a SDI Application to demonstrate HTTP server.

Course Code: CA-Lab – X
Title: Lab on Current Computing

The practical assignments of this course are based on the theory course CA-503, hence the list of assignments would be prepared at the time of framing the detailed syllabus as mentioned above.

Cours Code:CA-601
Title: Full time Industrial Training