

I. First Year: Certificate Course

ICT 101:

I. **IT Tools and Application:**

7 Marks

1. **Profile of Computer:** Types, Classification, Characteristics and Generation of Computer.

2. **Data Representation:**

2.1 Number System: Binary, Octal, Hexadecimal; Arithmetic operation like Addition, Subtraction, Conversion between System; Positive and Negative number representation.

2.2 Character code: ASCII, BCD, EBCDIC, ISCII, UNICODE etc.

2.3 Generation: Programming language Generation, Concept of Interpreter and Compiler.

3. **Computer Organization:**

10 Marks

3.1. Boolean Algebra: Boolean Functions; Minimization Boolean Functions; Truth Tables.

3.2. Logic Gates: AND, OR, NAND, NOR, XOR and NOT implementation of Boolean function using gates.

3.3. Computer System: Input Unit (and devices): Keyboard, Mouse, Scanner, Camera, OMR and MICR etc.; CPU: CU, ALU, MU; RAM, ROM; Secondary Storage: Floppy Disk, Hard Disk, CD-ROM, Disk Organisation: sector, track, cluster, access technique and size: Output Unit (and devices): CRT; Printer: Dot Matrix, Inkjet, Ledger, Plotter.

4. **Software and Hardware:**

8 Marks

4.1. Concept of hardware and software:

4.2. Operating System(OS): DOS (Disk Operating System): Booting of Computer; File and Directory, DOS shell, Types of Commands; Management in DOS; Disk Organisation, FAT, Configuration, batch file etc. WINDOWS 98/ME/XP/2000/NT: GUI, Anatomy of window, Manipulation working with multiple windows and working with essential Accessories, Linux.

Books:

1. P.K Sinha and P. Sinha. "Foundation of Computing", First Edition, 2002, BPB publication.
2. DOS and WINDOWS operating system reference manual.

II. PC Software Applications

1. Word Processing: 8 Marks
 - 1.1 Word Processing concept: Saving, Closing, Opening an existing document, Selecting Text, Editing Text, Finding and Replacing Text.
 - 1.2 Printing: Printing document, Creating and Printing, Merged document, Character and Paragraph formatting, Page Design and layout.
 - 1.3 Editing and Proofing tools.
 2. Spreadsheet package: 10 Marks
 - 2.1 Spreadsheet Concept: Creating, Saving, Editing a Workbook, Inserting, Deleting Worksheets, Entering data in Cell/formula, Copying and Moving data from selected cells, Handling operators in formulae, Functions: Mathematical, Statistical, Text, Financial. Date and time function using Function wizards.
 - 2.2 Formatting a worksheet: Formatting cells, changing data alignment, changing date, number, character or currency format, changing fonts, adding borders, and colors, Printing Worksheet, Charts and Graphs- Creating, modifying, Previewing charts.
 - 2.3 Integration: Integrating word processor, Spreadsheet, web pages.
 3. Presentation Packages: 7 Marks
 - 3.1 Presentation concept: Creating, Opening and Saving Presentations, Creating the Look of your Presentation, Working in different views, Working with slides.
 - 3.2 Formatting Presentation: Adding and Formatting text, Formatting Paragraph, Checking spelling and correcting typing mistakes, making Notes, Pages and Handouts.
 - 3.3 Drawing: Drawing and working with objects, Adding clip Art and other pictures, Designing Slide Shows, Running and controlling a Slide Show, Printing Presentation.
- Books:
1. S. Sagman, "Microsoft Office 2000 for windows", Second Indian Print, 2001, Pearson Education.
 2. Moseley Boodey: "Mastering MS Office 97" Professional edition, BPB Publication.

III. Programming in C

1. Introduction to 'C' Language 5 Marks
 - 1.1 Basics Components: Character Sets, Variable and Identifier, Data types, Built-in Data types. Variable Definition, Constants and Literals
 - 1.2 Operators: Arithmetic, Relational, Logical Operators and Expressions.
 - 1.3 Statements: Simple assignment statement, Basic Input/Output statement.
2. Conditional Statement and Loops: 5 Marks
 - 2.1 Decision making within a program: if statement, if-else statement, switch statement.
 - 2.2 Loops: while, do-while loop, for loop, Nested loops, infinite loops.
3. Functions: 5 Marks
 - 3.1 Top Down approach of problem solving: Modular programming and functions standard library of C functions, prototype of a function, Recursive Function.
 - 3.2 Parameter: Formal parameter list, Return type, Function call, Block Structure, passing parameter argument to a function: call by value, arrays as function argument.
4. Data Structure:
 - 4.1 One Dimensional Array: Array manipulation: Searching, Insertion, Deletion of an array: Finding the largest/smallest element in an array: Two dimensional array: Addition/Multiplication of two matrices, transpose of a square matrix; Null terminated string as an array of characters, representation of squares matrices
 - 4.2 Structure and Union: Structure variable, Initialization, structure assignment, Nested Structure, structural and functions, Structures and array: Array of structures, Structure containing array, Unions
 - 4.3 Pointers: Address operators, Pointer type declaration, pointer assignment, Pointer initialization, pointer arithmetic, functions and pointers, arrays and pointers pointer array.
 - 4.4 Self-referential structures and linked list: creation of a singly connected link list Traversing a link list, insertion into a link list, deletion from a link list, stack operation, queue operation; binary search tree, creation, insertion, traversal.
5. File processing:

Concept of file, file opening in various modes and closing a file, reading from a file.
6. Algorithm for Problem Solving:
 - 6.1. The basic model for computation: Algorithm, flow chart, programming languages, compilation, linking and loading, testing and debugging documentation.
 - 6.2 Problems: Exchanging values of two variables, summation of a set of numbers, decimal base to binary base conversion, Reversing digit of an integer GCD (Greatest common Division) of two numbers. Test whether a number is prime, organize number in ascending order, finding square root of a number, factorial computation, Fibonacci sequence, evaluate sign X as sum of series, reverse order of elements in an array, find

largest number in an array, sorting of an element, print elements of upper triangular matrix, multiplication of two matrices, evaluate a polynomial, stack and queue operation, link list problems, binary search trees problems.

Books:

1. Byron Gottfried, "Programming in C", 2nd Ed. Tata McGraw Hill, 2000.
2. RG dromey, " How to solve it by computer", 7th Ed. 2001 Prentice hall of India.
3. E. Balaguruswami, " Programming with ANSI C", 1st Ed. 1996 Tata McGraw Hill.
4. A. Kamthane, "Programming with ANSI and Turbo C", 1st Ed, 2002 Pearson

ICT 102: (Practical)

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| 1. IT Tools and Application: | 25 Marks |
| 2. PC Software applications | 25 Marks |
| 3. Programming in C | 50 Marks |

ICT 103: Project Work/Field Work based on ICT 101/102	100 Marks
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