VEER NARMAD SOUTH GUJARAT UNIVERSITY – SURAT
Bachelor of Computer Application (B.C.A) 2nd Year
Syllabus

S. Y. B. C. A. Semester 3
Effective From: June-2010

Paper No.: 301
Paper Title: NUMERICAL & STATISTICAL METHODS

1. Numerical Methods

1.1. Introduction
1.2. Errors in numerical calculations
1.3. Solution of algebraic and transcendental equations
1.4. Methods like bisection, iteration, false position, Newton Raphson
1.5. Interpolation for equal and unequally spaced points
1.6. Numerical differentiation and integration
1.7. Solution of linear system of equations by Gauss elimination Gauss serial methods

2. Statistical Methods

2.1. Introduction
2.2. Presentation of statistical data
  2.2.1. Types of variables
  2.2.2. Univariate, Bivariate and Multivariate data
  2.2.3. Univariate and Bivariate Frequency Distributions
2.3. Measure of Central Tendency-Mean, Median and Mode
2.4. Measures of Dispersion (absolute as well as relative)
  2.4.1. Mean Deviation
  2.4.2. Standard Deviation
  2.4.3. Coefficient of Mean Deviation and Coefficient of Variation
2.5. Correlation
  2.5.1. Introduction
  2.5.2. Types of Correlation and Scatter Diagrams
  2.5.3. Rank Correlation Coefficient
2.6. Regression
  2.6.1. Concept of Dependent and Independent Variables
  2.6.2. Introduction to Linear Regression
  2.6.3. Line of Regression (with one Independent Variable)

Methods should be explained conceptually and corresponding examples should be given. No proof should be given to any of the methods

Reference Books:

1. S. S. Sastry, Introductory Methods of Numerical Analysis – PHI
2. Introduction to Mathematical Statistics – Hogg RV & Craig AL Tata McGraw Hill
3. An introduction to the Theory of Statistics – Yule UG & Kendall MG – Charles Griffin & Co.

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Paper No.: 302

Paper Title: RELATIONAL DATABASE MANAGEMENT SYSTEM (R.D.B.M.S.)

1. **Codd's Laws for Relational Database Management System**

2. **Introduction to Oracle Tools**
   - 2.1. Export and Import, SQL*Loader
   - 2.2. Oracle DBA Functions like Granting & Revoking Permissions (ALL and PUBLIC Arguments GRANT and REVOKE OPTIONS)
   - 2.3. SQL*Plus

3. **Interactive SQL**
   - 3.1. Oracle Data Types
   - 3.2. Oracle DDL & DML
     (Create table, Alter table, Update with multiple column, Updating to Null values, Drop Table, Declaring Constraints like Primary Key, Foreign Key, Multicolumn Foreign Key, Foreign Key Restriction etc)
   - 3.3. Operators
   - 3.4. Oracle Functions
   - 3.5. Range Searching
   - 3.6. Pattern Matching
   - 3.7. Manipulating Dates
   - 3.8. Joins (Joining tables through Referential integrity, Equiv. Joins, Joins of two tables, Joining a table to itself)
   - 3.9. Sub Queries (DISTINCT with sub queries, Predicates with Sub queries, Aggregate functions in sub queries, HAVING Clause, EXISTS Operator)
   - 3.10. Using Union, Intersect and Minus Clause
   - 3.11. Indexes (Create Index, Drop Index, Types of Index)
   - 3.12. Views (Updating Views, Group Views, Views and joins views and sub Queries , Changing Values through view)
   - 3.13. Sequences
   - 3.14. Nested Tables & Var. Arrays

4. **PL/SQL**
   - 4.1. PL/SQL Block Structure
     - 4.1.1. Using Variables, Constants and Data type
     - 4.1.2. User Defined Record
     - 4.1.3. Assigning Values to Variables
     - 4.1.4. Control Statements (IF…THEN Statement , Loop, FOR ... Loop, While loops)
   - 4.2. Oracle Transactions
   - 4.3. Concurrency Control in Oracle
   - 4.4. Cursor (Explicit, Implicit)
   - 4.5. Error handling in PL/SQL
     - 4.5.1. Exceptions
     - 4.5.2. User Defined Exceptions
     - 4.5.3. Unhandled Exceptions
     - 4.5.4. Pragma Exceptions

5. **Stored Procedures, Stored Functions & Packages**

6. **Database Triggers**

Reference Books:

1. George Koch: The Complete Reference – Oracle Press
2. Oracle 9 PL/SQL Programming – Oracle Press
3. David C. Kreines: Oracle SQL: The Essential Reference – O'Reilly
4. Oracle 9 PL/SQL Programming - Iyan Bayross BPB Publication
5. Oracle 9 - P.S Despande - Dreamteach Press
6. Oracle SQL*Loader The Definitive Guide – Gennick & Mishra, SPD O'Reilly
7. Oracle PL/SQL Programming – Feuerstein & Peribyl – SPD O'Reilly
8. Starting Out With Oracle – Day Slyke – Dreamtech Press

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Effective From: June-2010

Paper No.: 303

Paper Title: Advanced 'C' Programming & Data Structures

1. **Pointers**
   - 1.1. Pointers and memory storage
   - 1.2. Operation on pointers
   - 1.3. Arrays of pointers
   - 1.4. Passing pointers to functions

2. **Primitive Data Structures**

3. **Non - Primitive data structures**
   - 3.1. Arrays - its storage structures and operations
   - 3.2. Stacks.
     - 3.2.1. Stack Operations
     - 3.2.2. Application of Stack in Recursion and Polish Notations
   - 3.3. Queues
     - 3.3.1. Types of queues: Simple, Circular, Double-ended, Priority
     - 3.3.2. Operations on queue
     - 3.3.3. Applications of queue
   - 3.4. Linked list
     - 3.4.1. Types of Linked Lists: Singly, Doubly, Circular
     - 3.4.2. Operations on linked list
     - 3.4.3. Application of Linked Lists (Polynomial Manipulation)

4. **Trees**
   - 4.1. Concept and Definitions
   - 4.2. Types of Binary Tree
   - 4.3. Operations on Binary Trees: Tree Traversals, Insertion & Deletion
   - 4.4. Linked and Threaded Storage Representation of Binary Trees
   - 4.5. Application of Trees (Manipulation of Arithmetic Expression)
   - 4.6. Search Trees
     - 4.6.1. Height-balanced trees: AVL Trees, 2-3 trees
     - 4.6.2. Weight-balanced trees

5. **Sorting & Searching Techniques.**
   - 5.1. Sorting:
     - 5.1.1. Insertion Sort
     - 5.1.2. Selection Sort
     - 5.1.3. Quick Sort
     - 5.1.4. 2-way Merge
     - 5.1.5. Bubble Sort
     - 5.1.6. Heap Sort
   - 5.2. Searching:-Sequential, Binary

Reference Books:

1. An Introduction to Data Structures with Applications – Trembley & Sorenson – McGraw Hill
2. Algorithms – Data Structure Programs – Wirth, Niclaus – PHI
3. Fundamentals of Data Structures, Horwitz, E. and Sahni – Computer Science Press.
4. The Art of Computer Programming, Vols, 1-3, Knuth D – Addison Wessley
5. Schaum's Outline of Data Structure with C++, John R.H. –TMH
6. Expert Data Structure with C-R,B.Patel, Khanna Publication
7. The Complete Reference 'C' -Fourth Edition - Herbert Schildt - Tata MC Graw Hill
8. Programming Language in 'C' Gotfried -Tata MC Graw Hill.
9. Data Structures & Program Design in C – R. Kruse, C. L. Tondo, B. Leung – PHI
10. Data Structures Using C & C++ - Langsam, Augenstein & Tenenbaum - PHI

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Paper No.: 304

Paper Title: Object Oriented Programming (OOP)

1. Principles of Object Oriented Programming

- 1.1. Procedure Oriented Programming V/S Object Oriented Programming
- 1.2. Basic Concepts of OOP (Encapsulation, Polymorphism etc)
- 1.3. Benefits of OOP
- 1.4. Structure & Classes
- 1.5. Encapsulation & Data Hiding
- 1.6. Constructors
- 1.7. Friend Functions
- 1.8. Inline Functions
- 1.9. Dynamic Object Creation & Destruction
- 1.10. Destructor

2. Object Oriented Properties

- 2.1. Introduction to Object Oriented Properties
- 2.2. Abstraction
- 2.3. Polymorphism
  - 2.3.1. Operator Overloading
  - 2.3.2. Function Overloading & Type Conversion
- 2.4. Inheritance
  - 2.4.1. Types of Inheritance
  - 2.4.2. Constructor & Destructor Calls during Inheritance
- 2.5. Dynamic Polymorphism
  - 2.5.1. Overriding
  - 2.5.2. Virtual Function
  - 2.5.3. Abstract Class

3. Data Files

- 3.1. Manipulators (In-Built, User Defined)
- 3.2. File Modes
- 3.3. File Functions
- 3.4. Error Handling During File Operation

Reference Books:

1. Let us C++ by Yashwant Kanetkar, TMH Publication
2. Programming with C++ by E. Balagurusamy, BPB Publication
3. Herbert Schildt: The Complete Reference C++ - TMH
4. Stroustrup: The C++ Programming Language by Addison Wesley
5. Robert Lafore OOP in C++ Galgotia Publication
6. Lippman: C++ Primer – Addison Wesley
7. Probal Sengupta: Object Oriented Programming Fundamentals & Applications – PHI

S. Y. B. C. A. Semester 3
Effective From: June-2010

Paper No.: 305
Paper Title: Software Engineering

1. **Introduction**
   - 1.1. Software, Software Characteristics, Applications, Myths.
   - 1.2. Software Engineering ,Generic View
   - 1.3. Software Process Models: Waterfall, Prototyping
   - 1.4. 4 GL Techniques
   - 1.5. Efforts Distribution

2. **Requirement analysis**
   - 2.1. Introduction
   - 2.2. Requirement Gathering Techniques
   - 2.3. DFD, Data Dictionary and Process Specification
   - 2.4. Importance of Requirement Specifications
   - 2.5. Software Requirement Specification Document

3. **System Design**
   - 3.1. Design Model
   - 3.2. Principal and Concepts
   - 3.3. Functional Independence
   - 3.4. Mapping of Requirements into Design
   - 3.5. Design Documentation

4. **Software Testing**
   - 4.1. Testing Fundamentals
   - 4.2. Functional and Structural Testing
   - 4.3. Testing Process

Note: Case Studies may be carried out at appropriate stages of the course.

Reference Books:

1. R. S. Pressman, Software Engineering – A Practitioners' Approach – McGraw Hill
2. Richard Fairley, Software Engineering concepts – McGraw Hill
3. Elias M : System Analysis & Design – Galgotia Pub.
4. Pankaj Jalote: An Integrated Approach to Software Engineering – Narosa.
5. Software Engineering: A Concise Study – Kelkar - PHI

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Paper No.: 306

Paper Title: Practical

All Students have to carry out practical work in Subjects - 302, 303 & 304