301: Numerical Methods

Unit: 1 **[25%]**

Errors in Numerical Analysis: -

Absolute Error, Relative Error, Percentage Error.

Numerical Solution of Non Linear Equations : -

Methods of finding solutions of Non Linear Equations

Bracketing Method:

1. Bisection Method
2. False Position Method

Open end Method:

1. Newton Raphson Method
2. Secant Method
3. Successive Approximation Method

(all methods with Algorithms)

Unit: 2 **[25%]**

Solution of Simultaneous Liner Equations : -

Gauss Elimination Method (Direct Method) ,

Gauss Seidal Method (Iterative Method) ,

Difference between Direct and Iterative Method

Interpolation :-

Forward difference , Backward Difference ,

Divided Difference

Finite Differences :

1). Newton's Forward Difference Interpolation Formula

2). Newton's Backward Difference Interpolation Formula

Interpolation with Unequal Interval :

1). Newton's Divided Difference Interpolation Formula

2). Langrage's Interpolation Formula

3). Langrage's Inverse Interpolation Formula

Unit: 3 **[25%]**

Numerical Integration:

Trapezoidal Rule ,

Simpson's 1/3 rd Rule for quadratic function ,

Simpson's 3/8 th Rule for third order Polynomial .

Unit: 4 **[25%]**

Numerical Solution of Differential Equation :-

Euler's Method ,

Taylor Series Method ,

Runge Kutta Second Order Method ,

Runge Kutta Fourth Order Method .

Text Books :-

1. Computer Oriented Numerical Methods (V. Rajaraman)

Reference Book : -

1. Introductory method of Numerical Methods (S.S.Sastry)
2. Computer Oriented Numerical Methods (R.S.Saslaria)
3. Scientific and Statistical Computing (Heena Timani)

302: System Analysis and Design

Unit: 1 **[30%]**

System Analysis Fundaments: Introduction to System, System Analysis and Design, Types of System: TPS, MIS, DSS, Need for System Analysis and Design, Role of the System Analyst.

System Development Strategies: SDLC, Structured Analysis Development Method, System Prototype Method.

Case Tools: Benefits of Computer-Assisted Tools, Categories of Automated Tools, Case Components.

Organizations as System: Interrelatedness and Interdependence of System, System Process, Boundaries, System Feedback, Managing Project Review and Selection.

Fact-Fining Techniques: Interview, Questionnaire, Record Review, Observation.

Data Flow Diagram: Advantages, Notations, Rules, Leveling, Logical and Physical DFD.

Data Dictionary: Importance, Data Elements, Describing Process Specification.

Structured Decisions: Decision Tree, Decision Tables, Structured English

Unit: 2 **[25%]**

The Essentials of Design

Designing Effective Output:

Objectives, Types of Output, Method, Factors to consider,

Designing Effective Input:

Objectives, Guideline for Form design, Screen and Web Forms,

Designing User Interface:

Objectives, Types of user interface, Designing Accurate Data-Entry

Procedures: Objectives, Effective coding, Data-Entry Method, Ensuring data quality through input validation

Unit: 3 **[25%]**

Quality Assurance through Software Engineering

Design of Software, Software design and documentation:
Structured Flowcharts, HIPO, Warnier/Orr Diagrams

Managing Quality Assurance:

Level of Assurance, Level of Test

Implementation of Information System:

Training Strategies, Conversion, Post Implementation Review

Unit: 4 **[20%]**

Case Studies:

- Financial Accounting System
- Payroll System
- Library System
- Inventory System
- Online Banking System
- Railway Reservation system
  (Input, Output, DFD)

Text Books:

1. Analysis and Design of Information System,James A.Senn
2. System Analysis & Design, S. Parthasarthy & B.W. Khalkar

Reference Books:

1. Introduction to SAD by lee
2. System Analysis & Design by kendall and kendall

303: Introduction To Algorithms

OBJECTIVES

- To introduce basic concepts of algorithms
- To introduce mathematical aspects and analysis of algorithms
- To introduce searching and Sorting algorithms
- To introduce sequential storage algorithms

Unit: 1 **[20%]**

Basic Concepts of Algorithms

Algorithm Fundamental:

Introduction – Notion of Algorithm – Fundamentals of Algorithmic Solving – Important Problem types – Fundamentals of the Analysis Framework – Asymptotic Notations and Basic Efficiency Classes.

Basic Concepts of Flowchart, Algorithm.

Array, Pointer, Union, Structure: Structure and Pointer, Structure and Array, Structure within Structure.

Unit :2 **[20%]**

Mathematical Aspects and Analysis of Algorithms

Mathematical Analysis of Non-recursive Algorithm – Mathematical Analysis of Recursive Algorithm – Example: Fibonacci Numbers – Empirical Analysis of Algorithms – Algorithm Visualization.

Unit : 3 **[30%]**

Searching and Sorting Algorithms

Linear Search and Binary Search.

Internal Sorting Algorithms: Bubble Sort, Quick Sort, Straight Selection Sort, Heap Sort, Simple Insertion Sort, Shell Sort

External Sorting Algorithms : Merge Sort, Radix Sort.

Unit : 4 **[30%]**

Sequential Storage Algorithms

Data Types : Primitive and Compound

Data Structure : Simple, Linear and Non Linear

Stack Implementation , Stack Application

Queue Implementation, Single, Double,Circular and Priority Queue.

Text Book:

1. Anany Levitin, "Introduction to the Design and Analysis of Algorithm", Pearson Education Asia, 2003.

Reference Book:

1. T.H. Cormen, C.E. Leiserson, R.L. Rivest and C. Stein, "Introduction to Algorithms", PHI Pvt. Ltd., 2001
2. Sara Baase and Allen Van Gelder, "Computer Algorithms - Introduction to Design and Analysis" Pearson Education Asia, 2003.
3. A.V.Aho, J.E. Hopcroft and J.D.Ullman, "The Design and Analysis Of Computer Algorithms", Pearson Education Asia, 2003.
4. An Introduction to Data Structures with Application By Tremblay & Sorenson McGraw-Hill 1984
5. Data Structure using C and C++ By Tenenbaum, Prentice Hall India. 2nd Edition 1997.
6. Sorting and Sort Systems By H. Lorin Addison-wesley 1975

304: Client Server Architecture & Interface

Unit: 1 **[25%]**

Client Server Basics:

Discover Client-Server And Other Computing Architectures, Two Tier Versus Three Tire Client-Server Model, COM,DCOM, Services Models

Visual Basic Building Blocks:

Forms, Exploring Properties, Methods And Events,

Intrinsic Visual Basic Controls:

Label and TextBox Controls, Command Button Control, Frame, Checkbox, and Option Button Controls, ListBox, Directory List Box, and File List Box Controls, Drive List box, directory list box, File box controls, formatting controls, control arrays, Tab order

Unit: 2 **[25%]**

VB Programming Fundamentals And Variables :

Introduction to Variables, Variable Declaration, Arrays, Introduction to Constants And Option Explicit Statement, Assignment Statements, Working With Math Operations, Strings, Formatting Functions

Controlling And Managing Program :

All Control Statements, Loops, Error Trapping, Working With Procedures, Functions

VB Advance Controls :

Menu bar, Popup Menus, Message Box, Input Box, Built-in Dialog Boxes, Creating MDI, Control Array

Unit: 3 **[25%]**

Visual Basic and Databases :

Understanding the Data Controls And Bound Controls, Introduction to Data Form Wizard, Introduce DAO, Working With Recordsets, Record Pointer, Filters, Indexes, Sorts And Manipulation of Records

Remote And ActiveX Data Objects :

Working With ODBC, Remote data Control, Introducing ADO, ADO Data Control, Using DataGrid Control And ActiveX Data Objects

Unit: 4 **[25%]**

ActiveX Controls, Extending ActiveX Controls And Classes:

Creating, Testing, Compiling, Enhancing And User Drawn ActiveX Controls, Using ActiveX Control Interface Wizard And Property Pages Wizard, Introducing Ambient, Extender Objects, Building Class Modules, ActiveX DLL

Using Files:

Opening, Closing, and Deleting Files, Reading and Writing to files

Reports And Packaging :

Data Reports And Crystal Reports, Packaging A Standard EXE Project

Text Books:

1. Visual Basic 6 Client/Server How-To (Unit 1: 1) Techmedia publication
2. Using Visual Basic 6 Special Edition, Prentice Hall India Publication.
3. Mastering Visual Basic 6.0 By Evangelos Petroutsos.

Question Paper Scheme:

Q.1 - Objective Type Unit I & II	(11) Marks
Q.2 - Unit-I OR Q.2 Unit-I	(12) Marks
Q.3 - Unit-II OR Q.3 Unit-II	(12) Marks
Q.4 - Objective Type Unit III & IV	(11) Marks
Q.5 - Unit-III OR Q.5 Unit-III	(12) Marks
Q.6 - Unit-IV OR Q.6 Unit-IV	(12) Marks

305: Database Management System

Unit: 1 **[25%]**

Basic concepts of Database Systems

Database approach - characteristics & implications. Database Architecture – data models, data independence, classification of DBMS, data modeling, mapping ,DBA, client/server architecture.

Relational and other models

Relational model concepts and constraints, relational algebra, queries in relational algebra.

Unit: 2 **[25%]**

Database Design using RDBMS

Functional dependency & normalization. Schema design and normal forms. Database design process and tools.

Structured query language

Data definition, update, queries, views, etc. Embedded SQL. Relational calculus, UEL and QBE Examples of RDBMS - Oracle, D2K, Sybase, etc. Case study of one such RDBMS.

Other models - Network and Hierarchical, their structures and constraints. Examples of such database systems.

Unit: 3 **[25%]**

Implementation techniques with data protections

System catalogs, query processing and optimization, transaction processing concepts, concurrency control, recovery, database security and authorization.

Unit: 4 **[25%]**

PL/SQL

* Variable declaration
* Control Structure
    1. Condition structure.
    2. Iterative structure.
* Cursor
    1. Implicit.
    2. Explicit.
* Exceptions.
    1. Predefine exceptions.
    2. Users define exceptions.
    3. Handling Raised exceptions.

Text Books:

1. Database Management System: Concept, Design, Architecture and SQL
    - by Dr. A.C. Shah, Dr. A.R. Patel, MacMillan Publisher India Ltd.,
2. Introduction to Database Systems, 4th Edition, C. J. Date, Narose Publishing.

Reference Books:

1. Database Management and Design, Gary W. Hansen and James V. Hansen, Prentice-Hall India, 1999.
2. Fundamentals of Database Systems, 2nd Edition, Elmasri and Navathe, Benjamin/Cummings, 1994.
3. Database System Concepts, A. Silberschatz, Henry Korth and S. Sudarshan, McGraw-Hill, 1997.

Question Paper Scheme:

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Q.4 - Objective Type Unit III & IV	(11) Marks
Q.5 - Unit-III OR Q.5 Unit-III	(12) Marks
Q.6 - Unit-IV OR Q.6 Unit-IV	(12) Marks