## COMPUTER SCIENCE (ELECTIVE)

Paper-A (100 Marks)
Section-I:
Total Marks: 50
Theory: 40 Marks
Practical: 10 Marks

## INTRODUCTION TO INFORMATION TECHNOLOGY

### Theory

Computer and its characteristics, Computer Organization & operation, Components of Computer, Input/Output devices, Primary & Secondary Storage devices, Buses, Type of Buses, Clock, Number System, Conversion between different No. Systems, Coding Schemes, Boolean Algebra, Postulates, Boolean Functions, Simplification & Representation of Boolean Functions, Logic Gates & Logic Circuits, Software and its Types, Computer Languages, Languages Translators, Compiler, Interpreters, Operating Systems Concepts, Batch Processing, Multiprogramming, Time-Sharing, Word Processor, Spreadsheet, Presentation Packages, Internet Explorer.

### Recommended Books

- Introduction to Computer by Peter Norton.
- Discovering Computer 2002 by G.B. Shelly, T. J. Cashman and M.E. Vermaat.
- Introduction to Computer Science by Schaum's Series.
- Using Information and Technology. Practical introduction to computer and communications by S. Willing and I Ilutchinson.

### Lab Manual for Excel

- Exploring Excel Work Place: Workbook, Worksheet, Menus, Tool Bars, Dialog Boxes, and other Icons.
- Worksheet Basics: Entering Data, Editing Worksheet, Inserting and Deleting Cell, Copying Data and Auto Fill.
- Saving and Opening Worksheets.
- Formatting Rows, Columns, Sheet, Conditional Formatting and Printing a Worksheet.
- Using Functions in Formulas.
- Copy or Moving Sheet.
- Find and Replace.
- Insert Pictures, Comments, Header, Footer, Rows, Columns, Hyperlink.
- Sorting, Filtering and Creating Tables.
- Creating Charts and Adding Graphics.

### Lab Manual for Word

- Exploring Word Work Place: Document, Menus, Tool Bars, Dialog Boxes and other Icons.
- Saving and Opening Documents.
- Editing and Formatting Text, Paragraphs and Printing Documents.
- Find and Replace.
- Insert Pictures, Comments, Header, Footer, Rows, Columns, Page Number, Break, Hyperlinks, Bookmark.
- Inserting Numbers and Bullets, Themes, Background.
- Draw Table, Inserting, Deleting and Formatting Rows, Columns.
- Working with Tables and Graphics.
- Working with Hyper Links

### Lab Manual for Power Point

- Exploring Power Point Work Place: Presentations, Menus, Tool Bars    Dialog Boxes and Other Icons.
- Saving and Opening a Presentation.
- Find and Replace.
- Editing, Formatting and Printing Slides.
- Setting the Slide Transitions, Custom Animation, Set Up Show, Rehearse Timing.
- Insert, Delete, Modify, Copy, Move Slides.
- Insert Pictures, Sounds, Movies, Tables, Text Boxes.

- Inserting Numbers and Bullets, Design, Layout Background, Line Spacing, Case Change.
- Start and Sort the Slide Show.

Create Presentations Using Templates and Auto Content Wizard.

**Paper-A (100 Marks)**

Section-II:
Total Marks: 50
Theory: 40 Marks
Practical: 10 Marks

## COMPUTER PROGRAMMING

**Tool to be used: C++**

**Theory**

**Algorithm and Problem Solving:** Pseudo Language, Algorithmic Notation. Fundamental programming constructs: The Language of a Computer, The Evolution of Programming Languages, Processing a High Level Language Program. The basics of C++ Program: syntax rules, semantic rules, programming language, Special symbols, Word symbols, Identifiers.

**Data Types and Control Structures:** Data types, Simple data types, Control structures, Arithmetic Operators and Operator precedence, Type conversion (casting).Allocating memory with constants and variables, Putting data into variables, Declaration and initializing variables, Input (Read) statement, Increment and Decrement operators, Output, Preprocessor Directives, Using Namespace in a program, Use Blanks, semicolons, brackets and commas, Comments, Naming identifiers.

**Control Structure**: Relational operators, Logical operators and logical exp, Selection: If and If …...else, Compound statements, Nested If, Switch structures. Control Structure (Repetition): Why is repetition needed?, The while looping structure, The for looping structure, The do …… while looping structure, Break and continue statements, Nested control structure.

**Function:** Standard (predefined) functions, User defined functions, Value returning function, Void function, Value and reference parameters and memory allocation, Reference parameters and value returning functions. Scope of an identifier, Side effects of global variables, Static and automatic variables.

**Arrays:** Declaration of array Memory Allocation of Array, Accessing and modifying and array, Traverse Array using indexes, C-Strings (Characters Strings).

**Recommended Book:** C++ By Robert Lefore.

**Paper-B (100 Marks)**

Section-I:
Total Marks: 50
Theory: 40 Marks
Practical: 10 Marks

## DATABASE MANAGEMENT SYSTEMS

### Course Description

This course builds students exposure to database system to provide indepth coverage of such areas as: the relational model, SQL, data modeling, database design, database administration and security.

### Objective

The purpose of this course is to offer the students an introduction to the design and use of database system. We cover database design using Entity Relationship Model followed by an overview of the relational model, how to convert Entity Relationship Model to relation and how one can use a relational database system to create database. SQL (Structure Query Language) the standard query language for relational database will be learned and experienced. After learning SQL the students will be able to:
- Create well designed database
- Do some basic administration and security management of database

**Tools: MY SQL/SQL Server/Oracle/DB2 and Microsoft Access**

**Theory**

Overview of database Management, Types of Database System, Models of Database, Database Architecture, Entity-Relational Model, Database Development Process, Relational Model, Relational Algebra, Relational Calculus, Normalization upto 3rd Normal Form.

**Recommended Books:**

1. Database Systems by C. M. Ricardo
2. Modern Database Management by J.A. Hoffer

## Experiments/Labs

### Tool: Microsoft Access

#### Contents

1. Introduction to Access basics. Opening Access application, menus, toolbar, other components
2. Creating Databases and tables
3. More on creating, editing and printing tables. Entering and editing data into tables
4. Creating and using customized forms.
5. Creating queries using Query-By-Example (QBE). Creating relationships between tables.
6. Searching for values using filters. Sorting records. Creating a form that contains a subform.
7. Creating, previewing and printing customized reports. Creating database applications. Creating startup forms. Automating repetitive tasks using macros and the Command Button Wizard.
8. More on field and table properties. Creating indexes.
9. Creating parameter queries. Using Access SQL.

### Lab Manual of ORACLE/SQL/MYSQL/DB2

### DATABASE

1. Basic select statement, selecting columns, Arithmetic operations, Operator precedence, Defining a Null value, Defining column alias,
   Concatenation Operator, Literal character string, Duplicate rows, Displaying table structure.
2. Limiting rows selection, Use of Where clause
3. Comparison Operators (=,>,>=,<,<=,<>, Between, In, Like, Null),
4. Logical Operators (AND, OR , NOT), Rules of precedence, Order by clause.
5. SQL Functions (Single-row functions, multiple-row functions),
6. Single-row functions (Character, Number, date, Conversion, General).
7. Retrieving Data from multiple tables,
8. Join, Types of Joins (inner join, outer join, equi join), Cartesian product.
9. Group functions (Average, count, max, min, stddev, sum, variance),
10. Group by clause, Having clause.
11. Subquery (Single-row, Multiple-row, Multiple-column subqueries).
12. Readable outputs, & substitution variable, User variable, Accept command, Defined & Undefined command, column command, break command, Title & Btitle command, Script file.
13. DML, Insert statement, Update statement, Delete statement, Database Transactions, Commit & Rollback statement, Locking.
14. Creating & managing tables, modifying table, adding comments to a table.
15. Constraints (Not Null, Unique, Primary, foreign, check), Adding a constraint, Dropping a constraint, Disabling a constraint, Enabling a constraint.
16. Viewing a constraint.
17. Views (simple views, complex views), Creating a view, Modifying a view, DML operation, Removing a view.
18. Sequence, Creating a sequence, Confirming sequence, Controlling user access, Privileges, Creating users, Role, changing password.

**Paper-B (100 Marks)**

Section-II:
Total Marks: 50
Theory: 40 Marks
Practical: 10 Marks

## DATA COMMUNICATION AND COMPUTER NETWORKS

**Objectives:** The purpose of this course is to create understanding of the fundamental concepts of data communication and computer networks. OSI reference model, TCP/IP suit and protocol standard.

- To become familiar with the state-of-the art data communication technology
- To understand the basic principles of data communication protocol layers.
- To examine and understand network protocols and architectures.
- To understand and recognize transmission media.
- To know basic functionality of networking devices.

**Theory Contents:**

Introduction to Computer Networks, OSI Reference Model, Concepts of layered architecture, Transmission Media, Twisted Pair Cable, Coaxial Cable, Optical Fiber, Data Transmission, Analog and Digital Transmission, Asynchronous and Synchronous Transmission, Error detection, Error correction, Flow control, LAN, WAN, MAN, Network Topologies, Bus, Ring, Star, Mesh, Network Devices, Hub, Bridge, Switch, Router, Wireless Transmission, Radio waves, Micro waves, Satellite waves, Medium Access methods, Ethernet/CSMA/CD, FDDI, Token Ring, Data Transport Services, Connection oriented service, Connectionless service, Transmission Impairments, Attenuation, Delay, Noise, Interference, TCP/IP Model, IP protocol, IP addressing, Subnets, Domain Name System, WWW, ARP, TCP, UDP, Telnet,

**Lab Manuals**:

Installation and configuration of Windows 2000 Professional, Creating and managing users, Assigning and revoking rights, Creating and managing groups, Creating folders, files and granting access, Configuring TCP/IP, Installation and configuration of network card,

**Text books:**

A.   Data and Computer Communication by: William Stalling,   Seventh Edition, Prentice Hall, 2004

B.   Data Communication and Networking by Behrouz A.   Forouzan, Third Edition, McGraw-Hill, 2003