उ. प्र. राजर्षि टण्डन मुक्त विश्वविद्यालय

School of Compupter & Information Science

विश्वविद्यालय परिसर शान्तिपुरम् (सेक्टर–एफ),
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Computer and Information Science

The School of Computer and Information Science was established with a view of Computer Educaion and make skilled professional in Computer world.

To achieve this objective the following programme are running in School of Computer and Information Science, U.P. Rajarshi Tandon Open University, Allahabad.

(1) M.C.A. (Master in Computer Application)

(2) M.Sc. (Master in Computer Science)

(3) BCA (Bachelor in Computer Application)

(4) PGDCA (Post Graduate Diploma in Computer Application)

(5) DIC (Diploma in Computer)

(6) D.COM (Diploma in Computer and Office Management)

(7) DIHT (Diploma in Hardware Technology)

(8) CCC (Computer Course Certificate)

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Rajit Ram Yadav	Lecturer, School of Computer & Information Science

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MCA- 1.1

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Boolean Algebra and Circuits

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MCA- 1.2

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MCA- 1.3

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The Central Processing Unit

Instruction Set Architecture

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MCA- 1.4

SYSTEMS ANALYSIS AND DESIGN

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Fundamentals of Systems, Real Time Systems, Distributed Systems, Development of a successful System, various Approaches for Development of information systems (Model Driven, Accelerated approach, Joint Application Development.

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Introduction to documentation of Systems

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Planning and Designing Systems:

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Modular and Structured Design

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System Design and Modeling

Logical and Physical Design, Process Modelling, Data Modeling (ER Diagram), Process specification Tools (Decision Tables, Decision Trees, Structured English Notation), Data Dictionary.

More Design Issues and Case Tools

Forms and Reports Design

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Physical file Design and Database Design

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Implementation and Security of Systems & MIS

Implementation and Maintenance of Systems:

Implementation of Systems, Maintenance of Systems.

Audit and Security of Computer Systems:

Definition of Audit, Audit of Transactions on computer, Computer Assisted Audit Techniques, Computer System and Security Issues, Concurrent Audit Techniques.

Management Information Systems:

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MCA-1.5

Data Communication Networks

Introduction to data Communication and computer network concepts.

Introduction to computer Networks – Network Goals and Motivations, classification of Networks, Network topology, Application of Network, Networking model, Network Architecture, ARPANET, Types of Networks, Advantages of Networks.

Data Transmission – Data communication Terminology, Models of Data Transmission, Analog and Digital data transmission, Transmission Impairments, Transmission Media and its Characteristics, wireless transmission, wireless LAN.

Data Encoding and Communication Technique- Encoding, Analog-to-Analog Modulation, Analog to Digital Modulation, Digital to Analog Modulation, Digital to Digital Encoding.

Multiplexing and Switching - Multiplexing, Digital Subscriber lines, ADSL Vs. CABLE, Switching.

Media Access Central and Data Link Layer

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Retransmission Strategies- Stop & wait ARQ, GO-BACK ARQ, Selective Repeat ARQ pipelining, piggybacking.

Contention – Based Media Access Protocols - Advantages of Multiple Access sharing of channel Resources, Pure Aloha, Slotted Aloha, CSMA, CSMA/CD, Ethernet frame format (IEEE 802.3).

Wireless LAN and Datalink layer switching – Introduction to wireless LAN, wireless LAN architecture (IEEE 802.11), Hidden station and Exposed Station problems, wireless LAN protocols : MACA and MACAW, IEEE 802.11 protocol stack, switching at Data link layer.

Network layer

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Routing Algorithms – Flooding, shortest path routing algorithm, Distance vector routing, Link state routing, Link state routing, Hierarchical routing, Broadcast routing, Multicast routing.

Congestion Control in Public Switched Network – Reasons for congestion in the network, congestion control vs. flow control, congestion prevention mechanism, General principles of congestion prevention mechanism, General principles Congestion control, open loop control, congestion control in Packet-switched Network.

Internetworking – Internetworking, Network layer protocols, ICMP, OSPF, BGP.

Transport Layer and Application Layer Services

Transport Services and Mechanism – Transport services, Elements of transport layer protocols.

TCP/UDP – Services provided by internet transport protocols, Introduction to (UDP, TCP), TCP segment header TCP connection establishment, TCP connection Termination, TCP Flow control, TCP Congestion control, Remote procedure call.

Network Security-I – Cryptography, Symmetric key cryptography, public key cryptography, Mathematical background.

Network Security-II – Digital Signatures, Management of public Keys, Communication Security, Web Security.

MCA-2.1

Introduction to Database Management System

The Database Management System Concepts

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Relational AND E-R Models – The Relational Model, Relational Constraints, Relational Algebra, Entity Relationship (ER) Model, E-R diagram, Conversion of ER diagram to Relational database.

Database integrity and Normalisation : Relational Database integrity, Redundancy and Associated problems, Single – valued dependencies, single valued Normalisation, desirable properties of decomposition, Rules of Data Normalisation.

File organization in DBMS – Physical Database Design issues, storage of database on Hard disks, file organisation and its types, types of indexes, Index and tree structure, Multi-key file organisation, Importance of file organisation on database.

Structured Query language and transaction Mgt.

The Structured Query language – SQL Data Definition language, DML, Data control, Database objects : Views sequences, Indexes and synonyms, dable Handiling, Nested Queries.

Transactions and Concurrency Management – The transactions, the concurrent transactions, the locking protocol, Deadlock and its prevention, optimistic concurrency control.

Database Recovery and Security – Recovery, Recovery Techniques, Security and Integrity, Authorisation.

Unit-4 **Distributed and Client Server Databases –** Need for Distribution Database Systems, Structure of distributed Database, Advantages and Disadvantages of DDBMS, Design of Distributed database, client server Database.

Application Development – Development of A Hospital Management System, Needs to Develop HMS, Creating a database for HMS, Developing Front and forms, Reports, using Queries and Record set.

Study Centre Management System : A Case Study

Introduction – Introduction to Software, Software Development process : Analysis, System Designing, Software Development, Testing and Maintenance.

MCA-2.2

Object oriented Technologies and Java Programming

Object Oriented Technology and Java

Object – Oriented Methodology-1 – Paradigms of Programming languages, Evolution of 00 Methodology, Basic Concepts of OO Approach, Comparison of object oriented and procedure – oriented Approaches, Benefits of OOPS, Applications of OOPS.

Object – oriented Methodology -2 – Classes and objects, Abstraction and Encapsulation, Inheritance, Method overriding and Polymorphism.

Java Language Basics – Introduction to Java, Primitive Data Type and Variables, Java Operators.

Expressions Statements and Arrays – Expressions, Statements, Control Statements, Selection Statements, Iterative Statements, Jump statements, Arrays.

Object oriented concepts and Exceptions Handling

Class and objects – Class Fundamentals, Introducing Methods, this Keyword, Using objects as Parameters, Method overloading, Garbage collection, the finalize () Method.

Inheritance and Polymorphism – Inheritance Basics, Access, Multilevel, inheritance, Method overriding Abstract classes, Polymorphism, Final Keyword.

Packages and interfaces – Package, Accessibility of Packages, using Package members, Interfaces, Implementing interfaces, interface and Abstract classes, Extends and Implements together.

Exceptions Handling – Exception, Handling of Exception, Types of Exceptions, Throwing, Exceptions, writing Exception subclasses.

Multithreading, I/O, and Strings Handling

Multithreaded Programming – Multithreading, The Main thread, JAVA Thread Model, Thread Priorities, Synchronization in JAVA, Inter thread Communication.

I/O IN JAVA – I/O Basics, Streams and stream, Classes, the predefined streams, Reading from and writing to console, reading and writing files, the transient and volatile Modifiers, using instance of Native Methods.

Strings and Characters – Fundamental of Characters and Strings, the String class, String operations, Data Conversion using value of () Methods, Strings Buffer and Methods.

Exploring Java I/O – Java I/O classes and interfaces, Stream classes, Text streams, Stream Tokenizer, Serialization, Buffered stream, print stream, Random Access file.

Graphics and user interfaces

Applets – The applet class, Applet architecture, An applet Skeleton : Initialization and Termination, Handling events, HTML Applet TAG.

Graphics and user interfaces – Graphics contests and Graphics objects, user interface components, Building user interface

with AWT, Swing – Based GUI, Layouts and layouts and layout Manager, Container.

Networking Featrures - Socket overwiew, Reserved parts and proxy servers, Internet Addressing : Domain Naming Services (DNS), Java and The Net : URL, TCP/IP Sockets, Datagrams.

Advance Java - Java database connectivity, An overview of RMI Application, Java Servlets, Java Beans.

MCA-2.3

Software Engineering

An Overview of Software Engineering

Software Engineering and its Models – Evolution of Software Engineering, Software development Models, Capability Maturity Models, Software process Technology.

Principles of Software Requirements Analysis – Engineering the product, Modeling the system architecture, Software Metrics.

Software Design – Data Design, Software prototyping and specification, Modular Design, Architectural Design, Interface Design, Design of Human Computer interface.

Software Testing – Basic Terms used in testing, Testing activities, Debugging, Testing Tools.

Software Project Management

Software Project Planning – Different types of Project Metrices, Software Project Estimation, Models for estimation, Automated tools for estimation.

Risk Management and Project Scheduling – Identification of Software Risks, Monitoring of Risks, Management of Risks, RISK control RISK Recovery, choosing the tasks of Software

Engineering, Scheduling Methods, The Software Project plan.

Software Quality Assurance – Software Quality, Formal Technical Review, Software Reliability, Software Quality Standards.

Software Changes Management – Baselines, Version Control, Change Control, Auditing and Reporting.

Advanced Software Engineering

Web Software Engineering – Characteristics of a web Application, Issues of Management of web Based Projects, Metrics, Analysis, Design and Construction, Reviews and Testing.

Mobile Software Engineering – Introduction to GSM, Wireless Application Development using J2ME, Introduction to JAVA Devices test suite.

Case Tools – Case Tools, Case Software Development Environment, CASE Tools and Requirement Engineering, Case Tools and Design and Implementation, Software Testing, Software quality and case Tools, Software Configuration Management, Software Project management and Case tools.

Advanced topics in Software Engineering – Evolution of formal methods, use of Mathematics in Software Development Application Areas, Limitation of formal Specification using formal methods, Clean room Software Engineering, Conventional Software Engineering Models vs. cleanroom Software Engineering Model, Cleanroom Software Engineering Principles, Strategy and process Overview, Limitations of Cleanroom Engineering. Similarities and Differences Between Cleanroom OO Paradigm, Software Reuse and its types, Component Based Software Engineering, Component Based Software Engineering (CBSE) Process, Component Technologies available, challenges for CBSE, Reengineering, Software Reengineering life cycle.

MCA-2.4

Operating System Fundamentals and Networking

Operating System Fundamentals & Networking

Graphical User Interface – Evolution of Humanand Machine interaction, Common Graphical User interfaces, Functionality of GUI, GUI Design Consideration : Psychological Factors, GUI Design Consideration, Standards.

Introduction to operating System – Evolution of operating systems, operating system structure, classification of Advanced operating systems, characteristics of Modern operating system.

Introduction to Networking Concept – Networks, the topologies, characteristics of the OSI Layers, OSI Model and communication Between Systems, Interaction Between OSI Model Layers, Protocols, Types of Networks, Medium, Dataflow, Physical Connection, Transmission media Connecting devices.

Internetworking : Concept, Architecture and protocols – History of Internetworking, Packet Switching, Internetworking concepts, Internet Addresses, Configuring IP Addresses, TCP/IP, Additional TCP/IP Related protocols, Application layer protocols, www, Domian Name System SNMP and UDP.

Linux Operating System

Introduction to Linux operating System – Features of Linux, Draw Backs of Linux, Components of Linux.

Linux Commands and Utilities – Entering the machine, The file System.

Linux Utilities and Editor - Same useful commands, Permission Modes and standard files, pipes, Filters and Redirection Shell Scripts, GUI, Editor.

User to user Communication- On-line Communication, off-line communication, Apache Server Settings, Network Server settings.

Unix System Administration – System Administration**,** Installing Linux, Booting the system, Maintaining user Accounts, file systems and special files, Backups and Restoration.

Windows 2000

Windows 2000 Networking – Windows 2000 operating System Architecture, using the mapped Drive.

Managing Windows 2000 Server – Using Window 2000 Server and client, Logging onto the Network, Browsing Network Resources, Accessing Network Resources Using My Network places, Mapping a folder.

Advanced Windows 2000 Networking – Windows 2000 Domains, workgroups & Trusted Relationships, user Administration, Remote Access.

Windows XP Networking – Introduction to Windows XP Networking, Windows XP in file Systems, Sharing Network Resources in Windows XP, Enabling offline file features.

Security and Management

Security Concepts – Goals of Computer Security, Security Problem and Requirements, Threats and Vulnerabilities, user Authentication, Security system and facilities, Cryptography, Intrusion detection, Computer-security classifications.

Computer Security : Hardening operating System and Application Code – Hardening file system security, Hardening Local Security policies, Hardening services, Hardening default Accounts, Hardening Network Activity, Fault Tolerant system, Backup and UPS.

Security and Management-I – Main issues is windows security Management, Domain controller, windows Resources security Management, Registry Management, Printer Management, Managing windows 2000 operating system, Active Directory, Windows 2000 DNS Management, Managing group policy.

Security and Management – II – User Authentication Management, users and group Management, resource Management, windows, 2000 Network-Security and Management, Encrypting file system Management.

MCA- 3.1

NUMERICAL AND STATISTICAL COMPUTING

FORTRAN 77 and FORTRAN 90

Introductory FORTRAN Concept :

Character set, Constants and variables, Data Types, Subscripted variables and simple fortran functions, Fortran Expressions, Naming Fortran Programs, Assignment statement, Fortran Commands.

Data transfer and Program Execution Contol

Format Specification for Read and Write statements, Format Commands, Control Commands, Transfer Commands.

Arrays and Repetitive Computations

Arrays, Array storage, Dimension Statement, DO Construct, Nested DO loops, continue statement Implied-DO.

Subprogram : Functions and Subroutines

Subprograms, Functions in FORTRAN , Function Arguments, Subroutines save variables, Function vs. Subroutine Subprograms.

Additional Features of Fortran

Global variables and Additional Features

Common statements, Equivalence declarations, Data Command, Block Data Subprogram, Declaration External, Character Expressions and Assignment.

File Manipulation

Records and Files, File structures, File Connection, The open and close statements, Preconnected files,

File Inquiry, Additional Sequential file manipulation statements, Internal files, File Input/output.

FORTRAN 90

Character set, Names, Source Program, Data types and Declarations, Type declaration Commands, Expressions and Assignments, Control and Iterative constructs, Arrays Program Units, Modules, Simple pointers.

Statistical Computations:

Presentation of Data :

Data and Statistical Data, Frequency distribution, Graphical Representation, Inter-Relationships of Graphs.

Measure of Central Tendency

Measures of Dispersion, Coefficient of variation and coefficient of Dispersion, Moments, Skewness and Kurtosis.

Correlation, Regression and Curve Fitting

Correlation and scatter diagram, Regression, Method of least square, Graphical Representation of Relation between correlation and Regression, Curve fitting.

Probability

Definitions (classical Definition of Probability, Limitation of Classical Definition of Probability, Statistical Definition of Probability, Axiomatic Approach, Simple properties of Probability of an event, Conditional Probability, Bayes Theorem, Boales inequality, Independent Events, Random Variable Expectation or Mathematical Expectation, Properties of Expectation , Distribution, Binomial Disribution,Poisson Distribution, Normal Distribution).

Index Number and Time Series Analysis:

Index Number (Price, Quantity, Value Indexes), Chain Base Index Number, Cost for living index, Criteria for a good Index Numbers, Time series, Analysis of Trend, Measurement of Seasonal Components, Cyclical and Random Component, Forecast and its Accuracy.

MCA- 3.2

C++ AND OBJECT ORIENTED PROGRAMMING

An Introduction to OOP:

What is object oriented Programming::

Object oriented programming, Paradigm, Advantages of OOP, Applications of OOP, The object orientation, C++

Object Oriented Programming System

OOPS, Class, Inheritance, Abstraction, Encapsulation and information Hiding, Polymorphism.

Advanced Concepts

Dynamism, Structuring Programs, Reusability, Oraganizing object – oriented Projects.

Introduction to object oriented languages

Objective-C, Python, C Sharp, Eiffel, Modula-3, Small talk, Object Rexx, Java, Beta.

An Introduction to UML

UML (Goals, History, use), Definitions, UML Diagrams (Use Case Diagrams, Class diagrams, Interaction Diagrams, Sequence diagrams), State diagram, Activity Diagrams, Physical diagrams.

C++ An Introduction

Overview of C++

Programming Paradigms, Concepts of C/C++, Functions and files.

Classes and objects:

Definition and Declaration of a class, Scope Resolution Operation, Private and Public member functions, creating objects, Accessing class data members and member functions, Arrays of objects, objects As Function Arguments.

Operator overloading

Operator Functions, Large objects, Assignment and

initialization, function call, Increment, Decrement Operator, Friends.

Inheritance-Extending classes

Concept of Inheritence, Base class and Derived class, Visibility Modes, Single inheritance, Multiple Inheritance, Nested classes, Virtual Functions.

Streams and Templates

Output, Input, Files and Streams, Templates, Exception Handling.

MCA- 3.3

COMPUTER NETWORKS

An Introduction to Computer Networks

Network classification and Reference Models :

Network, Network Goals, Application of Networks, References Mode, (OSI, TCP/IP), IEEE Standards for LAN.

Data Transmissions and Multiplexing

Transmission Terminology Analog and Digital Data transmission, Transmission media, Multiplexing.

Medium Access Control and Data Link layer

Data link layer, Medium Access Control Sublayer.

Network, Transport and Application layer

Network layer, Routing Algorithms, Congestion Control Algorithms, Transport layer, QOS, TCP/UDP, Application layer, DNS, Remote Procedure Call (RPC), File transfer protocol (FTP) Talnet.

Network Devices and Technology

Network Devices-I

Network Devices, Repeaters Bridges Switches, Hubs.

Network Devices – II

Routers, Gateways, Modem

ISDN:

Baseband and Broadband Communication, ISDN Services, Advantages of ISDN, ISDN Applications.

Asynchronous transfer Mode (ATM)

Switching Techniqus, circuit, Packet, Frame Relay, Cell Relay, ATM as Technology, ATM Layered Architecture in Comparison with OSI Model, ATM Protocal, The ATM Netwrok, The ATM cell, ATM classes of Services, ATM Traffic Control , Benefits of ATM, ATM Applictions.

MCA- 3.4

WINDOWS PROGRAMMING

Components of Windows Programming and

Visual Basic:

Visual Basic : Introduction :

Start and exit visual Basic, V.B. Interface, Debug window, print command, V.B. Arithmetic Operators,

Variables and Functions

Variables, variable Names, variable types, Range of the variable values, Fuctions.

Building A Project and Customizing Forms:

About Project,Form, Form Properties, Form Tools, Form Events.

Visual Basic Controls:

Central, Custom Control, Controls in a form.

Functions & Procedures

Form, Standard and class Module, sub procedure, DO-event Functions, Control Arrays.

Accessing Database:

Using Data Manager, Creating a database, Creating a New table, Attaching a table, Changing Design of an

existing table, Creating Indexes, working with data.

Creating Form with data Controls:

Data Controls Data aware control, Creating a form using data Controls, Manipulating data, creating the Menu Bar. Displaying a menu item code.

Object Linking & Embedding

Basics of OLE, the OLE Icon, Terms used in OLE, OLE automation, Using OLE Control Popup-Menu, Creating OLE object at Design time, Creating part of an OLE object, Testing Embedding/Linking.

Windows Programming using visual basic 6.0

Introduction:

Starting An Era of Visual Software Developoment, RAD Tools, Basic interface Component, Creating and linking object through Basic Programming, Activity.

Advanced Features of Visual Basic 6.0

Identification of some Advanced features of visual Basic 6.0, Employment of Features , Simple Animation using Active X, Drag and Drop, Linking to Database

Active X and windows API

Creating Active X DLLS, using windows API in Visual Basic IDE.

MCA- 3.5

DISCRETE MATHEMATICS

Mathematical Logic

Connectives :

Statements, connectives (Negation Conjunction, Disjunction), Conditional and Biconditional, Equivalence of formulae and well formed formulae, Tautologies, Duality law, Functionally complete sets of Connectivs.

Some More Connectives

Exclusive OR, NAND, NOR, Two state evices, Gate and Module, Two-level networks, NOR and NAND gates.

Normal Forms and The Theory of Inferences

Various Normal forms, Valid inference using truth tables and direct method of proof, Inference (Rules P and T), Consistency of Premises and indirect method of proof, Automatic proving of theorems.

The predicate Calculus

Predicates, Statement Functions, variables and Quantifiers, Free and bound variables, special valid formulas involving quantifiers.

Graph Theory

Introduction to Graphs:

Graph, Applications of Graphs, MTNL's Networking Problem, Travelling Salesman Problem, Satellite Channel Problem, Graph isomorphism, Bipartite graphs, Subgraphs, Paths and walks, Connected Graphs and Cycles, Operations on graphs, Matrix Representation of graphs, Fusion of Graphs.

Trees and Connectivity

Tree, Properties, Bridge or cut Edge, Distance and Centre, Spanning trees, and connector problems, Kruskal's Algorithm, Prim's Algorithm, Computer implementation, cut vertices and connectivity, Shortest Path problems (BFS), Binary trees.

Euler tours, Hamiltonian Cycles, Planar graphs and Digraphs

Euler Tours, Konisberg Bridge problem, Fleury's Algorithm, Hierhozer's Algorithm, Hamiltonian graphs, closure of a graph, two optimal Algorithm, The closet insertion Algorithm, Planar graphs, Directed graphs of digraphs.

Functions, Sets and Relations

Basic Concepts of Set theory:

Operations on sets, Venn diagram and some of the Applications of set theory, Cartesian product of sets,

Relations and ordering:

Relations, Hasse Diagram.

Functions:

Functions, Range and Domain of a function, Functions as Sets of ordered Pairs, Difference between Relations and Functions, Transformation or Operators, Equality of two functions, Graph of a function, Types of functions, Permutation of a set, Product or compositions of Mappings, Binary operations, characteristic functions, Hashing Function and its Application in Computer Science.

Fuzzy Sets:

Vagueness, Impreciseness, Fuzzy sets, Basic operations, On Fuzzy sets, Image and Inverse image, I-V Fuzzy sets, Fuzzy relations.

Lattices and Boolean Algebra

Posets and Lattices:

Posets, Lattices as posets, lattices as Algebraic Systems, Sublattices, Complete Lattices, Bounds of Lattices, Modular and Distributive Lattices, Complemented Lattices, chains.

Boolean Algebra

Definition and important properties, sub Boolean Algebra, Atoms, Antiatoms and irreducibles, stone Representation theorem, Bolean Expressions and their Equivalence, Minterns and Maxterms, Canonical Forms and free Boolean Algebras, values of Boolean Expressions, Boolean Functions, Symmetric Boolean Expressions.

Applications of Boolean Algebras:

Switching Algebra, Representations of Boolean Functions, Karnaugh Maps, Minimization of Boolean functions, Quine-McCluskey Algorithm.

Applications of Boolean Algebras:

Complement and 28 complement of a binary number, Modules and circuit diagrams for 1s and 2s complement. Binary Addition, Binary subtraction,

Single Parity Bit Generator, Serial Binary Adder, Finite State machines, Equivalence of States, Equivalence and Reduction of Machines.

MCA- 4.1

INTRODUCTION TO SOFTWARE ENGINEERING

Software Engineering Concepts

Introduction to Software Product, Component and Characteristics :

Software Engineering Phases, Documentation of the Software product, Software process and Models (Software Life Cycle, Requirements analysis and specification, Design and Specification, Coding and module testing).

Software Process Management:

Software Process Management, Human Resource Management, The software team (DD, CD, CC), Organisation, information and Decision, Problem Identification, Software crisis, Role of a System Analyst.

Project Planning and Control

Project planning and control, Project Scheduling, Project Standards, Project outsourcing.

Risk Management Concepts:

Introduction and Risk Management Concepts (Managing Risk, Typical Management Risks in software Engineering. Technical Planning, Project Tracking, Delivery Timings, Partial Recovery, Bench mark Testing.

Software Quality Concepts and Case Tools

Software Performance

Customer Friendliness, Software Reliability, Software Reviews, Software upgradation, Software tools and environment, Software Libraries and Toolkits,

Software Modules, Reapplication of Software modules, Development tools (Code Generators, Debuggers),

Quality Concepts.

Important Qualities of Software product and process (correctness, Reliability , Robustness, user Friendliness verifiability, Maintainability, Reusability, Portability, Data Abstraction, Modularity), Principles of Software Engineering.

Software Methodology An Object oriented concepts

The Evolving role of Software, An Industry perspective , structured Methodologies, Major influencing factors (Evolution of End user computing, Emergence of CASE tools, use of Prototyping and 4GL tools, Relational Database, Object Oriented Programming), using the Methodology, Choosing the Right Methodology, Implementing a Methodology, Current Generation of Software Development tools, Considerations in Application Development.

CASE Tools

Software crisis, An Engineering Approach to Software, CASE tools, factors Affecting Software Development, The Benefits of using CASE.

MCA- 4.2

RDBMS LAB

RDBMS Design

RDBMS Terminology :

Definitions (Database, Data base management system, Instances and Schemas, Traditional File Oriented Approach), Data Independence, Data dictionary, Database Security, Domain Security, Domain Definition, A Relation Relational Data Integrity, Candidate keys, Primary Key, Foreign keys, Referential Integrity.

Overview of Logical Database Design

The steps of Database Design (Conceptual Design, Schma Refinement, Physical Database Design and Tuning) , ER Model, ER Model Basics (Entity, Entity type and entity set), Attributes, Relationship, Weak Entitie, Components of an E-R diagram, ER Diagram Development.

Overview of Normalization

Redundancy and Associated problems, Role of Normalization, Single valued Dependencies, Single valued Normalisations (INF, 2NF, 3NF, BCNF), Desirable properties of Decompositions, Multivalued Dependencies, Multivalued Normalisation (Fifth Normal form), Rules of Data Normalization.

Practical On RDBMS:

E-R Diagram, Functional Dependency and Normalisation, SQL, Microsoft Access, View and Security using SQL.

RDBMS Lab. Introduction to MS Access.

Introducing Microsoft Access:

DBMS, Microsoft Access, Database, tables and Queries, forms and Reports.

Microsoft Access Basics

Starting and Quilting Microsoft Access, opening a database, The database window, objects of the Access database.

Working with Database

Creating a Microsoft Access database, creating objects, Set toolbars

Creating a table:

Plan fields and data types, create a table, set field properties, save and close a table, add and save records, modify fields in a table, Modify columns and rowas in datasheet, Attach validation rule to a field.

Finding Data

Find a value, Find and Replace, Create and Apply a

filter, specify criteria, sort records.

Creating a Query:

Create a query The quety window, Join tables, select field, specify criteria, sort records.

Creating a form

Create a form with form wizard, view Records in a form, Add, Delete and save Records, save and close a Form.

Customising Form

Change's a form's Design, Select and Resize Controls, Move and Delete Controls, Change Fonts , size and colour of Text.

Showing Data from More than one table on a form

Create a form that Contains a sub form , use a Query to Include fields from more than one table,

Creating Reports and Mailing labels:

Use Reports to Present data, Create a Report, Preview, Print and Save a Report, A report in Design view, Create and Print Mailing Labels.

MCA- 4.3

INTRODUCTION TO INTERNET PROGRAMMING

Fundamentals of Java Programming

Introduction to Java :

Applets and Applications, JAVA Buzzwords, The JAVA Plateform, Java libraries, starting with Java.

Data types, operators and Arrays

Data types in Java, Operators, Java keywords, Mixing Data types, Type Casting, Programming Constructs in Java, Arrays.

Classes and objects in Java

Classes and objects, Constructor, Subclassing, The extends keyword, The instance of operator, static variables and methods, The final keyword, Access

Control, Wrapper classes, Inner classes.

Exception Handling:

Exception classes, using TRY and CATCH, Handling Multiple exceptions, sequencing Catch blocks, Using Finally, Built-in Exceptions, throwing Exceptions, Catching Exceptions, user defined exceptions.

Packages and Interfaces

Creating Packages, Adding classes to existing Package, interfaces, creating Interfaces, Exceptions.

MCA- 4.4

TCP / IP PROGRAMMING

TCP/IP Fundamentals

Introduction to TCP/IP :

TCP/IP layring, TCP/IP stack, The TCP level, The IP level, The Ethernet level Internet Addressing (IP Address Component, IP Address format , IP Address classes, First Octet Rule, Domain Name System (DNS), Client / Server Model.

IP: Internet Protocol:

IP Header (IP Addresses, IP Address components, IP Address format and classes, IP Routing , IP Subnet Addressing, Subnet Mark.

TCP: Transmission Control Protocol

Basic Terminology (TCP, Internet Addresses, Network address, Host Address, Total Address, Symbolic names, Hostname, TCP Header (TCP header structure (source port, Destination Port), Acknowledgement Number, Window, Checksum, urgent Pointer, Options), Features of TCP, UDP (User Datagram Protocol).

MCA- 4.5

COMPUTER ORIENTED NUMERICAL TECHNIQUES

Computer Arithmetic and Solution of Non-Linear Equations:

Computer Arithmetic :

Floating point Arithmetic and errors, Pitfalls in Computations (Loss of significant Digits, Instability of Algoriths).

Solution of Non-Linear Equations

Iterative Methods for Locating roots, chord Methods for finding roots (Regula-falsi Method, Newton Raphson Method, Second Method), Ierative Methods and convergence criteria.

Linear System of Algebraic Equations and Polynomial Interpolation:

Solution of Linear Albegraic Equations:

Preliminaries, Direct Methods (Cramer's Rle, Gauss elimination Method, Pivating Strategies), Iterative Methods (The Jacobi Iterative Method, The Gass Seidal Iteration Method), Comparison of Direct and Iterative Methods.

Interpolation:

Lagrange's form, Interpolation, Polynomial, Inverse Interpolation, General Error Term, Newtons Formula for forward, Backward and Divided. Differences, Interpolation at Equaly spaced points.

MCA- 5.1

ACCOUNTING AND FINANCE FOR MANAGER'S

Accounting Framework

Accounting and it's Functions:

Scope and Emerging Role of Accounting, Accounting as an Information system. Role and activities of an Accountant Accounting Personnel, Nature of accounting Functions for Accounting and Finance.

Accounting Concept's and Standard's

Accounting framework, concept and standards, Changing Nature of GAPP, Attempts Towards Standardization and Accounting Standards in India.

Accounting Information and its Applications:

Purposes of Accounting Information, Accounting and Control in Organisations, Profit and Case Balance Distinguished, uses of Earnings Information and uses of Balance sheet.

Understanding Financial Statements:

Construction and Analysis of Balance Sheet

Conceptual Basis of a Balance sheet, Constructing a Balance sheet, Form and Classification of items.

Construction and Analysis of Profit and Loss Account

The linkage between Profit and loss account and Balance sheet, Measurement of Income, Preparation of Profit and Loss Account, Indirect Expenses, Methods of Depreciation. Form of Profit and Loss account, Cost of goods sold, Methods of Inventory valuation, Gross Profit, Operating profit Net profit

Construction and Analysis of Fund Flow Statement:

Working Capital and its need. Determining working capital Requirements, Sources of funds, Uses of Funds, Factor Affecting Fund, Requirements, Analysing change in Working Capital, Fund Flow Statement.

Accounting and Finance for Managers

Understanding and Classifying Cost's

Cost accounting, costs, Elements of cost, Components of Total Cost. Cost sheet, Classification of Costs, some other concepts of costs.

Absorption and Marginal Costing

Absorption costing, Marginal costing, Absorption Costing and Marginal costing, Differences, Marginal cost. Segregation of semi-variable costs. Contribution, Break even analysis. Utility of Marginal costing,

Limitations.

Cost Volume Profit Analysis

Meaning, Interplay and Impact of factors on Profit, Profit Graph, Cost Segregation, Marginal cost and Contribution.

Variance Analysis –

Meaning of Variance. Cost variances, Direct Material variances. Direct Labour Variances, Overead Variances, Sales variances Control of Variances, Variance Reporting.

Financial and Investment Analysis:

Ratio Analysis :

Classification, The norms for Evaluation, Computation and Purpose Management Uses of the Primary Ratio.

Leverage Analysis

Concept, Measures, and Effects of Financial Leverage, Operating Leverage, Combined Leverage, Financial Leverage and Risk

Budgeting and Budgetary Control

Investment Appraisal Methods:

Types of Investment Proposal, Need of Appraisal, Project Report, Methods of Appraisal, Depreciation, Tax and Inflows, Cost of Capital, Limitations of Investment Appraisal Techniques.

Financial Decisions

Management of Working Capital

Significance of Working Capital, Operating Cycle, Concepts of working Capital, Kinds of working Capital, Importance of working capital Management, Determinants of working Capital Needs. Approaches of Managing Working Capital. Measuring working capital working capital Management under Inflation, Efficiency Criteria.

Managing Cash Needs:

Need of Cash Determining Optimal Cash Balance,

Cash Management And Cash Budgeting.

Capital Structure

Measuring Features of an Appropriate Capital Structure, Determinants of Capital Structure.

Dividend Revision: Forms of Dividend, Dividend Policy,

Role of Financial Manager, Role of Board of Directors, Factors Affecting Dividend Decision.

MCA- 5.2

ARTIFICIAL INTELLIGENCE

Introduction to Artificial Intelligence

Overview of A.I., Knowledge : General Concepts, Definition and Importance of knowledge, knowledge Based systems, Representation of knowledge, knowledge organization, knowledge Manipulation, Introduction to Lisp, Functions, Predicates and Conditionals, Input, Output and Local variables, Iteration and Recursion, Property lists and Arrays.

Knowledge Representation

Formalized symbolic logics, syntax and Semantics for Propositional logic, Syntax and Semantics for FOPL, Properties of wffs, Inference Rules, The Resolution Principle, Truth Maintenance Systems, Model and Temporal Logics, Fuzzy Logic and Natural Language computations. Associative Networks, Frme Structures, Conceptual Dependencies and Scripts, Objects, class, Message, and Methods, object Oriented Langages and systems.

Knowledge Organization and Manipulation

Preliminary Concepts, Uniformed or blind search, Informed Search, Indexing and Retrieval Techniues, Integrating knowledge in Memory, Measures for Matching, Matching like patterns, Partial Matching, Fuzzy Matching Algorithms, The RETE Matching Algorithm.

Perception Communication, and Expert systems

Commands and Languages, Basic Parsing Techniques, Semantic Analysis and Representation Structures, Natural language Generation, Natural language Systems, Pattern Recognition, The Recognition and classification Process, Learning classification Pattern, Recognizing and understanding speech.

Knowledge Acquisition

Types of Learning, General Learning Model, performance Measures, Perceptions, learning Automata, Genetic Algorithms, Induction Basic Concepts, Inductive Bias, Generalization and specialization, The ID3 system, the LEX system The INDUCE system, Learing structure concepts.

MCA- 5.3

OPERATING SYSTEMS

Introduction :

Operating System, Generation of operating systems, Processors, Memory, Disks, Tapes, I/O Devices, Buses, Mainframe Operating Systems, Server Operating Systems Multiprocessor Operating Systems, Real time, Operating systems, smart card operating systems.

Operating System Structure:

Monolithic systems, Layered systems, Microkernels, client, Server Model, Virtual Machines.

Processes and Threads:

The process Model, process creation, Process Termination Process States Implementation of Processes, Thread usage, The classical thread Model, Hybrid Implementations, Interprocess Communication, Race Conditions, Critical Regions, Mutual Exclusion with busy waiting, sleep and wakeup, semaphores,

Memory Management:

The Notation of an Address Space, Swapping virtual memory, Paging Page labels, speeding up paging,

page Replacement Algorithms, The optimal Page Replacement Algorithm, the (FIFO) Page, Replacement Algorithm, The second chance page Replacement Algorithm, The clock Page Replacement Algorithm, Design issues for Paging systems, Implementation Issues, Segmentation.

Deadlocks:

Resources, The OSTRICH Algorithm, Deadlock, Avoidance, Deadlock prevention, Deadlock Detection and Recovery.

Security :

Basics of Cryptography, protection Mechanisms, Authentication, Malware, Defenses.

Case Study 1 : LINUX

Case Study 2 : WINDOWS VISTA

MCA- 5.4

OPERATIONS RESEARCH

Introduction to Operations Research

Operation Research – An Overview :

History, Approach, Techniques and Tools, Relationship Between O.R. specialist and Manager, Applications of OR., Phases and Processes of O.R., Study, Limitations of operation Research,

Review of Probablity and Statistics

Random Experiment and Probability, Random variable, Probability distribution, Standard Discrete Probability distributions, Continuous Probability Distributions.

Programming Techniques – Linear Programming and Applications:

Linear Programming – Graphical Method

Formulation of a linear programming problem, Formulation with Different types of constraints, Graphical Analysis, Graphical Solution, Multiple, unbounded solution and infeasible problems, Application of linear programming in Business and

Industry, self Assessment Exercises.

Linear Programming – Simplex Method

Principle of Simplex Method, Computational Aspect of simplex Method, Simplex Method with Several Decision Variables, Two phase and M-Method, Multiple, unbounded solutions and infeasible problems, sensitivity Analysis, Dual Linear Programming problem.

Transportation Problem:

Basic Feasible solution of a transportation problem (The North West Corner Rule, Matrix Minimum Method, Vogel Approximation Method (VAM), Modified Distribution (MODI) Method stepping store Method, Unbalanced Transporation problem, Degenerate Transportation problem, Transhipment problem, Maximisation in a transportation problem,

Assignment problem

Unbalanced Assignment problem, Problem with some infeasible Assignments, Maximisation in an Assignment problem. Crew Assignment problem.

Programming Techniques Further Applications:

Goal Programming:

Concepts of Goal Programming, Goal Programming Model Formulation, Graphical Method of goal programming, the simplex Method of Goal Programming, Application Area of Goal Programming,

Integer Programming

Integer Programming Formulation Techniques, Unimodularity, cutting plane method, Branch and Bound.

Dynamic Programming:

Dynamic Programming Methodology, Definitions and Notations, D.P. Applications.

Non-Linear Programming

Solution of a Non-linear Programming problem,

Convex and Concave function, KUHN TUCKER conditions for Constrained optimization, Quadratic Programming, Separable Programming.

Inventory and Waiting Line Models

Inventory Control – Deterministic Models

Inventory: An Essential Requirement, objectives of inventory, Functions of inventory, Classifications of inventory, Factors Affecting inventory, Inventory Modelling, Deterministic single item inventory models Deterministic Multi item inventory Models.

Inventory Control : Probabilistic Models:

Inventory Model with probabilistic Demand, Single period probabilistic Models, Multi-period probabilistic Models, Inventory Control systems, Fixed Order, Quantity system, Periodic Review System, other variants of probabilistic Models.

Queueing Models:

Characteristics of A Queueing Model, Notations and symbols, Statistical Methods, in Queueing, The M/M/I System, The M/M/C system, The $M/E_k/I$ System, Decision Problems in Queueing.

Game Theory and Simulation

Competitive situations: Game Theory

Definitions and Explanation of some important terms saddle points, dominance, mixed strategies: Games without saddle points, 2 x n Games, Exploiting an Opponents and Mistakes.

Simulation :

Reasons for using simulation, limitations of simulation, steps in the simulation process, Practical Applications of simulation, Hospital Simulation, Simulation and Inventory Control, Computer Simulation.

Case Studies:

Case 1: Insulator India Limited.

Case 2: Use of Operations Research Techniques: A Case Study of ECS Corporation.

MCA- 5.5

MULTIMEDIA

Introduction to Multimedia and its Applications

An Overview of Multimedia :

Multimedia – the Concept, Hardware for Multimedia Computer, Software for Multimedia, Components of Multimedia, Multimedia – Design, production and Distribution.

Application of Multimedia:

Application Areas for Multimedia, Publishing Industry and Multimedia, Communication Technology, and Multimedia Services, Multimedia in Business, Multimedia Pedagogues: Interactive systems for teaching and learning, concepts for distributed Learning Environment, A Medical Application : Mednet- A Medical collaboration and consultation system

Multimedia Authority Tools:

Multimedia Development tools, Features of Authority Software, Authoring tools Quick time, Hypertext, Applications of Hypertext, Elements of Hypertext.

Multimedia Development – Issues and Suggestions:

Learning Interface Design, Planning the Multimedia Program/application, Development Tips of Multimedia Building Blocks, Multimedia Authority.

MCS- 01

DISCRETE MATHEMATICS

Mathematical Logic

Connectives :

Statements, connectives (Negation Conjunction, Disjunction), Conditional and Biconditional,

Equivalence of formulae and well formed formulae, Tautologies, Duality law, Functionally complete sets of Connectivs.

Some More Connectives

Exclusive OR, NAND, NOR, Two state evices, Gate and Module, Two-level networks, NOR and NAND gates.

Normal Forms and The Theory of Inferences

Various Normal forms, Valid inference using truth tables and direct method of proof, Inference (Rules P and T), Consistency of Premises and indirect method of proof, Automatic proving of theorems.

The predicate Calculus

Predicates, Statement Functions, variables and Quantifiers, Free and bound variables, special valid formulas involving quantifiers.

Graph Theory

Introduction to Graphs:

Graph, Applications of Graphs, MTNL's Networking Problem, Travelling Salesman Problem, Satellite Channel Problem, Graph isomorphism, Bipartite graphs, Subgraphs, Paths and walks, Connected Graphs and Cycles, Operations on graphs, Matrix Representation of graphs, Fusion of Graphs.

Trees and Connectivity

Tree, Properties, Bridge or cut Edge, Distance and Centre, Spanning trees, and connector problems, Kruskal's Algorithm, Prim's Algorithm, Computer implementation, cut vertices and connectivity, Shortest Path problems (BFS), Binary trees.

Euler tours, Hamiltonian Cycles, Planar graphs and Digraphs

Euler Tours, Konisberg Bridge problem, Fleury's Algorithm, Hierhozer's Algorithm, Hamiltonian graphs, closure of a graph, two optimal Algorithm, The closet insertion Algorithm, Planar graphs, Directed graphs of digraphs.

Functions, Sets and Relations

Basic Concepts of Set theory:

Operations on sets, Venn diagram and some of the Applications of set theory, Cartesian product of sets,

Relations and ordering:

Relations, Hasse Diagram.

Functions:

Functions, Range and Domain of a function, Functions as Sets of ordered Pairs, Difference between Relations and Functions, Transformation or Operators, Equality of two functions, Graph of a function, Types of functions, Permutation of a set, Product or compositions of Mappings, Binary operations, characteristic functions, Hashing Function and its Application in Computer Science.

Fuzzy Sets:

Vagueness, Impreciseness, Fuzzy sets, Basic operations, On Fuzzy sets, Image and Inverse image, I-V Fuzzy sets, Fuzzy relations.

Lattices and Boolean Algebra

Posets and Lattices:

Posets, Lattices as posets, lattices as Algebraic Systems, Sublattices, Complete Lattices, Bounds of Lattices, Modular and Distributive Lattices, Complemented Lattices, chains.

Boolean Algebra

Definition and important properties, sub Boolean Algebra, Atoms, Antiatoms and irreducibles, stone Representation theorem, Bolean Expressions and their Equivalence, Minterns and Maxterms, Canonical Forms and free Boolean Algebras, values of Boolean Expressions, Boolean Functions, Symmetric Boolean Expressions.

Applications of Boolean Algebras:

Switching Algebra, Representations of Boolean Functions, Karnaugh Maps, Minimization of Boolean

functions, Quine-McCluskey Algorithm.

Applications of Boolean Algebras:

Complement and 28 complement of a binary number, Modules and circuit diagrams for 1s and 2s complement. Binary Addition, Binary subtraction, Single Parity Bit Generator, Serial Binary Adder, Finite State machines, Equivalence of States, Equivalence and Reduction of Machines.

MCS-02

'C' Programming and Data Structures:

Introduction

Introductory: :

An overview f C Escape sequences, Getting A "feel" for C.

Data types in "C"

Variables of type (ant] char, float, double,), Enumerated types, the typed of statement, Identifiers.

Operators and Expressions Inc

Elementary Arithmetic operations and operators, Expressions, L values and P values, Promotion and Demotion of variable types : The cast operator, Print f ( ) and Scan f ( ) functions.

Decision Structures in 'C'

Boolean operators and Expressions The goto statement, the if ( ), Statement, the if ( ) – else statement,.

Control structures – I

The do – while( ) and while Loops, the Comma Operator, the transfer of Central from within loops, Ternary operator, The Switch case default statement.

Programming in C

Control Structures II

'The for (;;) loop, unidimensional Arrays, The sizeaf operator, storage classless and scope.

Painters and arrays :

Pointer variables and pointer Arithmetic, Pointers, Arrays and the subscript operator, A Digression on

Scan f( ), Multidimensional Arrays.

Functions :

Function Prototypes and Declalrations, Functions and Scope, Pointers as Function Arguments, String Functions, Multi Dimentional Arrays as Function Arguments.

Functions II

Recursive functions, Macros, Conditional Compilation, Macros with Parameters, Command line Arguments, Variable length Argument lists, Complicated Declarations, Dynamic Memory Allocation.

Files and Structs, Unions and Bit-Fields

Files and File 70, Structs, the DOT Operator, Extructs and files : f seek ( ), Structs and Function and unions, The Bitwise operators.

MCS-03

Data Structures:

Introduction to Data Structures : Array

Program Analysis, Arrays, Array Declaration, Storage of arrays in Main memory, sporse arrays.

Lists

Basic Terminology, Static implementation of lists, Pointer implementation of lists, Doubly linked lists, circular linked list, Storage Allocation, Storage Pools, Garbage Collection, Fragmentation, Relocation and Compaction.

Stacks and Queues

Defining stack and Queue, stack oerations and Implementations, stack Applications, Queues: Operations and implementation, Queue Application, priority Queues.

Graphs

Defining graph, Basic, Terminology, Graph Representation, Graph traversal (DFS, BFS), shortest path problem, Minimum spanning tree.

Trees and File Organisation

Trees

Basic Terminology, Binary, trees, Traversals of a

Binary tree, Binary search Trees (BST).

AVL-Tree and B-Tree

Height Balanced tree, Building Height Balanced tree, B-Tree , B-Tree of order 5.

Files :

Terminology, File organization, sequential files, Direct, File organization, Indexed Sequential file organization.

MCS-04

Introduction to Computer Organisation

Hardware Concepts

Introduction and Data Representation :

The won Neumann Architecture, Computers: Then and Now, Data Representation, Instruction Execution.

Digital Logic Circuits

Boolean Algebra, logic Gates, Combinational circuits, Adders, Sequential circuits, Interconnection Structures.

Memory Organisation

Memory System, characteristics Terms for various memory Devices, RAM, External / Auxiliary Memory, High Speed Memories, Cache Memory, Associative Memories.

Input/Output Organisation

Input/Output Module, Input/Outpur Techniques, Direct Memory Access (DMA), Input/Output processors, External interface.

CPU Organisation

Instruction Sets

Instruction set characteristics, Addressing schemes, Instruction Format Design.

Register Organisation and Micro Operations

Basic Structure of the CPU, An Advanced Structure, Register Organisation, Micro Operations, Instruction Execution and Micro Operations.

ALU and Control Unit Organization

ALU Organisation, Control Unit Organisation, Functional Requirements of a Control unit structure of

Control unit, Hardwired Control unit.

Microprorammed Control Unit

MCU, Wilkes Control, The Microinstruction, Types of Microinstructions, Control Memory Organisation, Microinstruction formats, A simple structure of Control Unit, Micro instruction (sequencing, Execution), Machine Startup.

Microprocessor and Assembly Language Programming

Microprocessor Architecture

Microcomputer Architecture, CPU Components, CPU Registers, Instruction set, Addressing Modes, Introduction to Motorola 68000 Microprocessors.

Introduction to Assembly Language:

Assembly language Fundamentals, Input/Output Services, Assembly language Program Development tools.

Assembly Language Programming (Part-I)

Simple Assembly Programs (Data transfer, shift operations), Programming with loops and comparisons, Arithmetic and String Operations.

Assembly Language Programming (Part – II)

Arrays, Modular Programming, Interfacing Assembly language Routines to High level language programs, Interrupts

MCS -06

THEORY OF COMPUTATION

Finite Automata and Formal Languages

Finite Automata and Languages :

Regular Expressions (Introduction to Defining of languages, Kleene closure Definition, Formal Definition of Regular, Expressions, Algebra of Regular Expressions), Regular languages, Finite automata, Mealy and Moore Machines.

Non-Determnistic Finite Automata

Equivalence of NFA and DFA, Pumping Lemma, Closure properties (Regular Langaes and Finite Automata), Equivalence of Regular expression and Finite Automata.

Context Free Grammar:

Grammar and its classification, Chomsky, Classification for Grammar, Context free grammar, pushdown Automata (PDA), Non-Context free languages, Pumping Lemma for context free Languages, Equivalence of CFG and PDA.

Turing Machine and Recursive Functions

Turing Machine

Prelude to formal definition, Instantaneous Description and transition diagrams, Turing Machines as Computer of functions, Modular Construction of Complex turing machines, Symbol Writing machines, Right/Left head moving machines.

Turing Machine Miscellany

Extensions –cum-Equivalents of Turing Machine, Universal Turing Machine (UTM), Languages Accepted/Decided by TM, The diagonal language and the universal language, Chosky Hierarchy.

Recursive Function Theory

Recursive Function Theory

Recursive Definitions, Partial, Total and Constant Functions, Primitive Recursive Functions, Intuitive Introduction to primitive recursion, Primitive Recursion is weak Technique, The Techniques of unbounded minimalisation, Partial Recursion and u-Recursion.

Complexity of Computability

Computbility/Decidability

Decidable and undecibable problems, The halting, problem, Reduction to another undecidable problem, undecidability of post correspondence problem, undecidable problems for context free languages.

Complexity

Notations for Growth rates of functions (The Constant Factor in Complexity Measure, Asymptotic considerations, well known Asymptotic growth rate Notations, The Notation O, The Ω Notation, The Notation Θ, The Notation W, classification of problems, Reduction, NP-Complete and NP-Hard Problems, Establishing NP-Completeness of problems.

Applications

Applications of Finite Automata, Applications of Regular Expressions, Application of Context free grammars (Definition of C-type small language, Definition of Part of HTML), ACM Code of Ethics and Professional Conduct.

MCS-07

Introduction to System Software

Programming Concepts and Software Tools

Introduction to Programming Language Concepts :

Algorithm, Flowcharting, Problem and its Algorithm, Concept of a Programming Language, Categories of Languages, Elements of a Programming language.

Introduction to Assembler

Advocates of a translator, types of translators, Assembler implementation, Macro processor, Loaders.

Introduction to Compiler writing

Compiler, Approaches to compiler development, compiler Designing Phases, Software tools.

Graphical user interface :

Graphical user interface, Evolution of the human and Machine interaction, Common Graphical user interface terms, functionality of graphical user interfaces, A look at some graphical user interfaces.

Introduction to a text editor and debugging system

Introduction to a text editor, overview of the Editing process, Types of Editors and user interface, Editor structure, Interactive debugging systems, Debugging Functions and Capabilities, Relationship with other parts of the system, user interface criteria.

Fundamentals of operating system

Introduction to operating system:

Operating System, Evolution of operating systems, serial processing, Batch processing, Multipgoraming, types of operating System, Batch Operating system Multiprogramming Operating system, Network operating system, Distributed Operating System,

Operating System Structure, Layered Structure Approach, Kernel Approach, Virtual Machine, Client Server Model, Future Operating System trends.

Process Management

Process concept Processor scheduling, Types of Schedulers, Scheduling and performance Criteria, Scheduling Algorighms, Interprocess Commnications and synchronization, Basic concepts of concurrency, Basic Concepts of Interprocess Commnication and Synchronization, Mutual Exclusion, Semaphores, Hardware support for mutual Exclusion, Mechanism for Structured form of Interprocess Communication and synchronization, Deadlocks, System model, Deadlock Characterisation and Modelling.

Memory Management

Introduction, single process monitor, Multiprogramming with Fixed partitions, Multiprogramming with dynamic partitions, Paging Address mapping in a paging system, Hardware Support for Paging, Address Translation by Associative Memory, Sharing and Protection in a Paging System, Segmentation, Address Mapping in a Segmented System, Implementation of segment tables, sharing and Protection in a Segmented System, Virtual memory, Advantages of virtual memory, Demand Paging Virtual memory management policies.

File Management

Introduction, File concept, Directories, Disk organization, Disk Space Management methods, Linked List, Bit Map, Disk Allocation Methods, Contiguous Allocation, Non Contiguous Allocation, Disk Scheduling, FCFS, Shortest seek time-first scheduling, scan scheduling, File Protection, Passwords, Access Lists, Access Groups.

UNIX Operating System-I

Theoretical Concepts of UNIX operating System

Introduction, Basic features of unix operating system, UNIX system Architecture, File Structure processing Environment, CPU Schedulings Memory

Management, Swapping, Demand Paging, File System, Blocks and Fragment and Inodes, Directory Structure.

UNIX-GETTNG STARTED I

Introduction, Getting started, user Names and Groups, Logging in, Correcting Typing Mistakes, Format of UNIX commands, changing your Password, Characters with special Meaning, UNIX documentation, Files directories, Current Directory, Locking at the Directory Contents, Absolute and Relative, Pathnames, Some UNIX Directories and Files.

UNIX Getting Started II

Introduction, Looking at file contents, your own directories, file permissions, Basic operations on files, Links between Files, Changing permission modes, standard files, Standard Output, Standard Input, Standard Error, Filters and Pipelines, Processes, Finding out about Processes, stopping Background Processes.

TEXT Manipulation

Introduction, Inspecting files, file statistics, Searching for Patterns, Comparing Files, Operating on files, printing files, Rearranging Files, Sorting files, Splitting files, Translating characters,

Editors

Introduction, General characteristics of V_i , Starting up and quitting from V_i , Adding text and Navigation, changing Text, Searching for Text, Copying and Moving Text, The Features of ex, The live editors Ex and Ed. starting up and Quitting, Addressing Lines, Looking at Text, Adding Deletig and changing text, Searching for and replacing text, cut and paste operations, files and Miscelleneous features, The Stream Editor SED, changing several filed in SED, AWK.

UNIX operating System I

User to user Communication

Introduction, Online Communication, OFF-line

communication.

Shell Programming

Introduction, Programming in the Bourne and the C-shell, wild cards, simple shell programs, variables, Programming Constrcts, interactive shell scripts, advanced Features.

Programming Tools

Introduction, The UNIX C compiler, other tools (Lint-the – C verifier, Program Profiles, Program listings), Cross References and Program flow, Maintaining Programs, the source code control system (Initialising a file, Examining and Altering files, Identification Keywords, Miscellaneous Commands).

System Administration

Introduction, System Administration – A Definition, Booting the system, Maintaining user accounds, file systems and special files, Backups and Restortion.

MCS-08

INTRODUCTION TO SOFTWARE ENGINEERING

Software Engineering Concepts

Introduction to Software Product, Component and Characteristics :

Software Engineering Phases, Documentation of the Software product, Software process and Models (Software Life Cycle, Requirements analysis and specification, Design and Specification, Coding and module testing).

Software Process Management:

Software Process Management, Human Resource Management, The software team (DD, CD, CC), Organisation, information and Decision, Problem Identification, Software crisis, Role of a System Analyst.

Project Planning and Control

Project planning and control, Project Scheduling, Project Standards, Project outsourcing.

Risk Management Concepts:

Introduction and Risk Management Concepts (Managing Risk, Typical Management Risks in software Engineering. Technical Planning, Project Tracking, Delivery Timings, Partial Recovery, Bench mark Testing.

Software Quality Concepts and Case Tools

Software Performance

Customer Friendliness, Software Reliability, Software Reviews, Software upgradation, Software tools and environment, Software Libraries and Toolkits, Software Modules, Reapplication of Software modules, Development tools (Code Generators, Debuggers),

Quality Concepts.

Important Qualities of Software product and process (correctness, Reliability , Robustness, user Friendliness verifiability, Maintainability, Reusability, Portability, Data Abstraction, Modularity), Principles of Software Engineering.

Software Methodology An Object oriented concepts

The Evolving role of Software, An Industry perspective , structured Methodologies, Major influencing factors (Evolution of End user computing, Emergence of CASE tools, use of Prototyping and 4GL tools, Relational Database, Object Oriented Programming), using the Methodology, Choosing the Right Methodology, Implementing a Methodology, Current Generation of Software Development tools, Considerations in Application Development.

CASE Tools

Software crisis, An Engineering Approach to Software, CASE tools, factors Affecting Software Development, The Benefits of using CASE.

MCS-09

C++ AND OBJECT ORIENTED PROGRAMMING

An Introduction to OOP:

What is object oriented Programming::

Object oriented programming, Paradigm, Advantages of OOP, Applications of OOP, The object orientation, C++

Object Oriented Programming System

OOPS, Class, Inheritance, Abstraction, Encapsulation and information Hiding, Polymorphism.

Advanced Concepts

Dynamism, Structuring Programs, Reusability, Oraganizing object – oriented Projects.

Introduction to object oriented languages

Objective-C, Python, C Sharp, Eiffel, Modula-3, Small talk, Object Rexx, Java, Beta.

An Introduction to UML

UML (Goals, History, use), Definitions, UML Diagrams (Use Case Diagrams, Class diagrams, Interaction Diagrams, Sequence diagrams), State diagram, Activity Diagrams, Physical diagrams.

C++ An Introduction

Overview of C++

Programming Paradigms, Concepts of C/C++, Functions and files.

Classes and objects:

Definition and Declaration of a class, Scope Resolution Operation, Private and Public member functions, creating objects, Accessing class data members and member functions, Arrays of objects, objects As Function Arguments.

Operator overloading

Operator Functions, Large objects, Assignment and

initialization, function call, Increment, Decrement Operator, Friends.

Inheritance-Extending classes

Concept of Inheritence, Base class and Derived class, Visibility Modes, Single inheritance, Multiple Inheritance, Nested classes, Virtual Functions.

Streams and Templates

Output, Input, Files and Streams, Templates, Exception Handling.

MCS-11

Computer Graphics

Introduction to Computer Graphics, Display Technologies, Random and Raster Scan, frame buffer, bit plane, input Devices, Graphics Standards, Graphics Hardware.

Line and Circle Drawing Algorithms, Scan Conversion, filling algorithms, clipping, Two and Three Dimensional transformations, Homogeneous Coordinates, Rigid Body and Affine transformations, Parallel and perspective projections, vanishing points, viewing transformation, Hidden line removal method, Curve and Surface : Cubic Spline, Bezier curve, B-Spline Curves, Parametric Surface, Surface of revolution, Sweep surface, Fractal Curves and surfaces.

Introduction to Multi-media Technology, Audio System, Image Compression, Data Compression, Digital Motion Video, Authoring tools, Multimedia Applications, Multimedia DBMS.

MCS-12

Introduction to Database Manageent Systems

Introductory Concepts of Data Base Management Systems.

Basic Concepts :

Introduction, Traditional file Oriented approach, Motivation for database aapproach database basics, three views of data, The three level Architecture of DBMS Mapping between different levels database

Management System facilities, DDL, DML, Elements of a database Management System (DML Pre Compiler, DDL Compiler, File Manager, Database Manager, duery Processor, database Administrator, Data dictionary) , Advantages and disadvantages of database management system.

Data base Models and its Implementation:

Introduction, File Management System Entity, Relationship (E-R) Model, The hierarchical model, DBTG set, the network model, The Relational model, Advantages and Disadvantages of Relational Approach, Difference between Relational and other models.

File Organisation for Conventional DBMS

Introduction, File Organisation, Sequentil file organization, Index-sequential file organization (Types of Indexes, Structure of Index Sequential Files, VSAM, Implementation of Indexing through Tree-Structure), Direct file organization, Multi key file Organisation (Need for the multiple Access path, multicost , File organization, Inverted file organization, cellular Partitions, comparison and Tradeoff in the Design of Multikey file).

Management Considerations:

Introduction, Organisational Resistance to DBMS Tools (Political observation, Information transparency, Fear of future potential, Reasons for Success), Conversion from An Old system to a new system, Evaluation of a DBMS, Administration of a database Management System.

Enterprise Wide Information System of the Times of India Group (A Case Study)

Introduction, organization and the operating environment unique nature of the Business, Information System goals and how to achieve the Goal The Response System and Respnet Choices, Benefits.

RDBMS and DBMS

Relational Model

Concepts, Formal Definition of a Relation, the Codd,

Commandments, Relational Algebra, Relational Completeness.

Normalisation

Functional dependency, Anomalies in a database, Properties of Normalized Relations, 1st NF, 2nd NF, 3rd NF, BCNF, Fifth Normal form examples of Database Design.

Structured Query Language

Categories of SRL Commands Data Definition, Data Manipulation , views.

Distributed Databases

Structure of Distributed database Trade-OFFS in distributing the database, Design of Distributed Databases.

Emerging Trends in DBMS

Introduction to object oriented Database Management System

Next Generation database System, New database applications, object oriented database Management system, Promises and Advantages of object oriented Database Mgt. system, Difference between RDBMS and OODBMS, Alternative object oriented Database strategies.

Introduction to client/Server Database

Evaluation of client/Server, Emergence of client server Architecture, the cliend/server Computing, the critical products, Developing on Application, SQL (DDL, DML), Client/Server. where to Next?

Introduction to Knowledge Databases

Definition and Importance of knowledge, Knowledge base system, Difference between a knowledge base system and a database system, knowledge Representation Schemes.

MCS- 13

OPERATING SYSTEMS

Introduction :

Operating System, Generation of operating systems, Processors, Memory, Disks, Tapes, I/O Devices, Buses, Mainframe Operating Systems, Server Operating Systems Multiprocessor Operating Systems, Real time, Operating systems, smart card operating systems.

Operating System Structure:

Monolithic systems, Layered systems, Microkernels, client, Server Model, Virtual Machines.

Processes and Threads:

The process Model, process creation, Process Termination Process States Implementation of Processes, Thread usage, The classical thread Model, Hybrid Implementations, Interprocess Communication, Race Conditions, Critical Regions, Mutual Exclusion with busy waiting, sleep and wakeup, semaphores,

Memory Management:

The Notation of an Address Space, Swapping virtual memory, Paging Page labels, speeding up paging, page Replacement Algorithms, The optimal Page Replacement Algorithm, the (FIFO) Page, Replacement Algorithm, The second chance page Replacement Algorithm, The clock Page Replacement Algorithm, Design issues for Paging systems, Implementation Issues, Segmentation.

Deadlocks:

Resources, The OSTRICH Algorithm, Deadlock, Avoidance, Deadlock prevention, Deadlock Detection and Recovery.

Security :

Basics of Cryptography, protection Mechanisms, Authentication, Malware, Defenses.

Case Study 1 : LINUX

Case Study 2 : WINDOWS VISTA

MCS- 14

COMPUTER NETWORKS

An Introduction to Computer Networks

Network classification and Reference Models :

Network, Network Goals, Application of Networks, References Mode, (OSI, TCP/IP), IEEE Standards for LAN.

Data Transmissions and Multiplexing

Transmission Terminology Analog and Digital Data transmission, Transmission media, Multiplexing.

Medium Access Control and Data Link layer

Data link layer, Medium Access Control Sublayer.

Network, Transport and Application layer

Network layer, Routing Algorithms, Congestion Control Algorithms, Transport layer, QOS, TCP/UDP, Application layer, DNS, Remote Procedure Call (RPC), File transfer protocol (FTP) Talnet.

Network Devices and Technology

Network Devices-I

Network Devices, Repeaters Bridges Switches, Hubs.

Network Devices – II

Routers, Gateways, Modem

ISDN:

Baseband and Broadband Communication, ISDN Services, Advantages of ISDN, ISDN Applications.

Asynchronous transfer Mode (ATM)

Switching Techniqus, circuit, Packet, Frame Relay, Cell Relay, ATM as Technology, ATM Layered Architecture in Comparison with OSI Model, ATM Protocal, The ATM Netwrok, The ATM cell, ATM classes of Services, ATM Traffic Control , Benefits of ATM, ATM Applictions.

MCS- 16

ARTIFICIAL INTELLIGENCE

Introduction to Artificial Intelligence

Overview of A.I., Knowledge : General Concepts, Definition and Importance of knowledge, knowledge Based systems, Representation of knowledge, knowledge organization, knowledge Manipulation, Introduction to Lisp, Functions, Predicates and Conditionals, Input, Output and Local variables, Iteration and Recursion, Property lists and Arrays.

Knowledge Representation

Formalized symbolic logics, syntax and Semantics for Propositional logic, Syntax and Semantics for FOPL, Properties of wffs, Inference Rules, The Resolution Principle, Truth Maintenance Systems, Model and Temporal Logics, Fuzzy Logic and Natural Language computations. Associative Networks, Frme Structures, Conceptual Dependencies and Scripts, Objects, class, Message, and Methods, object Oriented Langages and systems.

Knowledge Organization and Manipulation

Preliminary Concepts, Uniformed or blind search, Informed Search, Indexing and Retrieval Techniues, Integrating knowledge in Memory, Measures for Matching, Matching like patterns, Partial Matching, Fuzzy Matching Algorithms, The RETE Matching Algorithm.

Perception Communication, and Expert systems

Commands and Languages, Basic Parsing Techniques, Semantic Analysis and Representation Structures, Natural language Generation, Natural language Systems, Pattern Recognition, The Recognition and classification Process, Learning classification Pattern, Recognizing and understanding speech.

Knowledge Acquisition

Types of Learning, General Learning Model, performance Measures, Perceptions, learning Automata, Genetic Algorithms, Induction Basic Concepts, Inductive Bias, Generalization and specialization, The ID3 system, the LEX system The INDUCE system, Learing structure concepts.

MCS- 17

INTRODUCTION TO INTERNET PROGRAMMING

Fundamentals of Java Programming

Introduction to Java :

Applets and Applications, JAVA Buzzwords, The JAVA Plateform, Java libraries, starting with Java.

Data types, operators and Arrays

Data types in Java, Operators, Java keywords, Mixing Data types, Type Casting, Programming Constructs in Java, Arrays.

Classes and objects in Java

Classes and objects, Constructor, Subclassing, The extends keyword, The instance of operator, static variables and methods, The final keyword, Access Control, Wrapper classes, Inner classes.

Exception Handling:

Exception classes, using TRY and CATCH, Handling Multiple exceptions, sequencing Catch blocks, Using Finally, Built-in Exceptions, throwing Exceptions, Catching Exceptions, user defined exceptions.

Packages and Interfaces

Creating Packages, Adding classes to existing Package, interfaces, creating Interfaces, Exceptions.

BCA-01

Foundation Course in English for Computing

Reading, Writing, Listening and speaking skills.

From "Animal Farm" by George orwell : Reading comprehension (Study Guide, Passage for Reading, Note on the Author, Vocabulary (words having related meanings, multiple Meanings, word-formation), Grammar and usage, conversation, pronunciation (letters and Sounds, English vowels, word stress), writing,

"A Page From the book of Memory" by Indira Gandhi: Reading comprehension, vocabulary, Grammar and usage (Articles, Past Perfect Tese), Conversation, pronunciation (English Consonants, vowel contrast), writing.

"A world of four senses" by VED Mehta:

Reading comprehension, Vocabulary Grammar and usage (Prepositional phrases, Participial phrases, Phrasal verbs, Relative clauses, Adverbial clauses, writing, conversation, pronunciation.

"Science and Human Life" by Bertrand Russel :

Reading comprehension, Vocabulary, Grammar and Usage (The Passive voice, Non-finite verbals, Gerunols, Participles, Model, Auxiliaries), writing, Conversation.

"The voice of India: by Jawahar Lal Nehru :

Reading Comprehension Vocabulary, Grammar and usage, writing, conversation, pronunciation.

Composition and Study Skills:

Development of Paragraphs :

The Topic sentence, Illustration, Cause and Effect, Definition, Comparison, and Contrast.

Writing A Composition :

A model-compoosition for study, writing the first draft, revising your composition.

Note-Taking :

How do ead? Specimen notes, reduction Devices, Passage for note taking, eadings and subordinate

points, organization of notes (into tables , into diagrams).

Techniques of Summarising :

The Technique of summarizing, writing a summary from a particular point of view.

Visual Aids :

The function of visual Aids, using Visual aids tables, charts and graphs.

English for Science and Technology

"Malaria – A New Threat:"

Reading Comprehension vocabulary, Grammar and usage, writing.

The Fight Against wound Infections:

Reading, Comprehsnsion, Vocabulary, Grammar, and usage, writing.

"Mineral Oil "

Reading comprehsnsion, Vocabulary, Grammar and usage, writing.

"The Exploitation of Steam"

Reading comprehension, Vocabulary, Grammar and usage, writing.

"From "Brain Research and Human Responsibility"

Reading comprehension, vocabulary, Grammar and usage, writing.

English for computers.

The Development of computers:

Reading, Comprehension, Vocabulary, writing.

Computer Types:

Reading, comprehension, Analog Computer, Monster, Mini, Micro, Mainframe Computers, Vocabulary, Grammar and usage, writing.

Basic Structure of a Computer :

Reading Comprehension, Basic Structure of a Computer, Input and output devices, vocabulary, Grammar and usage, writing.

Magnetic Discs:

Reading comprehension, vocabulary, Grammar and usage, writing.

Printers :

Reading comprehension printers, Vocabulary, Grammar and usage, sequencing.

BCA-02

Computer Fundamentals and PC Software

Computer Fundamentals : Hardware & Software

Computer and Memory System :

Computer, IC, Classification of Computers, Memory System, Characteristics terms for various Memory Devices, Primary storage, Auxiliary memory, Cache memory.

Input/Output Organisation & New Technologies:

Input/Output Devices, Input/Output Module Interface, External interfaces, parallel processing, pipelining, vector processing, Introduction to Risc.

Software Concepts and Terminology:

Computer Software (System/Application Software) Categories of languages, (Machine, Assembly, High Level, 4-GL), Elements of a Programming language (variable, constants, Data type, Array and Expressions, Input/Output statement, Conditional and Looping Statement, Subroutine and Functions).

Opening System Concepts :

Definition, Evolution, Serial Processing, Batch Processing, Multiprogramming, Types of O.S. (Batch, Multiprogramming, Network, Distributed).

Computer Fundamentals:Communication, Networking, Security:

Fundamentals of Data Communication:

Definitions, Concept of Data Communication, Data Communi-cation modes (Synchronous and Asynchronous Transmission, Simplex, Half-duplex

and Full-duplex Communication), Communication Hardware (Sender and Receiver Hardware, Communication devices, Communication Channels).

Introduction to Computer Networks and Emerging Trends:

Network Concept and classification, LAN (Star, Bus, Ring), WAN (Switching techniques WAN Devices/Hardware, Applications (E-mail, EDI), Networking Scenario (Internet, Bitnet, Compuserve, ISDN, NICNET).

The Management of Computer Security and Principles of Cryptography:

Definitions, Security Status on PC, Breaches of Security, Security Measures, (Physical, Software, Network, Password Security), Cryptography (Cipher Systems, DES), Cryptanalysis.

Computer Virus :

The Evolution of virus, the process of infection, classification of viruses (Boot Infectors, System Infectors, COM.or. EXE infectors). Prevention, The cure.

A Graphical User Interface :

Introduction to GUI :

GUI, Evolution of the human and machine interaction, Common GUI terms (Pointing devices, Bit-maapped displays, windows, menus, dialog boxes, Icons), MS-Windows, Windows-95.

Manage System in Windows 95.

My Computer, System settings, Backup, your data, Disk Drive utilities, Add/Remove Applications, Set up windows for Multiple Users DOS Prompt.

Files and Folders :

Windows Explorer Working with files working with Folders, Recycle Bin.

Program and Accessories

Run your programs, Windows 95, Accessories, Briefcase.

Communication through Network :

Network setup & configurations logging, Onto the Newwork, mapping network Drives Network

Browsing, Sharing Folders and printers.

Multimedia in windows 95 :

Multimedia Add-ons, Media types (Audio, Visual), Multimedia tools (CD player, Media player, Sound Recorer, Volume Control).

Sample GUI oriented Applications:

MS Word Basics

The word screen Getting to word documents typing and Revising text, Finding and Replacing, Editing and Proofing tools,

Formatting text :

Formatting text characters, Formatting Paragraph, Document templates.

Page Design and layout :

Page set up, tables.

Mail Merge and document Management

Mail Merge, Macros, protecting documents, printing a document.

Presentation graphics and powerpoint

What is business graphics, (Types of Business Graphics How to make an effective presentation? Physical aspects of presentation), A presentation graphics Package.Powerpoint, Creating a presentation, working with tools, slide show.

BCA-03

PC Software Application Skills

Problem Solving Techniques

Classical Problems and Puzzels :

Crossing the konigsberg Bridges, Cannibals and missionaries, Decanting problems, Decision trees, classical Conundrums.

The Higher Arithmatic-I

Prime Numbers, Gaps between primes, The sieve of Eratosthenes, Euler's proof of the infinitube of the primes.

The Higher Arithmetic – II

Hungarian problems, An Archimedean Result, The

Theorem of Pythagoras and irrational numbers, The division of a plane by straight lines, Minimum spanning circles.

General Methods :

Experimentation, Five sailors A Monkey and many coconuts, the twelve coins problem, Poin Care on the psychology of invention.

Introduction of MS-Excel :

Introduction to EXCEL

EXCEL Basics, Worksheets within work book, Enter and Edit data Range Names, Navigate worksheet, Search and Replace data, Rearrange cell contents , save and protect workbook, Exit EXCEL.

Formatting and printing worksheet

Page set-up, Column with and row height, fonts, Alignment, Numbers, Autoformat, format painter, Getting, worksheet printed.

Customising workplace

EXCEL windows, workplace displays, workplace at different Magnifications, using custom controls, using, dialog boxes.

Calculations in worksheet :

Formula basics, functions,

Charts :

Chart components chart types, chart wizard Resizing and moving charts, Editing charts, use charts, for analysis, printing charts.

Database power of EXCEL :

Database concepts, creating database, Adding Records, Deleting Records, Editing Records, Sorting a database, Filtering a database , Data tables, Pivat table.

Focus on analysis :

Goal seek, Salver, scenario manager,

Automating worksheet:

Using Macros, using Templates (Creating, opening, Modifying).

Internet Awareness

Internet An overview :

Internet, DNS, Tools, and services, on Internet, (Gopher www).

Internet Tools: E-mail, FTP & TELENET:

Electronic Mail : A Message window, the components of E-mail, Address Book, Troubleshooting in E-mail, Interesting E-Mail Addresses, Mail Reflectors, Mailing assets and list servers, FT telnet.

Browsers :

Net scape navigator, search engines, NCSA Mosaic, Microsoft, Internet Explorer.

Visiting websites :

Downloading, Examples (Net scape, Navigator, Microsoft, Internet Explorer, List of URLs of Interesting sites).

BCA-04

Foundation Course in Mathematics in Computing

Elements of Differential Calculus

Real Numbers and Functions : Basic properties of R, Absolute value, intervals on the real line, Functions, new Functions From OLD, Types of Functions.

Units and continuity - Basic properties of R. continuity.

Differentiation - The derivative of a function, Algebra of derivatives, continuity versus Derivability.

Derivatives of Trigonometric Functions - Derivatives of inverse functions, derivatives of inverse Trigonometric Functions,use of Transformations.

Derivatives of some standard functions - Exponential functions, Derivatives of Logarithmic functions, Hyperbolic Functions Methods of Differentiation.

Drawing Curves

Higher Order Derivatives : Second and third order derivatives, n^{th} order derivatives, Leibniz Theorem, Taylor's series and Maclaurin's series.

The Ups and Downs : Maxima-Minima of functions, Mean value theorems (Rolle's Theorem, Lagrange's Mean value theorem), sufficient conditions for the existence of Extreme points.

Geometrical properties of curves - Equations of Tangents and Normals, Angle of intersection of Two curves, singular points, asymptotes.

Curve Tracing - Graphing a function and curve tracing tracing a curve: Cartesian Equation, Parametric Equation, Polar Equation.

Integral Calculus

Definite Integra; Preliminaries, Definite integral, fundamental theorem of calculus.

Methods of Integrtion - Basic Definitions, Integration by Substitution, Integration by Parts.

Reduction Formulas - Integrals involving Trigonometric function, Integrals involving productions of trigonometric functions, Hyperbolic, Functions.

Integration of Rational and Irrational functions - Integrations of Rational Trigonometric functions, Irrational Functions.

Applications of Calculus

Applications of Differential Calculus - Monotonic functions Inequalities, Approximate values.

Area under a curve : Cartesian equation, polar form parametric form, Numerical integration, (Trapezoidal, Simpson's).

Applications of Integral Calculus - Length of a plane curve, volume of a solid of Revolution, Area of Surface of Revolution.

Solutions of Polynomial Equation

Sets - Set, subsets, venn diagrams, operations on sets, laws Relating operations, Cartesian product.

Complex number's - Geometrical Representation, Aalgebraic operations, De Moivre's Theorem.

Cubic and Biquadratic Equations' - Linear equations, Quadratic Equations Cubic Equations, Biquadratic Equations, Ferrari's solution, Descartes solution Roots and their Relation with coefficients.

Equations and Inequalities

Systems of Linear Equations - Linear systems, solving By

substitution solving by elimination.

Cramer's Rule - Matrix, Determinants, Cramer's Rule

Inequalities - Inequalities known to the Ancients, Cauchy Schwarz Inequality weierstrass' Inequalities, Tehebychev's Inequalities,

Conics

Preliminaries in plane Geometry - Equations of a straight line, symmetry, change of Axes, Polar Coordinates.

The Standard Conics - Focus Directrix Property, Parabola, Ellipse, Hyperbola, Polar Equation of Conics.

General Theory of Conics - General Second Degree Equation, Central and Non Central Conics, Tracing A Conic, Tangents, Intersection of Conics.

The Sphere Cone and Cylinder

Preliminaries in Three Dimensional Geometry - Points, Planes,

The Sphere - Equations of a sphere, tangent lines and planes, Intersection of Spheres.

Cones and Cylinders - Cones, Tangent planes cylinders.

Conicaids

General Theory of Conicoids - Conicoid, change of Axes, Reduction to standard form.

Central Conicoids - A conicoids centre, classification of Central Conicoids, Ellipsoid, Hyperboloid of one sheet, Hyperboloid of two sheets, Intersection with A Line or Plane.

Paraboloids - Standard Equations of a Paraboloid, Tracing, Paraboloids, Intersection with a line or a plane.

BCA-05

'C' Programming and Data Structures:

Introduction

Introductory:

An overview of C, Escape sequences, Getting A "feel" for C.

Data types in "C"

Variables of type (out, char, float, double,), Enumerated types, the typed of statement, Identifiers.

Operators and Expressions Inc

Elementary Arithmetic operations and operators, Expressions, L values and P values, Promotion and Demotion of variable types : The cast operator, Print f ( ) and Scan f ( ) functions.

Decision Structures in 'C'

Boolean operators and Expressions The goto statement, the if (), Statement, the if ( ) – else statement,.

Control structures – I

The do – while( ) and while Loops, the Comma Operator, the transfer of Central from within loops, Ternary operator, The Switch case default statement.

Programming in C

Control Structures II

'The for (;;) loop, unidimensional Arrays, The sizeaf operator, storage classless and scope.

Painters and arrays :

Pointer variables and pointer Arithmetic, Pointers, Arrays and the subscript operator, A Digression on Scan f( ), Multidimensional Arrays.

Functions :

Function Prototypes and Declalrations, Functions and Scope, Pointers as Function Arguments, String Functions, Multi Dimentional Arrays as Function Arguments.

Functions II

Recursive functions, Macros, Conditional Compilation, Macros with Parameters, Command line Arguments, Variable length Argument lists, Complicated Declarations, Dynamic Memory Allocation.

Files and Structs, Unions and Bit-Fields

Files and File 70, Structs, the DOT Operator, Extructs and files : f seek ( ), Structs and Function and unions, The Bitwise operators.

Data Structures:

Introduction to Data Structures : Array

Program Analysis, Arrays, Array Declaration, Storage of arrays in Main memory, sporse arrays.

Lists

Basic Terminology, Static implementation of lists, Pointer implementation of lists, Doubly linked lists, circular linked list, Storage Allocation, Storage Pools, Garbage Collection, Fragmentation, Relocation and Compaction.

Stacks and Queues

Defining stack and Queue, stack oerations and Implementations, stack Applications, Queues: Operations and implementation, Queue Application, priority Queues.

Graphs

Defining graph, Basic, Terminology, Graph Representation, Graph traversal (DFS, BFS), shortest path problem, Minimum spanning tree.

Trees and File Organisation

Trees

Basic Terminology, Binary, trees, Traversals of a Binary tree, Binary search Trees (BST).

AVL-Tree and B-Tree

Height Balanced tree, Building Height Balanced tree, B-Tree , B-Tree of order 5.

Files :

Terminology, File organization, sequential files, Direct, File organization, Indexed Sequential file organization.

Searching and Sorting Techniques:

Searching Techniques:

Sequential search, Binary Search,

Sorting Techniques-I

Internal Sort (nsertion Sort, Bubble Sort, Quick Sort, way merge sort Heap sort), Sortings on Several keys.

Sorting Techniques-II

Data storage (Magnetic Tapes, Disks), sorting with Disks, k-way merging, Buffering, Sorting, with tapes.

BCA-06

Introduction to System Software

Programming Concepts and Software Tools

Introduction to Programming Language Concepts :

Algorithm, Flowcharting, Problem and its Algorithm, Concept of a Programming Language, Categories of Languages, Elements of a Programming language.

Introduction to Assembler

Advocates of a translator, types of translators, Assembler implementation, Macro processor, Loaders.

Introduction to Compiler writing

Compiler, Approaches to compiler development, compiler Designing Phases, Software tools.

Graphical user interface :

Graphical user interface, Evolution of the human and Machine interaction, Common Graphical user interface terms, functionality of graphical user interfaces, A look at some graphical user interfaces.

Introduction to a text editor and debugging system

Introduction to a text editor, overview of the Editing process, Types of Editors and user interface, Editor structure, Interactive debugging systems, Debugging Functions and Capabilities, Relationship with other parts of the system, user interface criteria.

Fundamentals of operating system

Introduction to operating system:

Operating System, Evolution of operating systems, serial processing, Batch processing, Multipgoraming, types of operating System, Batch Operating system Multiprogramming Operating system, Network operating system, Distributed Operating System,

Operating System Structure, Layered Structure Approach, Kernel Approach, Virtual Machine, Client Server Model, Future Operating System trends.

Process Management

Process concept Processor scheduling, Types of Schedulers, Scheduling and performance Criteria, Scheduling Algorighms, Interprocess Commnications and synchronization, Basic concepts of concurrency, Basic Concepts of Interprocess Commnication and Synchronization, Mutual Exclusion, Semaphores, Hardware support for mutual Exclusion, Mechanism for Structured form of Interprocess Communication and synchronization, Deadlocks, System model, Deadlock Characterisation and Modelling.

Memory Management

Introduction, single process monitor, Multiprogramming with Fixed partitions, Multiprogramming with dynamic partitions, Paging Address mapping in a paging system, Hardware Support for Paging, Address Translation by Associative Memory, Sharing and Protection in a Paging System, Segmentation, Address Mapping in a Segmented System, Implementation of segment tables, sharing and Protection in a Segmented System, Virtual memory, Advantages of virtual memory, Demand Paging Virtual memory management policies.

File Management

Introduction, File concept, Directories, Disk organization, Disk Space Management methods, Linked List, Bit Map, Disk Allocation Methods, Contiguous Allocation, Non Contiguous Allocation, Disk Scheduling, FCFS, Shortest seek time-first scheduling, scan scheduling, File Protection, Passwords, Access Lists, Access Groups.

UNIX Operating System-I

Theoretical Concepts of UNIX operating System

Introduction, Basic features of unix operating system, UNIX system Architecture, File Structure processing Environment, CPU Schedulings Memory

Management, Swapping, Demand Paging, File System, Blocks and Fragment and Inodes, Directory Structure.

UNIX-GETTNG STARTED I

Introduction, Getting started, user Names and Groups, Logging in, Correcting Typing Mistakes, Format of UNIX commands, changing your Password, Characters with special Meaning, UNIX documentation, Files directories, Current Directory, Locking at the Directory Contents, Absolute and Relative, Pathnames, Some UNIX Directories and Files.

UNIX Getting Started II

Introduction, Looking at file contents, your own directories, file permissions, Basic operations on files, Links between Files, Changing permission modes, standard files, Standard Output, Standard Input, Standard Error, Filters and Pipelines, Processes, Finding out about Processes, stopping Background Processes.

TEXT Manipulation

Introduction, Inspecting files, file statistics, Searching for Patterns, Comparing Files, Operating on files, printing files, Rearranging Files, Sorting files, Splitting files, Translating characters,

Editors

Introduction, General characteristics of V_i , Starting up and quitting from V_i , Adding text and Navigation, changing Text, Searching for Text, Copying and Moving Text, The Features of ex, The live editors Ex and Ed. starting up and Quitting, Addressing Lines, Looking at Text, Adding Deletig and changing text, Searching for and replacing text, cut and paste operations, files and Miscelleneous features, The Stream Editor SED, changing several filed in SED, AWK.

UNIX operating System I

User to user Communication

Introduction, Online Communication, OFF-line communication.

Shell Programming

Introduction, Programming in the Bourne and the C-shell, wild cards, simple shell programs, variables, Programming Constrcts, interactive shell scripts, advanced Features.

Programming Tools

Introduction, The UNIX C compiler, other tools (Lint-the – C verifier, Program Profiles, Program listings), Cross References and Program flow, Maintaining Programs, the source code control system (Initialising a file, Examining and Altering files, Identification Keywords, Miscellaneous Commands).

System Administration

Introduction, System Administration – A Definition, Booting the system, Maintaining user accounds, file systems and special files, Backups and Restortion.

BCA-07

Elements of Systems Analysis and Design

System Analysis

Overview of System Analysis and Design :

System, Systems study, Sytems analysis and systems approach , characteristics of a system, Elements of systems analysis, types of systems, System Development life cycle, Software Crisis (Prpgrammer's point of view, user's point of view), Role of a systems analyst.

Project Selection

System projects, sources of Proect requests, Managing Project Review and selection, Preliminary investigation, Problems classifications and definitions.

Feasibility Study

Preliminary study, different types of feasibility (Technical, Operational, Economic, Social, Management , Legal and Time feasibility),Investigative study, cost/ Benefit analysis, Fact Findings (nterviewing questionnaires, observing the current system, Determination of DFD, New

System.

System Requirement Specifications and analysis

DFD, data dictionaries, HIPO (VTOC,IPO), decision tables and decision trees, warnier-ORR diagrams, NASSI-SHNEIDERMANN CHARTS

System Design

Structured System Design

System Design Considerations, Design, Methodologies, Structured Design, Modularisation, Design Process, System Specifications, Prototype Design.

Input Design and control

Processing Transaction data, Elements of input data, Input Media and Devices, Input Media and Devices, Input Design Guidelines, Input verification and Control, Data Dictionaries, How to layout derminal screen, Major concerns Regarding CRT-Input Screen Design.

Output System Design

Types of output, output Devices, output Design Consideration, Design of output Reports Designing Screen output, Menu design, Form Design and Control, Computer Graphics.

File and Data Base Design

Selecting data storage Media Types of File (Master, Transaction, Table, Report Backup, Archival, Dump, Library), File organization, File Design, Data base Design, Types of database coding system, Types of Code (Classification, Function, Card, Sequence, Significant digit , Subset code, Mnemonic code, Acronym).

System Development and Implementation

System Development

Task of System Development, Prototype installation Hardware and Software selection and performance, Benchmark Testing, Preparing software development cycle, software specification language selection criteria.

System Control and Quality Assurance

Quality Assurance in Software life, cycle, Levels of Quality Assurance, Design objectives, Reliability and maintenance, Maintenance issues, Maintainable Designs, Testing practice and plans, Levels of tests, special sstes tests, Desiging test data, system control, Audit Trial.

Documentation

Characteristics of a good documentation, types Software Design and documentation tools , need for documentation, Format for preparing documentation Package.

System Implementation

Training of Personnel involved with system, Training Methods, Conversion Methods, Review plan, System Maintenance, Hardware, Acquisitions, criteria for vendor's selection, service Bureaux.

Management Information System

Introduction to MIS

Definition, Historic Development, Typical Systems,

The Technology Component

Overview of computing Technology, Overview of Communication Technology, Database Technology, Decision Support Systems, knowledge Based systems.

The Organisational Impact of MIS

Information as a Resource, Information for Competitive Advantage, Organisation, Information and Decision, MIS as a profession.

Building Management Information Systems

System Analysis, Techniques of Systems Analysis.

Case Studies

Case (A) Information System Planning, Case (B) Preparing for systems analysis, Case (C) Systems Analysis Completion, Case (D) System Design Proposal, Case (E) Evaluation and selection of Systems Case (F) Implementation plan and Activities.

Emerging Trends

The Analyst As A Professional

Attributes of a good analyst, Organisational issues, The Systems Analyst and law.

Human Computer Interaction

The What, Why, When and where of Human Computer Interaction, Communicating with Computers, Ergonomics, Human problems in the Automated Office, Designing Human Machine Systems.

Introduction to Multimedia

Multimedia – The Concept, Design, Production and Distribution, Components of Multimedia, Software and Hardware for Multimedia.

BCA-08

Duction to Database Manageent Systems

Introductory Concepts of Data Base Management Systems.

Basic Concepts :

Introduction, Traditional file Oriented approach, Motivation for database aapproach database basics, three views of data, The three level Architecture of DBMS Mapping between different levels database Management System facilities, DDL, DML, Elements of a database Management System (DML Pre Compiler, DDL Compiler, File Manager, Database Manager, duery Processor, database Administrator, Data dictionary) , Advantages and disadvantages of database management system.

Data base Models and its Implementation:

Introduction, File Management System Entity, Relationship (E-R) Model, The hierarchical model, DBTG set, the network model, The Relational model, Advantages and Disadvantages of Relational Approach, Difference between Relational and other models.

File Organisation for Conventional DBMS

Introduction, File Organisation, Sequentil file organization, Index-sequential file organization (Types of Indexes, Structure of Index Sequential Files, VSAM, Implementation of Indexing through Tree-Structure), Direct file organization, Multi key file Organisation (Need for the multiple Access path, multicost , File organization, Inverted file organization, cellular Partitions, comparison and Tradeoff in the Design of Multikey file).

Management Considerations:

Introduction, Organisational Resistance to DBMS Tools (Political observation, Information transparency, Fear of future potential, Reasons for Success), Conversion from An Old system to a new system, Evaluation of a DBMS, Administration of a database Management System.

Enterprise Wide Information System of the Times of India Group (A Case Study)

Introduction, organization and the operating environment unique nature of the Business, Information System goals and how to achieve the Goal The Response System and Respnet Choices, Benefits.

RDBMS and DBMS

Relational Model

Concepts, Formal Definition of a Relation, the Codd, Commandments, Relational Algebra, Relational Completeness.

Normalisation

Functional dependency, Anomalies in a database, Properties of Normalized Relations, 1st NF, 2nd NF, 3rd NF, BCNF, Fifth Normal form examples of Database Design.

Structured Query Language

Categories of SRL Commands Data Definition, Data Manipulation , views.

Distributed Databases

Structure of Distributed database Trade-OFFS in

distributing the database, Design of Distributed Databases.

Emerging Trends in DBMS

Introduction to object oriented Database Management System

Next Generation database System, New database applications, object oriented database Management system, Promises and Advantages of object oriented Database Mgt. system, Difference between RDBMS and OODBMS, Alternative object oriented Database strategies.

Introduction to client/Server Database

Evaluation of client/Server, Emergence of client server Architecture, the cliend/server Computing, the critical products, Developing on Application, SQL (DDL, DML), Client/Server. where to Next?

Introduction to Knowledge Databases

Definition and Importance of knowledge, Knowledge base system, Difference between a knowledge base system and a database system, knowledge Representation Schemes.

BCA-09

Introduction to Computer Organisation

Hardware Concepts

Introduction and Data Representation : The won Neumann Architecture, Computers: Then and Now, Data Representation, Instruction Execution.

Digital Logic Circuits - Boolean Algebra, logic Gates, Combinational circuits, Adders, Sequential circuits, Interconnection Structures.

Memory Organisation- Memory System, characteristics Terms for various memory Devices, RAM, External / Auxiliary Memory, High Speed Memories, Cache Memory, Associative Memories.

Input/Output Organisation - Input/Output Module, Input/Outpur

Techniques, Direct Memory Access (DMA), Input/Output processors, External interface.

CPU Organisation

Instruction Sets- Instruction set characteristics, Addressing schemes, Instruction Format Design.

Register Organisation and Micro Operations -Basic Structure of the CPU, An Advanced Structure, Register Organisation, Micro Operations, Instruction Execution and Micro Operations.

ALU and Control Unit Organization- ALU Organisation, Control Unit Organisation, Functional Requirements of a Control unit structure of Control unit, Hardwired Control unit.

Microprorammed Control Unit - MCU, Wilkes Control, The Microinstruction, Types of Microinstructions, Control Memory Organisation, Microinstruction formats, A simple structure of Control Unit, Micro instruction (sequencing, Execution), Machine Startup.

Microprocessor and Assembly Language Programming

Microprocessor Architecture - Microcomputer Architecture, CPU Components, CPU Registers, Instruction set, Addressing Modes, Introduction to Motorola 68000 Microprocessors.

Introduction to Assembly Language: Assembly language Fundamentals, Input/Output Services, Assembly language Program Development tools.

Assembly Language Programming (Part-I) - Simple assembly Programs (Data transfer, shift operations), Programming with loops and comparisons, Arithmetic and String Operations.

Assembly Language Programming (Part – II)

Arrays, Modular Programming, Interfacing Assembly language Routines to High level language programs, Interrupts

BCA-10

Windows Programming

Components of windows Programming and Visual Basic

Visual Basic : Introduction - Start and Exit visual basic, V.B. Interface, Debug, Window, print command, V.B. Arithmetic Operators.

Variables and Functions- Variables, variable names, variable types, Range of the variable values, functions.

Building A Project & Customizing Forms - About Project, Form, Form properties, Form tools, Form Events.

Visual Basic Controls -Control, Custom Control, Controls in a form,

Functions and Procedures- Form, Standard and class Module, Sub procedure, DO-event Functions, Control Arrays.

Accessing Database - Using Data Manager, Creating a database, Creating a New Table, Attaching a table, changing Design of an existing table, Creting Indexes, working with data.

Creating form with data controls - Data controls, Data Aware Control, Creating a form using Data Controls, Manipulating data, creating the menu Bar, Displaying a menu item code.

Object Linking and Embedding - Basics of OLE, the OLE Icon, Terms used in OLE, OLE Automation, using OLE Control popup-Menu, Creating OLE object at Design time Creating part of an OLE object, Testing Embedding/Linking.

Windows Programming Using visual Basic 6.0

Introduction - Starting An Era of visual software Development, RAD Tools, Basic interface component, Creating and linking object through Basic Programming, Activity.

Advanced Features of Visual Basic 6.0 - Identification of some Advanced features of visual Basic 6.0 Employment of Features, Simple Animation using Active X, Drag and Drop, Linking to Database.

Active X and Windows API - Creating Active X DLLs, Using windows API in visual Basic IDE.

BCA- 11

Multimedia

Introduction to Multimedia and Its Applications

An Overview of Multimedia :

The Concept, Hardware for Multimedia Computer Software for Multimedia, Components of Multimedia, Multimedia – Design, production and Distribution.

Applications of Multimedia

Application Areas for Multimedia, Publishing Industry and Multimedia, Communication Technology and Multimedia Services, Multimedia in Business, Multimedia Pedagogues: Interactive systems for teaching and learning, Concepts for Distributed Learning Environment, A Medical Application: Mednet – A Medical Collaboration and Consultation system.

Multimedia Authoring Tools

Multimedia Development tools, Features of Authoring Software, Authoring Tools, Quick Time, Hypertext, Applications of Hpertext (Computer Application, Business Application, Educationa Application, Entertainment and Leisure Applications, Elements of Hypertext (Nodes, Links, Annotations, Buttons, Editors, Browsers, Trails, Built-in Programming Languages).

Multimedia Development – Issues and Suggestions

Learning Interface Design, Planning the Multimedia Programme/Application, Developing Tips of Multimedia Building Blocks, Multimedia Authoring.

BCA-12
RDBMS LAB

RDBMS Design

RDBMS Terminology :

Introduction, Database, Database management system, Instances and Schemas, Traditional File Oriented Approach, Benefits of Conventional or Centralised DBMS, Data Independence, Data Dictionary, Database Security, Domain Definition, A Relation, Relational data integrity, Candidate keys, primary key, Foreign keys, Referential Integrity, Candidate keys and Nulls, Data dictionary checklist.

Overview of Logical Database Design

Introduction, The Steps of Database design, Conceptual Design, Schema Refinement, Physical database Design and Tuning, ER Model, ER Model basics (Entity, Entity type and Entity set), Attributes (Attribute, key Attributes in Entity types, Composite vs. Simple attributes, Single vs. Multivalued Attributes, Derived vs. Stored Attributes, Null values, value sets of Attributes, Relationship, Degree of Relationship type, Structural Constraints, weak entities, Components of an E-R Diagram, ER Diagram Development examples.

Overview of Normalisation

Introduction, Redundancy and associated problems, Role of Normalization, Single valued dependencies, single valued normalizations, (1NF, 2NF, 3NF, BC NF), Desirable properties of decompositions (Attribute Preservation, Lossless-Join Decomposition, Dependency Preservation, Lack of Redundancy, Deriving BC NF), Multivalued dependencies, Multivalued Normalisation – Fourth Normal Form, The fifth Normal form, Rules of data Normalization.

Practical on RDBMS

Introduction, DBMS and file oriented approach, Relational Databases and Integrity Constraints Entity- Relationship diagram, Functional dependency and Normalisation , Normalisation Structured Query Language (SQL), Microsoft-Access, views and

security using SQL.

RDBMS Lab Introduction to MS Access

Introducing Microsoft Access

Introduction, DBMS, Microsoft Access database, tables and Queries, forms and Reports,

Microsoft Access Basics

Introduction, Starting and Quilting Microsoft Access, Opening a database, The database window, objects of the Access database.

Working with database:

Introduction, creating a Microsoft Access database, Creating objects, set toolbars to your working style.

Creating a table

Introduction, Plan fields and data types, create a table, set field properties, save and close a table, Add and save records, Edit records and close a table, Modify fields in a table, Modify Columns and rows in datasheet, Attach validation rule to a field.

Finding Data:

Introduction, Find a value, find and replace, create and apply a filter, specify criteria, sort Records.

Creating a Qurey:

Create a Query, The Query Window, Join tables, select fields, specify criteria sort Records, Calculate Totals, Modify a Query, Save a Query.

Creating a form

Introduction, Create a form with a form wizard, view records in a form, Add, Delete and save Records, Save and close a form.

Customising your form

Introduction, Change a form's design select and Resize controls, Move and Delete Controls, Change Fonts, Size and colour of text.

Showing data from more than one table on a form

Introduction, create a form that Contains a sub form, use a Query to include fields from more than one table.

Creating Reports and mailing labels:

Introduction, Use Reports to present data, create a Report, preview, print and save a Report, A Report in design view, create and print mailing labels.

BCA-13

COMPUTER NETWORKS

An Introduction to Computer Networks

Network, Classification and Reference Models :

Introduction, Network, Network Goals/ Motivation, Applications of Networks, Types of network, Reference Model (OSI, TCP) IEEE standards for LAN.

Data transmission and Multiplexing

Introduction, Transmission, Terminology, Time-domain Concepts, Frequency domain Concepts, Relationship between Data Rate and Bandwidth, Analog and digital data transmission, transmission media, Multiplexing.

Medium Access Control and D.L.L.

Introduction, D.L.L., Medium Access Control Sublayer (Contention based media access protocols, polling based MAC protocols, IEEE standard 802.3 and Ethernets, IEEE standard 802.4 Token bus, IEEE standard 802.5 Token Ring.

Network, Transport (TCP/IP) And Application layer

Introduction, Network layer (Routing Algorithms, Shortest path routing, Flooding), Congestion Control Algorithms, Comparison of virtual circuit and datagram subnets, Internetworking (Repeaters, Bridges, Routers), Transport layer (Transport service and Mechanism, Types of Service/Quality of Service), Transport Control Mechanism (Addressing, Flow Control and buffering , Multiplexing, Connection establishment and Management , Crash Recovery), TCP/UDP, Application layer (The domain ame system (DNS), TCP/IP Internet Domain Name, Electronic Mail, www, Mail-based Applications), Remote

procedure Call (RPC), File transfer protocol (FTP), Telnet.

Network Devices and Techology

Network Devices –I

Introduction, Network devices (Repeaters, Bridges, Switches, Hubs).

Network Devices-II

Introduction, Network devices (Routers, Comparison of Bridges and Routers, Gateways, Modem).

Integrated Services Digital Network (ISDN)

Introduction, Baseband and Broadband Communication, ISDN Services, Advantages of ISDN,. ISDN applications (Internet Access, Telephony, Telecommuniting, Video conferencing, Education, Large-Scale file transfers).

Asynchronous Transfer Mode (ATM)

Introduction, Switching Techniques (Circuit switching, Packet Switching, Multirate Circuit Switching, Frame Relay, Cell Relay), How compatible is ATM as Technology? , ATM layered Architecture in Comparison with OSI Model, How ATM protocol works?, The ATM Network, The ATM CELL, ATM clases of services (ATM Service classes, ATM Technical Parameters), ATM, Traffic Control (Network Resource Management, Connection Admission Control, (Network Resource Management, Connection Admission Control, Usage Parameter Control and Network Parameter Control, Priority Control, Congestion Control), Benefits of ATM, ATM Applications (ATM Services, ATM workgroup and Campus networks, ATM enterprise network consolidation, multimedia virtual private networks and managed services, frame relay backbones, Internet backbones, Residential broad bankd networks, Carrier infrastructures for the telephone and private line networks).

BCA-14

TCP/IP Programming

TCP/IP Fundamental

Introduction to TCP/IP :

TCP/IP Layering, TCP/IP stock (TCP level, IP level, Ethernet level), Internet addressing (IP Address Component, IP Address format, IP Address classes, First – Octet Rule), Domain name system (ONS), Client/ Server model.

IP internet protocol:

IP header, IP Addresses, IP Address Components, IP Routing, IP subnet Addressing, subnet Mask.

TCP – Transmission Control Protocol:

Basic Terminology, (TCP, Internet addresses, Network address, Host address, Total address, Symbolic names, Hostname, TCP header, TCP Reader structure Acknowledgement Number, window, checksum, Urgent pointer, options), Features of TCP, User Datagram protocol (UDP) (UDP header, characteristics).

BCA- 16

COMPUTER ORIENTED NUMERICAL TECHNIQUES

Computer Arithmetic and Salution of Non-
Computer Arithmetic :

Floating point Arithmetic and errors, Pitfalls in Computations (Loss of significant Digits, Instability of Algoriths).

Solution of Non-Linear Equations

Iterative Methods for Locating roots, chord Methods for finding roots (Regula-falsi Method, Newton Raphson Method, Second Method), Ierative Methods and convergence criteria.

Linear System of Algebraic Equations and Polynomial Interpolation:

Solution of Linear Albegraic Equations:

Preliminaries, Direct Methods (Cramer's Rle, Gauss

elimination Method, Pivating Strategies), Iterative Methods (The Jacobi Iterative Method, The Gass Seidal Iteration Method), Comparison of Direct and Iterative Methods.

Interpolation:

Lagrange's form, Interpolation, Polynomial, Inverse Interpolation, General Error Term, Newtons Formula for forward, Backward and Divided. Differences, Interpolation at Equaly spaced points.

BCA- 16

OPERATING SYSTEMS

Introduction :

Operating System, Generation of operating systems, Processors, Memory, Disks, Tapes, I/O Devices, Buses, Mainframe Operating Systems, Server Operating Systems Multiprocessor Operating Systems, Real time, Operating systems, smart card operating systems.

Operating System Structure:

Monolithic systems, Layered systems, Microkernels, client, Server Model, Virtual Machines.

Processes and Threads:

The process Model, process creation, Process Termination Process States Implementation of Processes, Thread usage, The classical thread Model, Hybrid Implementations, Interprocess Communication, Race Conditions, Critical Regions, Mutual Exclusion with busy waiting, sleep and wakeup, semaphores,

Memory Management:

The Notation of an Address Space, Swapping virtual memory, Paging Page labels, speeding up paging, page Replacement Algorithms, The optimal Page Replacement Algorithm, the (FIFO) Page, Replacement Algorithm, The second chance page Replacement Algorithm, The clock Page Replacement Algorithm, Design issues for Paging systems, Implementation Issues, Segmentation.

Deadlocks:

Resources, The OSTRICH Algorithm, Deadlock, Avoidance, Deadlock prevention, Deadlock Detection and Recovery.

Security :

Basics of Cryptography, protection Mechanisms, Authentication, Malware, Defenses.

Case Study 1 : LINUX

Case Study 2 : WINDOWS VISTA

BCA-17

C++ and Object Oriented Programming

An Introduction to Object Oriented Programming

Object Oriented Programming :

OOP Paradigm, the soul of OOP, OOP characteristics, Advantages of OOP, Applications of object Oriented Programming (System software, DBMS, Applications of OODBMS, Advantages and Disadvantages of OODBMS), The Object Orientation, OO Languages, Advantages of C++.

Object Oriented Programming System:

What is OOPS?, Class, Inheritance, Abstraction (Procedural language, Object-oriented language), Mechanisms of Abstraction, Encapsulation and information hiding, Polymorphism, overloading,

Advanced concepts

Dynamism (Dynamic Typing, Dynamic Binding, Late Binding, Dynamic Loading, Structuring programs, Reusabiity, Organizing Object-oriented Projects (Large scale designing, Separate Interface and Implementation, Modularising, Simple Interface, Dynamic decisions, Inheritance of Generic Code, Reuse of tested code.

Introduction to Object Oriented Languages

Objective-C, Features of objective-C, Python,

Features of Python, C # (C SHAR), Features of C#, Eiffel, Modula-3, Features of modula-3, Small talk, object REXX, Java, Features of Java(Object Oriented, Distributed, Interpreted, Robust, Secure, Architecturally neutral, Portable High performance, Dynamic) , Beta various object oriented programming languages Comparative chart.

An Introduction to Unified Modelling Languae (UML)

UML, Goalsaf UML, History of UML, UML Diagrams (Use case, class, interaction diagrams), State diagrams, Activity Diagrams, Physical diagrams.

C++ — An Introduction

Overview of C++

Programming Paradigms (Prrocedural Programming, Modular Programming, Data Abstraction, Object Oriented Programming), Concepts of C++ functions and files.

Classes And Objects

Definition and Declaration of a class, Scope Resolution Operation, Private and Public member functions, Creating Objects, Accessing class data members and member functions, Arrays of objects, Objects as Function Arguments.

Operator overloading

Operator Functions, large objects, Assignment and initialization, Function Call, Increment, Decreement Operator, Friends.

Inheritance-Extending classes

Concept of inheritance, Base class and Derived class, visibility Modes, Single inheritance Multiple Inheritance, Nested classes, virtual functions.

Streams and Templates

Output, Input, Files and streams, Templates, Exception, handling.

BCA-18
THEORY OF COMPUTATION

Finite Automata and Formal Languages

Finite Automata and Languages :

Regular Expressions (Introduction to Defining of languages, Kleene closure Definition, Formal Definition of Regular, Expressions, Algebra of Regular Expressions), Regular languages, Finite automata, Mealy and Moore Machines.

Non-Determnistic Finite Automata

Equivalence of NFA and DFA, Pumping Lemma, Closure properties (Regular Langaes and Finite Automata), Equivalence of Regular expression and Finite Automata.

Context Free Grammar:

Grammar and its classification, Chomsky, Classification for Grammar, Context free grammar, pushdown Automata (PDA), Non-Context free languages, Pumping Lemma for context free Languages, Equivalence of CFG and PDA.

Turing Machine and Recursive Functions

Turing Machine

Prelude to formal definition, Instantaneous Description and transition diagrams, Turing Machines as Computer of functions, Modular Construction of Complex turing machines, Symbol Writing machines, Right/Left head moving machines.

Turing Machine Miscellany

Extensions –cum-Equivalents of Turing Machine, Universal Turing Machine (UTM), Languages Accepted/Decided by TM, The diagonal language and the universal language, Chosky Hierarchy.

Recursive Function Theory

Recursive Function Theory

Recursive Definitions, Partial, Total and Constant Functions, Primitive Recursive Functions, Intuitive Introduction to primitive recursion, Primitive Recursion is weak Technique, The Techniques of unbounded minimalisation, Partial Recursion and u-Recursion.

Complexity of Computability

Computbility/Decidability

Decidable and undecibable problems, The halting, problem, Reduction to another undecidable problem, undecidability of post correspondence problem, undecidable problems for context free languages.

Complexity

Notations for Growth rates of functions (The Constant Factor in Complexity Measure, Asymptotic considerations, well known Asymptotic growth rate Notations, The Notation O, The Ω Notation, The Notation Θ, The Notation W, classification of problems, Reduction, NP-Complete and NP-Hard Problems, Establishing NP-Completeness of problems.

Applications

Applications of Finite Automata, Applications of Regular Expressions, Application of Context free grammars (Definition of C-type small language, Definition of Part of HTML), ACM Code of Ethics and Professional Conduct.

BCA-19

INTRODUCTION TO SOFTWARE ENGINEERING

Software Engineering Concepts

Introduction to Software product, Component & Characteristics Engineering :

Software product, Components and characteristics, Software Engineering phases, Documentation of the Software product, Software Process and models (Software life cycle, Requirements analysis and specification, Design and Specification, Coding and module testing).

Software Process Management

Software process management, Human Resource Management (Software process,Team leaders, Problem Solving,Influence and Team Building), The Software team (Democratic Decentralized (DD), Controlled Decentralized (CD), Controlled Centralized (CC), Organisation, Information and Decision, Problem identification, Software Crisis, Role of a system Analyst.

Project planning and Control :

Project scheduling, Project standards, Project outsourcing.

Risk Management Concepts:

Introduction and Risk Management Concepts, Technical Planning, Benchmark Testing.

Software Quality Concepts and Case Tools:

Software Performance

Customer Friendliness, Software Reliability, Software Reviews, Software Upgradation, Software tools, and environment, Software libraries and toolkits, Software Modules, Reapplication of Software Modules, Development tools (Code Generators, Debuggers).

Quality Concepts

Important Qualities of Software product and process (Correctness, Reliability, Robustness, Verifiability, Maintainability, Reusability, Portability, Data Abstraction, Modularity). Principles of Software Engineering (High quality software is possible, Give products to customers Early, Determine the Problem before writing the Requirements, Evaluate Design Alternatives, Use an Appropriate Process Model, Minimize Intellectual Distance, Good Management is more Important than Good Technology, People are the key to success, Follow with care, Take responsibility).

Software Methodology : An object Oriented Concepts

The Evolving Role of Software, An industry Perspective, Structured Methodologies , Major influencing Factors (Evaluation of End user computing, Emergence of CASE Tools, use of Prototypin and 4 GL Tools, Relational Databases), using the Methodoogy, Choosing the Right Methodology, Implementing a methodology, Current Generation of Software Development tools, 4 GL Considerations in Application Development (Problems in Application Development, Impact o f AGLs, Limitation of 4GLs, LINC),

Case Tools

Introduction, Software crisis, What is wrong with current Development Methods?, Software and its increasing Cost, Software Errors and their Impact, An Engineering Approach to Software, why case fails?, Case tools (Generation of CASE tools, Categories of Case tools (Generation of CASE tools, Deft Case tools, The Deft CASE system, The Deft way (DFDs, ERDs, PSPs), Factors Affecting Software Development, The benefits of using CASE.

BCA-20

INTERNET ADMINISTRATION

Fundamentals of Intranet Administration

Fundamentals of Intranet :

The Intranet, How Intranet works?, Difference between Internet and Intranet and LAN, Advantages of the intranet, types of Intranet, Software and Hardware Requirement for Intranet, Application Areas (Education Industry , Service, Research and Development, Government), Future of the intranet,

Intranet's Security

Security concerns, Threats (nternal external), Security solutions , Advise from Security Experts.

Choosing Intranet Hardware and Software

Selection of Computing infrastructure, Hardware (Servers, Clients, Security Systems), Network environment (LAN, Address Translation, Firewall), Software (Operating System – Server and Clent, Groupware, Database Connectivity), Other aspects (Protocol support tools, web based tools, Security tools.

Configuring Intranet

Configuring intranet (web Authoring, Preview, web Graphics, GIF, JPEG, Adding Ineractivity), Installation (Network Installation and administration, User management, Disk Quotas, Security Configuration and analysis, Account Policies, Permission and restrictions, Tuning Server Perforance, Configuring network settings), Networks and Security, Tuning Applications over intranet (SQL/API, ODBC, JDBC).

Intranet Authoring and Management tools

Intranet, Authoring tools (Editors, supporting applications for Services like FTP, Telnet etc. Graphical tools for creating, animating, etc.) Intranet Management tools (Databases – Basic, ODBC distributed, web servers.

Intranet Protocols:

Basic Intranet protocols (communication cum Mail

Protocols, Service Protocols), web server specific protocols (Common Gateway Interface (CGI), Internet Server Application Program Interface (ISAPI), Netscape server Application Programming Interface (NSAPI), Distributed Mail system Protocol (DMSP), Latest protocols (Code division Multiple Access (CDMA) , Wireless Application Protocol (WAP), General Packet Radio Service (GPRS), Protocols for E-Commerce).

PGDCA -1.1

DISCRETE MATHEMATICS

Elementary Logic

Propositional Calculus: :

Propositions, Logical Connectives, Logical Equivalence, Logical Quantifiers.

Methods of Proof:

What is a proof? Different Methods of proof and Direct proof, Indirect proofs), Principle of induction.

Boolean Algebra and Circuits

Boolean Algebras, Logic circuits, Boolean Functions.

Basic Combinatories

Sets, Relations and Functions

Introducing Sets, Operations on sets, Relations, Functions.

Combinatorics – An Introduction:

Multiplication and addition Principles, Permutations (Permutation of objects Not Necessarily distinct, circular permutation), Combinations, Binomial Coefficients, Combinatorial probability.

Some More Counting Principles

Pigeonhole principle, Inclusion – Exclusion Principle, Applications of inclusion exclusion.

Partitions and Distributions

Integer partitions, Distributions, distinguishable objects into Distinguishable Containers, Distinguishable objects into Indistinguishable containers, Indistinguishable objects into Distinguishable Containers, Indistinguishabe objects into Indistinguishable Containers.

PGDCA-1.2

Problem Solving and Programming

An Introduction to C

Problem solving :

Problem solving Techniques, Design of Algorithms, Analysis of Algorithm efficiency, Analysis of Algorithm Complexity, Flow charts,

Basics of C

History of C, Salient features of C, Structure of a C Program, Compiling a C Program, Link and Run the C Program, Diagrammatic Representation of Program execution process.

Variables and Constants

Character set, Identifiers of Keywords, Data types and storage, Data type Qualifiers, Variables, Declaring variables, Constants, Symbolic Constants.

Expressions and Operators

Assignment Statement, Arithmetic operators, Relational Operators, Logical operators, Comma and Conditional Operators, Type Cast operator, Size of Operator, C shorthand, priority of operators,

Control Statements, Arrays and Functions:

Decision and Loop Control Statements

The if statement, the switch statement, the while loop, The do… while Loop, The for loop, The Nested Loops, The goto statement, The break statement, The continue statement.

Arrays

Array Declaration, Initialization, Subscript, Multi-dimensional Arrays.

Strings

Declaration and Initialization of Strings, Display of Strings, using different formatting Techniques, Arrays of Strings, Buit in String functions and Applications

Functions

Definition of a function, Declaration of a function, Function prototypes, The return statement, Types of variables and storage classes, Types of function invoking, Call by value, Recursion.

Structures, Pointers and File Handling

Structures and Unions

Declaration of Structures, Accessing the Members of a structure, Initializing structures, Structures as function Arguments, Structures and Arrays, unions.

Pointers:

Pointers and their characteristics, the address and Indirection operators, Pointer type Declaration and Assignment, Pointer Arithmetic, Passing Pointers to functions, Arrays and pointers, Arrays of Pointers, Pointers and strings.

The C Preprocessor

define to implement Constants # define to create, functional Macros, conditional selection of Code using # if def. Predefined Names Defined by pre-processors, Macros vs. Functions.

Files

File Handling in C using File pointers, Input and output using file pointers, string Input/Outpur Functions, Formatted Input/ Output Functions, Block Input/ Output Functions, Sequential Vs. Random Access Files, Positioning the file Pointer, the buffered I/O – The UNIX like file routines.

PGDCA-1.3

COMPUTER ORGANIZATION AND ASSEMBLY LANGUAGE PROGRAMMING

Introduction to Digital Circuits

The Basic Computer:

The Von Neumann Architecture, Instruction Execution, Instruction Cycle,Computers: Then and Now.

Data Representation

Number Systems, Decimal Representation in Computers, Alphanumeric Representation, Data Representation for Computation.

Principles of Logic Circuits I

Logic Gates, Logic Circuits, Combinational circuit (Address, Decoders, Encoders, ROM)

Principles of Logic Circuits – II

Sequential Circuits (Definition) Flip Flops (Basic Flip-Flops, Excitation Tables, Master slave Flip-Flop, Edge-Triggered Flip-Flops), Sequential circuit Design (Registers, Counters Asynchronous Counters, synchronous counters, RAM) Design of a sample counter.

Basic Computer Organisation

The Memory System:

The Memory Hierarchy RAM, ROM, DRAM, FLASH Memory Secondary Memory and characteristics, Raid and its Levels, The concepts of High speed Memories, virtual memory, SIMM, DIMM.

The input /Output System

Input/output Devices , The Input/Output Interface, The Device Contrallers and its structure, Device Drivers, Input – Output Techniques, Input Output Processors, External Communication Interfaces.

Secondary Storage Techniques:

Secondary Storage Systems, Hard Drives, Removable Storage options.

The I/O Technology:

Keyboard, Mouse, Video Cards, Monitors (Cathode Ray Tubes, DPI, Interlacing, Bandwidth, Liquid Crystal Displays, Digital Camera, Sound Cards, Printers, Modems, Scanners, Power Supply.

The Central Processing Unit

Instruction Set Architecture

Instruction set characteristics, Instruction set Design Considerations, Addressing Scheme (Immediate Addressing, Direct Addressing, Indirect Addressing, Register Addresing, Register Indirect Addressing, Indexed Addressing Scheme, Base Register Addressing, Relative Addressing Scheme, Stack

Addressing), Instruction set and Format Design issues (MIPS 2000, Instruction Format).

Registers Micro-Operations and Instruction Execution

Basic CPU Structure, Register Organisation, General Registers in a processor, Micro-operation Concepts, Instruction Executions, Instruction Pipelining.

ALU Organisation:

ALU Organisation, Arithmetic Processors,

The Control Unit :

The Control unit, the Hardwired Control, Wilkes Control, The Micro- programmed Control, The Micro instructions , The Execution of Micro Program

Reduced Instruction set Computer Architecture

Instruction to RISC, RISC Architecture, The use of Large register file, Comments on RISC, RISC pipelining.

Assembly Language Programming

Microprocessor Architecture

Microcomputer Architectures, Structure of 8086 CPU, Register set of 8086, Instruction set of 8086, Addressing modes.

Introduction to Assembly Language Programming

The Need and use of the Assembly language, Assembly program , Execution, An Assembly program and its components, Input output in Assembly program, The types of Assembly programs.

Assembly Language Programming (Part-I)

Simple Assembly programs, Programming with Loops and Comparisons, programming for Arithmetic and String operations.

Assembly language programming (Part-II)

Use of Arrays in Assembly, Modular Programming, Interfacing, Assembly language Routines to High level language programs, Interrupts, Device Drivers in Assembly.

PGDCA-1.4

SYSTEMS ANALYSIS AND DESIGN

Introduction to Systems Development

Introduction to SAD :

Fundamentals of Systems, Real Time Systems, Distributed Systems, Development of a successful System, various Approaches for Development of information systems (Model Driven, Accelerated approach, Joint Application Development.

System Analyst – A profession

Needs Systems Analysts, users, Analysts in various functional Areas (Systems Analyst in Traditional Business, Systems Analyst in Modern Business), Role of a Systems Analyst, Duties of a Systems Analysts, Qualification of a Systems Analyst.

Process of System Development

Systems Development Life Cycle, Phases of SDLC, Products of SDLC Phrases, Approaches to Development (Prototyping, Joint Application Design, Participatory Design), Case Study (College Library).

Introduction to documentation of Systems

Concepts and process of Documentation, Types of Documentation, Different Standards for Documentation, Documentation and Quality of Software.

Planning and Designing Systems:

Process of Systems Planning

Fact Finding Techniques, Need for fact finding, Issues involved in Feasibility Study, Cost Benefit Analysis, Preparing Schedule, Gathering Requirements of System.

Modular and Structured Design

Design principles (Top Down Design, Bottom up Design), Structure Charts, Modularity (Goals of Design, Coupling, Cohesion).

System Design and Modeling

Logical and Physical Design, Process Modelling, Data Modeling (ER Diagram), Process specification Tools (Decision Tables, Decision Trees, Structured English Notation), Data Dictionary.

More Design Issues and Case Tools

Forms and Reports Design

Forms, Reports, Differences between forms and Reports, Process of Designing Forms and Reports, Deliverables and outcomes, Design specifications, Types of Information, General formatting Guidelines, Guidelines for Displaying Contents, Criteria for form Design, Criteria for Report Design.

Physical file Design and Database Design

Introduction to Database Design, Design of Database fields, Design of Physical Records, Design of Physical Files, Design of Database, Case Study (Employee database),

Case Tools for Systems Development

Use of Case Tools by Organisations, Advantages and Disadvantages of CASE Tools, Components of CASE, Types of CASE tools, classification of CASE Tools, Reverse and Forward Engineering, Visual and Emerging Case tools.

Implementation and Security of Systems & MIS

Implementation and Maintenance of Systems:

Implementation of Systems, Maintenance of Systems.

Audit and Security of Computer Systems:

Definition of Audit, Audit of Transactions on computer, Computer Assisted Audit Techniques, Computer System and Security Issues, Concurrent Audit Techniques.

Management Information Systems:

Role of MIS in an organization, Different kinds of information systems, Expert Systems.

Basic Diploma in Computer (DIC)

DIC-01 – Personal Computer and PC Software

Problem Solving Tecniques:

Classical Problems and Puzzles:

The Konigsberg Bridges, Cannibals and missionaries, Decanting problems, decision trees, classical Conundrums.

The Higher Arithmetic –I:

Prime numbers, Gaps between primes, The sieve of Eratosthenes, Euler's proof of the infinitude of the primes.

The Higher Arithmetic-II:

Hungarian problems, An Archimedean Result, the theorem of Pythagoras and irrational numbers, The division of a plane by straight line, Minimum Spanning circles:

General Methods:

Experimentation, five sailors, A monkey and Many coconuts, the twelve coins problem, Poin care on the Psychology of invention.

Introduction to MS-Excel:

Introduction to Excel:

Excel Basics, worksheets, within workbook, Enter and Edit data in Excel, Range Names, Navigate worksheet, search and replace DATA, Rearrange cell contents, save and Protect workbook, Exit Excel.

Formatting and Printing worksheet:

Page set up, Column width and Row Height, Fonts, Alignment, Numbers, Autoformat, Format Painter.

Customising Workplace:

Excel windows, workplace, Displays, worksheet, at different Magnifications, using custom controls using dialaog Boxes.

Calculations in Worksheet:

Formula basics, Functions,

Charts:

Chart components, chart types, chart wizard, Resi- zing and moving charts, editing charts, use charts for analysis, printing charts.

Database Power of Excel:

Database Concepts, creating, database, Adding Records, Deleting Records, Editing Records Sorting a database, Filtlering a database, Data tables , Pivot table.

Focus on analysis:

Goal seek, Salver, Scenario Manager.

Automating Worksheet:

Using Macros, using Templates.

Internet Awareness

Internet :An Overview:

DNS, working of Internet, Tools and Services on Internet, Browsing the Internet, Gopher.

Internet Tools: E-Mail, PTP & Telnet:

E-Mail, E-Mail, Addressing, The Components of E-Mail, Address Book, Troubleshooting in E-Mail, Interesting E-Mail Addresses, Mail Reflectors, Mailing Lists and list servers, FTP and Telnet, Interesting Sites.

Browsers:

Netscape Navigator, Search Engines, NCSA, Mosaic, Microsoft, Internet Explorer.

Visiting web sites:

Downloading.

Basic Diploma in Computer (DIC)

DIC-02 – Information Technology

Information Technology:

Computer Basics, Input Units and Devices, Output units, and Devices, Computer Memories, WINDOWS, Documentation using MS word.

Object Oriented Programming with C++ :

OOP using C++, Data types and variables, operators, Expressions and Statement, Flow of Control of Program, Looping, Functions, Arrays and Strings, Structure, Pointer, Classes and Constructors / Destructors, Operator overloading, Derived Classes and inheritance, Polymorphism and virtual functions.

Basic Diploma in Computer (DIC)

DIC-03 – Business System

Introdction to Business Data Processing:

Business systems, Management Functions, Levels of management, Information requirements for Planning, Coordination and Control for various levels in Business, Industry and Government, large volumes of data and data handling implicit, Identification of relevant data, classification of data elements by function and by source, Primary and Secondary, Historical data for reference and analysis, Need for ensuring accurate, reliable and timely processing of data, Basic tasks in Business data processing, data origination, Capture, sorting, merging, calculating, Summarising, managing output-results, storing and retrieving transmission, both interim and final.

Concept of Files:

Master and transaction files, file organization, sequential,

relative and indexed, Modes of processing: batch Online, real time.

Principles and Techniques of Programming:

Introduction to programming: Programme definition, Life cycle, characteristics of a good program, data handling (flow charts, pseudocodes) Report production and file updation, Simple report generation, overview of Control break procedure for report production.

Operation on files:

Input, Output and I/O; processing a file, multiple handling file updation, sequential file updation, random file update.

Programming Paradgms:

Unstructured Programming, Structured Programming, procedural programming, modular Programmaing Program design, Top down and botton up design, program documentation.

Business Applications:

Design, analysis and development of computerized financial accounting, Computerized Inventory Control, Computerized Payroll, Computerized Invoicing application.

Basic Diploma in Computer (DIC)

DIC-04 – Programming and Problem Solving Using 'C'

Introduction

Introductory:

An Overview of C, Escape sequences, Getting A "feel" for C.

Data types in 'C'

Variables of type (out char, float, double,); Enumerated type, the typed-of statement, identifiers.

Operators and Expressions Inc.

Elementary Arithmetic operations and operators,

Expressions, L values and P values, Promotion and Demotion of variable types : The cast operator , print f() functions.

Decision Structures in 'C'

Boolean operators and Expressions The goto statement, the if(), Statement, the if () – else statement.

Control structures-I

The do – while ( ) and while Loops, the Comma Operator, the transfer of Central from within loops, Ternary, operator, The Switch case default statement.

Programming in C

Control Structures II

'The for (;;) loop, unidimensional Arrays, The sizeof operator, storage classless and scope.

Painters and arrays:

Pointer variables and pointer Arithmetic, Pointers Arrays and the subscript operator, A Digression on Scan f(), Multidiensional Arrays.

Functions:

Function Prototypes and Declarations, Functions and Scope, Pointers as Function Arguments, String Functions, Multi Dimentional Arrays as Function Arguments.

Functions – II

Recursive functions, Macros, Conditional Compilation, Macros with Parameters, Command, Line Arguments, Variable length Argument lists, Complicated Declarations, Dynamic Memory Allocation.

Files and Structs, Unions and Bit-Fields

Files and File 70, Structs, the DOT Operator, Extructs and files: f seek (), Structs and Function and Unions, The Bitwise operators.

Data Structures:

Introduction to Data Structures : Array

Programme Analysis, Arrays, Array Declaration, Storage

of arrays in Main memory, sporse arrays.

Lists:

Basic Terminology, Static Implementation of lists, Pointer implementation of lists, Doubly linked lists, circular linked list, Storage Allocation, Storage Pools, Garbage Collection, Fragmentation, Relocation and Compaction.

Stacks and Queues:

Defining stack and Queue, stck oerations and implementations, stack Applications, Queues: Operations, and implementation, Queue Application, priority Queues.

Graphs

Defining graph, Basic, Terminology, Graph Representation, Graph traversal (DFS, BFS), shortest path problem, Minimum spanning tree.

Trees and File Organisation:

Trees

Basic Terminology, Binary, trees, Traversals of a Binary, tree Binary search trees (BST).

AVL-Tree and B-Tree

Height Balanced tree, Building Height Balanced tree, B-Tree, B-Tree of order 5.

Files:

Terminology, File organization, sequential files, Direct, File organization, Indexed Sequential file organization.

Searching and Sorting Techniques:

Searching Techniques:

Sequential search, Binary Search,

Sorting Techniques-I

Internal Sort (Insertion Sort, Bubble Sort, Quick Sort, Way Merge Sort Heap Sort), Sortings on Several keys.

Sorting Techniques –II

Data Storage (Magnetic Tapes, Disks), sorting with Disks, K-way merging, Buffering, Sorting, with tapes.

Diploma in Computer in Office Management

DCOM-01 – Office Environment and Data Processing

Office Environment:

Organisation of a typical office:

Concept of an office, The concept of an oranisation.

Document flow Management in an Office:

Importance of document as means of Communication information inputs for the documents, Management of inward mail Movement, information processing, Document preparation, Types of Documents, Channels of document flow, Handling of outward mail, Document storage and Retrieval.

Management and Human relations in Office:

Management in an office, Management styles, Effective Leadership, Human relations, Methods of working, integration of Methods through Administrative Management.

Office Management Information System:

Need for Management Information System, MIS, MIS in Government.

State of art in using Modern Technology in Office:

Need for Office Automation, Office Automation, Automation in Government Offices, Computer Aided Office Monitoring of Development Programmes, A New emerging technology – Optical information Technology.

Convergence of Technologies:

Office Automation :

Today's Office, Office Automation Explosion, Advantages, Office Automation functions.

Office Automation Technology

Document Generation, Document Distribution, Archival, Impact of Personal Computers,

Office Automation Technology-Workstations:

Workstation Architecture, Hardware Technologies, Workstation, Software, input technologies, Workstation graphics, printer technologies, Storage Technologies.

Communication and Convergence of Technologies:

Communication Technologies, Emerging Services, Software Trends,

Introduction to Computer:

History of Computers:

About to ENIAC, Computer generations, Languages, Software and Applications, Computers in India.

Computer Hardware-Software Components:

Impact of Technology, Components of a Computer, Computer Hardware, Computer Software.

Introduction to Personal Computer:

Micro Computer and its operating systems, The personal Computer and its Environment, Disk operating system Commands, Printer,

Introduction to Data Processing:

Systems Analysis and Design:

Steps in System Analysis, Systems Design Concepts, Design of Systems Components Systems Documentation, System Design Methodologies.

Algorithm and Problem Solving:

Algorithm, Different Aspects of problem solving, Computer animation and Algorithm, Debugging of a program, Verification of a Program.

Programming Concepts:

Algorithm and flowcharting symbols, Elements of a Programming language.

Programming Techniques:

Current Trends in Programming Techniques.

Diploma in Computer in Office Management

DCOM-02 – Information Processing in Office

Management Information System :

An MIS Perspective :

MIS Introduction, Historical Background, Status of MIS in organizations, Framework for understanding Management Information System.

Information Needs and its Economics:

Growing Need for information, Data, Information, Information from Data, value of information.

Management Information and Control Systems:

System View, Role of MIS at various Management Levels, Structure of MIS, Information Network, Desirable Characteristics of MIS.

MIS : Role of Computers:

Human efforts and the limitations, planning for computerized MIS, Elements of computerized MIS, Data Processing in Computerised MIS, Role of Office Function in Computerized MIS, Computerised MIS in action.

Database Management System:

Introduction to Database Management System:

Database, Need of Computerised Database, DBMS.

Database Structure:

The architecture of A DBMS, Indexing and searching Techniques.

Various Approaches of DBMS:

A Study of the three Approaches, Hierarchical Approach, Network Approach, Relational Approach.

A Database Management Package:

Introducing dBASE III Plus:

Concepts of A dBASE III Plus file, Entering Data in a file, Adding data, Listing of Records, Listing Selected fields.

Data Retrieval and file Maintenance:

Data Retrieval, Updating a file, Arithmetic Calculations.

Sorting and Indexing:

Sorting, Indexing,

Printing A formatted Report:

Creating A report format, using Multiple files.

Programming in dBASE III Plus

dBASE III Plus Program file, Commands in a Program, Conclusion.

Diploma in Computer in Office Management

DCOM-03 – Office Productivity Tools

Word processing and Desk Top publishing:

Word Processing : Evolution and Concepts:

Evolution of word processing, Basic word processing functions, Common word processing features and tools.

Wordstar : A Typical word processor:

Menus, Commands, Screen Displays and Help, Creating Text, Editing Text, Formatting Text, Printing Text.

Advanced word processing Feature – Spellstar:

Approach and Methodology of Spelling check, spellstar.

Advanced word processing feature-Mail Merge:

Mail Merge

Desktop Publishing (DTP):

Components of Publishing System, Limitations of a word processor to perform DTP- tasks, Components of A DTP System, Pagemaker : A Typical DTP Software, Limitations of DTP VIS-À-VIS professional publishing.

Spreadsheet in Business Decision:

Fundamentals of Decision Making and Spreadsheet:

History, Modelling for Decision making in Business, Lotus Access System, Strengths of Lotus 1-2-3, 1-2-3 Screen, Lotus 1-2-3 Function keys.

Basic Skills in using spreadsheet:

Data entry and Menu Handling, Moving around the worksheet, Indicating and Erasing a Range, Copying and Moving Data, Saving A file and Quitting 1-2-3.

Tuning A spread sheet:

Worksheet Commands Handling a range.

Managing a Spreadsheet:

1-2-3 file functions, printing a file, plotting graphs in Lotus 1-2-3

Database Functions in Lotus 1-2-3

Dataase functions in 1-2-3.

Functions and Programming in Lotus 1-2-3:

Functions, Macros – Programming in 1-2-3.

Diploma in Computer in Office Management

DCOM-04 – Computer Application in Office

Database Management Systems (Financial) :

An Approach for Developing a Payroll Application :

Need for Computerisation, Benefits of a Computerised Systems, Features of the System, System Analysis and Design, Using dBASE III Plus for programme Development.

An application for a Hotel:

Inputs and outputs, Files layout, Program Modules, in the system.

Alternate Programming Approach- Payroll:

Role of Computerised System in Office, Versatility of A Computer for Office Applications, Selection of a suitable programming Medium, System Study: Payroll Application, Application Software Development, Comparative Study of Different Programming Approaches.

Financial Accounting:

Scope of the System , A Sample System for Financial Accounting.

Inventory Control System:

Inventory Management, Computer System.

Database Management System – Non Financial Applications:

DAK Management System:

System Study, General Design of the System, Approach to Program Design, Modules of the System, Implementation and Utilisation.

Personnel Management System:

System Study, General Description of the Computerised System, System Design, Modules of the System, Implementation and Utilisation.

Designing A Database From Textual Information:

Problem Definition, System Requirement, System Design Framework, Implementation Considerations, Approach to Program Design, Modules of the System.

Applications on Spreadsheet:

An Office Application Using Multiple Packages:

Pakage characteristics, System Description : Recruitment Management System, Activities and Program Modules, Application Development, Running an integrated Application.

Budgeting and Cash Flow:

Relevancy of Cash flow in Business, The Budgeting process, The operating Manager and the Accountant, A brief Recapitulation of Relevant Accounting terms, Advantages of using electronic computers, A comprehensive illustration, Making changes in the spreadsheet.

Profit Analysis :

Worksheet Description, Developing the worksheet, "What-IF" Analysis.

Diploma in Computer in Office Management
DCOM-05 – Modern Office

Communication in the Office :

Introduction to an Integrated Office Communication :

Concept of an Automated office, Applications in A Modern Office, Equipment in Modern Office, Typical Modern Office, Integrated Communication for Modern Office.

Fundamentals of Data Communication and Networking:

The Data Communication process, Types of electronic signals, types of transmission, Modes of transmission, character transmission, Lines for Data Transmission, Transmission Methods, Communication Hardware, Data transmission error and Recovery, Data Communication protocols.

Fundamentals of Data Communication and Networking – II:

Impact of Technology growth, Genesis of Computer Networks, Distributed processing and Networking, Network topologies, switching Alternatives, Computer Networks, Applications for Computer Networks.

Introduction to Local Area Network:

Definition of LAN, Advantages of LAN, Resource sharing – An example, characteristics of LAN, Transmission Medium, LAN topologies, IEEE 802.3 LAN and CSMA/CD protocol, Access Methods and Topologies, LAN Architecture, LAN Standards, LAN services, Application of LANS, Connecting to the Rest of the world-use of LAN, Sharing Data Base Information of A LAN, Accounting on a LAN, Communication Between A LAN and a Mainframe Computer.

Emerging trends in Computer Networking

Standards, The Standards Makers, The OSI Reference model, Emerging trends in Data Communication in

Department of Telecommunication (DOT), International Gateway Packet Switching System, Existing Indian Networks.

PHASED Modernisation:

An Approach to Modernisation:

Information in the office, Need for Modernisation, Criteria for priorities, Environmental Concerns.

Information Systems Analysis Methodologies:

Need for a Methodology, Information processing and Technology Options, Current Office Environment : Office Models, Procedure Models : A closer view, A pragmatic Approach to systems Design and Development.

Office Information System Implementation:

Hardware and Software Selection, Methods of System Acquisition and testing, Training of Personnel, Change over procedures, Review and Maintenance.

Human Aspects of Modernisation:

Characteristics of Human-Machine interaction, Ergonomics, Human problems in the Automated Office, Designing Human-Machine Systems, A Futuristic Perspective.

Expert-Systems in Office:

Expert System, Knowledge Representation, Reasoning Strategies, Expert System shells, use of Expert Systems in Offices.

Security and privacy:

Computer Security – Part – I:

Computer Security and Data Security, Components of Computer Security, Physical Security.

Part – II :

Abuses of Electronic Access, Security procedures for electronic Access Control.

Part – III:

Cryptographic Terminologies , codes, ciphers, Elements

of Encryption Algorithms.

Computer virus and protective Measures:

Security Risks with PCS, perverse Software, Computer virus, preventive measures and treatment.

Case Studies:

System Implementation in an office Environment – An Interview

System Implementation in a Corporate Environment.

System Design and Implementation in a Planning Environment.

Planning for Office Modernisation.

Diploma in Hardware Technology (DIHT)

DIHT-01 – Fundamentals of Computer and IT

Introduction to Computer:

Computer Basics:

Characteristics of Computer, Application of Computer.

Basic Components of Computer:

Components of Computer, CPU, Memory, Keyboard, Mouse, VDU, Printers, RAM, ROM, CD-ROM, Hardware and Software.

Classification of Computer:

Analog, Digital Hybrid Computer, General purpose, Special Computer, Micro, Mini, Mainframe Computer, Super Computers, Desktop, Laptop, Palmtop.

Representation of Data/information:

Information Technology, Data, information, Data processing, Characteristics of information, Scope of information, Basic data types.

Basics of Digital Electronics:

Digital Number System :

Number System, Decimal System, Binary System, Octal System, Hexadecimal System, Code Conversion, Binary Coes, 8421 Code/BCD Code, 2421 Code, 5211 Code, Reflective Code, Sequential Codes, Non weighted codes, Gray Code, Error Detecting and Correction Codes, ASCII Code, EBCDIC Code, Floating point Numbers.

Digital Logic Gates:

Gate. AND, OR, NOT, BUF, NAND, NOR, XOR, XNOR, Universal Gates.

Simplification of Boolean Functions:

Karnaugh Maps, Minimization Technique upto 5-vriable K-map, Inverse function.

Digital Combinational Circuit:

Decoders, Encoders, Priority Encoder, Multiplexer, De-Multiplexer, Boolean Function, Implementation, Mux-

Demux Application Example.

Sequential Circuits:

Concept of Sequential logic, Asynchronous sequential circuit, Synchronous sequential circuits, Latces and Flip-Flops, RS, JK Latch, JK Master Slave Flip-Flop, Sequential circuits Design.

Memory System:

Introduction of Memories System:

Memory Cell, Block diagram of Memory Cell, Memory locations and address, Memory operations, Memory hierarchy.

Main Memories:

Semi-conductor RAM Memories, Static Memories, Dynamic RAM, Performance Measure, SDRAM, ROM, Flash Memory, Speed, sigze and cast of memory,

Secondary Storage Memories:

Magnetic Disk Memory, Flopy Disk Memory, RAID Disk Arrays Optical Disk. .

High Speed and Virtual Memories:

Cache Memories, Performance Consideration, Virtual Memories, Demand Paging.

Microprocessor:

Introduction to Microprocessor:

Evolution, Introduction and Characteristics of Microprocessor Systems, Microprocessors Register Structure, ALU, Timing and Control Unit, CPU, Memory, Input/Output, Hardware, Software and firmware, Machine , Language, Assembly language, High level language.

8085 Microprocessor :

Architecture, Softwaer Model, Functions and operations, Instruction and Data format, Opcode format, Data transfer Instructions, Arithmetic instructions, Addressing Mode of 8085.

16-Bit Microprocessor :

Architecture, Bus interface unit, Execution Unit, Register Organisation, Memory Segmentation, Software Model of 8086, 8088 Microprocessor.

Advanced Microprocessors and Micro Controllers:

Introduction to 32 bit and 64 bit Microprocessors, The 80386. Microprocessor, The 80486 Microprocessor, Pentium Processor, Motorola 68XXX Processors, Microcotrollers.

DIHT-02 – Basic Electronics Devices and PC Software

System Software:

Software:

Software, Classification of Software, Types of Software, Software Packages, Evaluating Packages, Selection Process, Market of Packaged software.

Operating System Techniques :

Multiprogramming, Multiprocessing, Multitasking, Batch Processing Operating Systems, User interface.

Linker and Loader:

Linker, Loader, Address binding, Compiler Drivers, Basic loading, with relocation, Position – Independent Code, Bootstrap loading, Dynamic Linking, Dynamic loading.

Programming languages and its types:

Classification of Programming Language, procedural language, functional language, Logic oriented languages, object-oriented languages, Parallel Processing Languages, Program Structure, Conditional Structures, Looping Structures.

Operating System :

Concept of Operating System:

Services of O.S., Functions of O.S., Characteristics of an operating system, Advantages of an O.S., Types of O.S., Operating System Techniques.

Disk Operating System :

DOS 1-2, Directory, Main operations on Files, DOS Commands.

Windows:

Windows 95, The windows 95, Desktop, Menus, working with Program and Document windows, Dialog Boxes, Control Panel, About help, Difference between Windows 95 and Windows 98.

System files:

Booting sequence, Batch File, Executable file, Config. File, Com file

Windows XP :

Features of windows XP :

About Windows XP, System requirements for windows XP, Features new to windows XP.

Files and Folders:

Files and Folders, Control Panel, Windows Registry, DLL.

Windows Installation:

Installation of Windows XP, Process, Description of Universal plug and play features in windows XP.

Setting in Windows XP :

Device Manager, Set up your Screen Saver, User Account Passwords.

LINUX Operating System :

Features of LINUX:

History, Features, Structure of Linux, Differences between Linux and UNIX, Difference between Linux and MS Windows, Hardware requirements, space

requirements and Coexistence.

Directories and File Systems:

File System, Permissions, Terminals, Common Commands, The mount and umount Command, File Compression, backing up and restoring.

Linux Installation:

Installation Overview, Installation in Detail, Repartitioning your DOS/Windows drives, Partition basics, choosing console or X installation, Post-Partition Steps, Installing software Packages.

Booting Process in Linux :

First time log-in, shutting down/rebooting, Booting in Linux, system startup, Init, Configuring Boot Loaders, virtual consoles.

DIHT-03 – Computer Interfacing Devices

Introduction to Motherhood:

Basics of Motherboard:

Installation of CPU, PC Board or Motherboard, CPU Speed, Microcode Efficiency and Pipelines, Word Size, Data path, Internal Cache memory, Slots and sockets.

Concept of various CPU and PC Buses:

CPU Chips, concept of Bus, AT Bus (ISA), PS/2 Bus, EISA, Local Bus, Latest Bus PCI, AGP, PC Card (Portable Bus), PC Card Features, Mini PCI, Card Bus.

Introduction of various controllers:

System controllers, Video Adapter, Floppy Disk Controller and Disk Drivers, IDE Controller, SCSI Host Adapter, Serial Port, USB, Firewire or IEEE 1394.

Understanding the Speed and Role of Connectors:

System clock/ Calender and CMOS chip, Location and Identification Components.

PC Assembly:

Requiremets before PC Assembly:

PC Repair tools, Avoidable tools, General PC Disassembly Advice.

Upgradation of Motherboard:

Diagram, Remover the board Correctly, Remove the Drivers, Remove the Power supply, Remove the CPU and RAM, upgradation of Computer.

Installation and Configuration of New Motherboard:

Installation of New Circuit board, Application of plug and play, Configuration of New Circuit Boards, software, Switch setup Advice, Avoiding Configuration Conflicts, Understanding I/O Addresses, DMA, RAM, and ROM Addresses.

Maintenance of Motherboard:

Resolving Drive conflicts, PNP, DIP switches, Finding the Bad Boards, Failure of Boards.

PC Memory:

Understanding the PC Memory:

Installing RAM, Memory sizes, speeds and shapes, Memory Modules, Motherboard Chipsets, Dynamic RAM, SDRAM, FPM and EDO DRAM, DDRSDRAM, SLDRAM.

Managing the PC Memory:

Memory Maintenance in the DOS world, Device Drivers, Command Shell, Video RAM, Flash RAM, Buffers and Frames, Extended Memory, EMS, LIM, PAGED, Expanded Memory.

Testing and Trouble-Shootings of Memory:

Power Drops and Surges, Mismatched chip speeds and Manufactured, Memory tests.

Assembling and maintenance of Power supply:

Components of the Power Supply, Form Factor connectors, Power Problems, Devices to Remedy

Electrical Problems .

Working with Hard Disk Drive :

Basics of Hard Disk Drive:

Magnetic Recording, Data Recording Method, Data Encoding Method, NRZ, Hard Disk Drive.

Interfacing Devices of Hard Disk Drive:

ST-506/412, ESDI, ATA IDE, ATA Cable/Connector, SCST, Logical working of Hard disk Drive.

Installation and Configuration of HDD:

Software setup, setup configuration, Low level formatting , HD test, Non-destructive Formatters, surface Analysis, Defect free Drivers, Drive Partitioning, FDISK.

Maintenance and trouble-shooting of HDD:

Un-erasing a file, undeleting partially overwritten file, unformatting Hard disks, Backing up and Restoring MBR, with DEBUG, Hardware Failure, Check stepper Motor, Check the Controller, Disk Media Error, check drive cables, Check Drive is spinning.

DIHT-04 – Computer Network and Security Maintenance

Network Basics:

Introduction:

Networking, Need, Advantages and Types,

Network Topologies:

Terminology, Bus Topology, Ring Topology, Star topology, Hybrid Network Topology.

Network Protocols, Hardware and Software:

Networking Protocols, Standards, Network Hardware, Internetwork and Network software.

Network Design and Configuration:

Network components/Configurations, Directions, Procedure.

Transmission and Network Elements:

Signal Transmission:

Terminology, Data transmission, Connection- oriented and Connectionless Transmissions, Synchronous and Asynchronous Transmission, Transmission Media, Analog Signals.

OSI Reference Model:

Terminology, the OSI Model,

Ethernet:

Terminology, Ethernet origins, Ethernet configuration, Ethernet communication, Ethernet collision, Ethernet frames, Frames types.

Network and Devices:

Token Ring Architecture, Fiber Distributed Data Interface (FDDI), Token Ring Case Study, ATM, Connectivity Devices, Transceivers, Repeaters, Hubs, Media Dependent Adapter, Internetworking Devices, Gateways,

Internet Connectivity:

The Internet:

Usage, Architecture of the Internet, IP, TCP/IP Reference Model, Unified Networks.

The Internet Services:

E-Mail, Remote login, ISPs, Message transfer, File Trnsfer Protocol (FTP), Telnet, Leased line.

ISDN & Bridge-Routers:

ISDN, NFAS, Advantages of ISDN, Interfaces, Physical layer Protocols, 2BIQ, Link layer Protocols, Bridge-Routers.

ISP Connectivity:

Internet service Provider (ISP), ISP Connection Options, DSL, Cable Modem, DSL, SHDSL, Broadband Access, Dynamic DNS.

Installation and Administration:

Network Operating Systems:

Terminology, Network Operating Systems, Windows for Workgroups/Windows 95/Windows NT Server, UNIX/LINUX, MAC OS Apple Share.

World wide web & client server Model :

www, architecture of www.

Network Planning and Management:

Quality of Service Analysis, Propagation Delay, Response Time, Throughput, Workload, Network, Maintenance and Management, Network Management tools.

Network Security:

Cryptography, Encryption, Authentication , Firewalls, Proxy Servers, Virtual Private Networks (VPNs).

Certificate in Computer Course

CCC-01 – Microsoft Office and Internet

Microsoft Windows:

Windows Fundamentals:

Basic elements, parts of a window, Types of windows, Types of Icons, Basic Techniques for working in windows, Menus.

Managing the File System :

Switching between Directory windows, changing view of the Directory window, Changing Drives and Directories, working with files and directories, Managing floppy Disks.

Printing in Windows :

Activating print Manager, Printing using print Manager, Pausing and Resuming printing.

Windows Accessories:

Write, Paintbrush,

Microsoft word:

MS-Word Basics :

Starting the word screen, word document.

Unit-02 Typing and Editing :

Typing and Revising text, finding and Replacing, Editing and proofing tools.

Unit-03 Formatting Text :

Formatting Text Characters, Paragraph, Document Templates.

Unit-04 Page Design and Layout:

Page setup, tables.

Unit-05 Mail Merge :

Mail Merge.

Unit-06 Document Management :

Opening, Saving and protecting documents, finding documents, printing a document,

Microsoft Excel :

Introduction to Excel :

Excel Basics, Worksheets, within workbook, Enter and Edit Data, Range Names, Navigate, Worksheet, Search and Replace Data, Save and Protect work book.

Formatting and print worksheet :

Page Setup, Column width and Row Height, Fonts, Alignments, Numbers.

Customising workplace :

Excel Windows, Worksheet at different Magnifications, Using custom Controls,

Calculations in worksheet :

Formula Basics, Functions,

Charts :

Chart types Editing charts.

Database Power of Excel :

Database Concepts, Creating database, Adding Records, Deleting Records, Editing Records, Sorting a database.

Microsoft Powerpoint:

Presentation Graphics :

Business Graphics, Types of Business Graphics, Physical Aspects of presentation.

Introducing Powerpoint :

Power point views, The Powerpoint Window.

Creating a presentation:

Create a title slide, creating a graph, creating tables, Make organization charts, Save and Close a presentation, Change Slide layout, Slide show.

Customizing the Slide show:

Create a blank presentation, working with text, change fonts, size and colour of text, working with graphic tools, Align Objects, group or ungrup the objects.

Internet Awareness:

Internet : An Overview:

Internet, DNS, Host/Terminal, Connections, Individual Computer TCP/IP Link, Dedicated Link Connections, Tools and Services on Internet, Usenet and Newsgroups, Transfering Files with Ftp, Browsing the Internet.

Internet Tools:

E-mail, FTP, Telnet.

Browsers :

Netscape Navigator Search Engines, NCSA Mosaic, Microsoft, Internet Explorer.

Visiting Websites:

Downloading, Examples, URL.

Certificate in Computer Course

CCC-02 – Fox-pro

Foxpro, creating a database file, viewing and Editing Data, Modify structure, Memo field and File utilities, Sorting and Indexing Database files, printing Reports and Labels, Memory variables, Data & Time Functions and Keyboard, Macros, Mathematical Commands and Functions, Programming with Foxpro, Multiple Database files, Windows, Menus and popups.

Case Studies:

Pay-roll problem & Income Tax problem.

Case Study :

The Investment Problem.

Certificate in Computer Course

CCC-03 – The Technology

Hardware :

Computers : An Introduction :

Computers : Then and Now, Instruction Execution.

Memory Organisation :

Memory System, Characteristics terms for various memory Devices, Main Memory or Primary Memory, External/Auxiliary Memory, High Speed Memories.

Input/Outpur organization:

Input/Output Devices, Input/Output Module/ Interface, Input/Output Techniques, Input/Output processors, External Interfaces.

Introduction to parallel organization :

Parallel processing, Pipelining, vector processing, Introduction to RISC, RISC pipelining.

Software:

Software Concept and Terminology:

Computer Software, Categories of Languages, Elements of a programming language,

Operating System Concepts :

Evolution of operating system, Types of Operating System, Future Operating System Trends.

Graphical User Interface :

GUI, Evolution of the Human and Machine Interaction, Common Graphical user Interface Terms, Functionality of GUI.

Software Development Methodologies/Tools :

The Evolving Role of Software, An Industry perspective structured Methodologies, Major influencing factors, choosing the right Methodology, Implementing A Methodology Current generations of Software Development tools.

Communication:

Fundamentals of Data Communication :

Concept, Data Communication modes, Communication Hardware.

Computer Networks:

Network concept and classification,LAN, WAN.

Emerging Trends in Networking :

E-Mail, EDI, Networking Scenario.

Computer Security and Virus:

Risk Analysis and Disaster Planning:

Risk Analysis, Disaster Recovery Planning.

Principles of Cryuptography :

History, Cryptography, Cryptoanalysis.

The Management of Computer Security:

Definitions, Security, Status on PC, Breaches of Security , Security , Measures,

Computer Virus:

The Evolution of virus, The Menance, The process of infection, classification of viruses, Type of virus, Prevention, The cure.