Swami Ramanand Teerth Marathwada University, Nanded

Syllabus

B. Sc. First Year

COMPUTER SCIENCE

Semester System (MCQ Pattern)

(To Be Implemented From Academic Year 2013-2014)

Theory/ Practical	Semester /Annual	Semester No.	Paper No.	Title of the Paper	Marks						Min. Lectures / Week
					MCQ	Internal	Experiment	Oral	Record Book	Total	
Theory	Semester	I	I	Fundamentals of Computer Organization	40	10	---	---	---	50	03
			II	Foundations of Computer Programming	40	10	---	---	---	50	03
		II	III	Programming in C	40	10	---	---	---	50	03
			IV	Data Structures	40	10	---	---	---	50	03
Practical	Annual	-	V	Computer LAB-I	---	---	75	15	10	100	03
Total					**160**	**40**	**75**	**15**	**10**	**300**	---
Total Marks for Theory = 50+50+50+50 = **200**					Total Lectures / Week /Division for Theory = **06**						
Total Marks for Practical =100					Total Lectures / Week / Batch for Practical = **03**						
Total Marks for FY = 200+100 = **300**					Minimum Lectures / Week for FY = **09**						
Computer LAB-I: Practical Based On Papers I, II, III And IV											

Paper –I

Fundamentals of Computer organization

(Marks : 50 Periods : 40)

1. **Introduction to Computer System** (6 periods)

History of Computer, Generations, Block diagram of computer, Characteristics of computer, Classification and Types of computer.

2. **Data Representation within Computer** (6 periods)

Bit, Byte, Word, ASCII, EBCDIC, BCD code, Introduction to Number system: Binary, Decimal, Octal, Hexadecimal. Conversions from one Number system to another.

3. **Memory** (5 periods)

Memory Cell, RAM, ROM, EPROM, Floppy Disk, Hard Disk, CD-ROM, DVD.

4. **Input and Output Devices** (7 periods)

Keyboard Entry, Direct Entry: Card Reader, OCR, OMR, MICR, Pointing Devices: Light Pen, Mouse, Touch Screen. Monitor. Printers: Dot-Matrix, Inkjet, Laser.

5. **Disk Operating System** (8 periods)

DOS Preliminaries, Files, Directory, Wild Character, Booting Procedure, Internal DOS Commands, External DOS Commands.

6. **Introduction to Windows Operating System** (8 periods)

Windows Operating system History, Files, Folders, Architecture of Windows O.S., Desktop, My Computer, Recycle bin, Control Panel, Features of Windows (GUI, Multasking, Multi-user)

Reference Books:

1. Fundamentals of Computer by V.Rajaraman, BPB Publication
2. Computers and Commonsense by Robert Hunt and Shelly,BPB Publication.
3. Fundamentals of Computer by Bichkar and Sontakke, Sadhusudha Publication
4. MS-DOS 6.22 by Russell A, Stultz, BPB Publication.
5. Advanced MS-DOS Programming by Ray Duncan, BPB Publication
6. Teach Your Self Windows 2000 by Brain Underdahl
7. Windows 98 Complete, BPB Publication.

Paper - II

Foundations of Computer Programming

(Marks : 50 Periods : 40)

1. **Introduction to Problem Solving and representation** (7 periods)

Problem Aspects, Top-Down design, implementations of algorithm, program verification, efficiency of algorithms, analysis of algorithms. Definition and properties, Principles of flowchart, Flowchart Symbols, Converting algorithm to flowchart.

2. **Fundamental of Algorithms** (7 periods)

Algorithm for exchanging the value of two variables, counting, summation of set of numbers, factorial computations, generation of Fibonacci series, reversing digits of and integers, Character to number conversion.

3. **Factoring Methods** (6 periods)

Finding square root of numbers, smallest divisor of an integer, GCD of two integers, generating prime numbers, computing prime factors of integers

4. **Array Techniques** (7 periods)

Introduction to array, memory representation of array, algorithm for array order Reversal, array counting, finding maximum and minimum element from array.

5. **Sorting and searching techniques**

Bubble sort, selection sort, merge sort **,** insertion sort, linear search and binary search (7 periods)

6. **Text processing and pattern searching techniques** (6 periods)

Text line length adjustment, Left and Right justification of text, keyword searching in text

Text Books:

1. How to Solve It by Computer, by R.G. Drommy (PHI Ltd)
2. Fundamentals of Computer by V. Rajaraman, BPB Publications
3. ANSI C by E. Balguruswamy, PBP Publication

Paper- III

Programming in C

(Marks : 50 Periods : 40)

1. **Introduction to C** (5 periods)

Introduction, Character set, C tokens, Data types, Constant, Variables, declaration of storage class, Input/Output Statement, operators, Hierarchy of Operation, Structure of C program.

2. **The Decision and Looping, Control Structure** (8 periods)

If Statement, If-Else statement, Nesting of If-Else, else-if ladder, Switch Statement, Goto. While loop, Do-While loop, For loop.

3. **Arrays and Pointers** (5 periods)

Introduction to Array, One-dimensional arrays: Declaration & Initialization, Two-dimensional arrays: Declaration & Initialization, Multi-dimensional arrays

Introduction, understanding pointers, accessing address of variable, declaring pointer variables, initialization of pointer variable

4. **Storage Classes** (4 periods)

Automatic, Register, Static, Scope rules.

5. **Functions** (7 periods)

Introduction, Definition of function, return values and their types, function calls, function declaration, recursion, passing arrays to functions,What are string, Standard Library string functions: strlen(), strcpy(),strcmp(), strcat().

6. **Structure and Union** (7 periods)

Introduction, defining a structure , defining a structure variable, accessing structure members, initialization of structure, structure within structure, union

Reference Books:

1. C programming by B. Gottfried, Schaum's outline series

2.Programming in ANSI C by E. Balaguruswamy, TATA MCGRAW Hill Publication.

3. Let US C by Yeshwant Kanetkar, BPB Publication.

4. Programming in ANSI and Turbo C by Prof. Kamthane, Pearson Education.

Paper-IV

Data Structures

(Marks : 50 Periods : 40)

1. **Introductions and Overviews** (6 periods)

Introduction, Elementary Data Organization, Data Structure Operation, Notation and Concept of Algorithm.

2. **Array, Records and Pointers** (6 periods)

Introduction, Linear array, representation of Linear Array in Memory, Traversing Linear Array, Inserting and Deleting.

3. **Sorting and Searching Methods** (7 periods)

Sorting Methods: Quick Sort, radix –exchange sort, merge sort Sort. Searching Methods: Binary Search, Linear Search. Time complexity analysis of sorting and searching techniques.

4. **Linked List** (7 periods)

Introduction, Representation Linked list in memory, searching a linked list, Inserting and deleting linked list.

5. **Stack, Queue and Recursion** (7 periods)

Introduction to Stack, Array representation of stack, Push and Pop operation. Introduction to Queue, Array representation of queue, Insert and Delete operation, Recursion.

6. **Trees and Graphs:** (7 periods)

Basic terminology, binary trees and its representation, insertion and deletion of nodes in binary tree, binary search tree and its traversal, threaded binary tree, Heap, Balanced Trees. Terminology and representation of graphs using adjacency matrix, Warshall's algorithm

Text Books:

1. Data Structure by Seymour Lipschutz, Schaums ouline series in Computers, McRaw Hill.

2. An Introduction to Data Structure with Application by Jean-Paul, Tremblay- Paul, G. Sarenson, Tata McGraw Hill.

Reference Books:

1 Mark Allen Weiss, *Data structures and algorithms analysis in C++*, Second edition, Pearson Education.

2. Y. Langsm, M. Augenstin, A. Tanabaum,*Data Structure using C and C++*, Pearsons Education Asia Pub.

3. Trembley and Sorenson, *Introduction to Data Structures*, PHI Pub.

Paper V

Computer LAB

(Practical based on DOS, Windows and programming in C Language and Data Structure)

(Experiment – 75, Oral -15, Record Book- 10) 100 Marks

The following are guidelines for the computer lab, the subject teacher or lab instructor can prepare different kinds of problem statements for the lab evaluation

1. Introduction to various components of computer system and study of various Input and Output devices.
2. Study of Booting procedure of DOS.
3. Study about CONFIG.SYS and AUTOEXEC.BAT files.
4. Study of Internal and External Commands.
5. Study of components of Windows operating system.
6. Study of Windows Accessories.
7. Study about the Ms-Word (File Menus, Document creation, Text formatting).
8. Writing programs in C for small problem mainly computational to illustrates expression and operator precedence.
9. Writing some simple programs like finding factorial of numbers, summation of set of numbers, computation of prime numbers, prime factors etc.
10. Problem related to Array like Print reverse order of array, sum of array element, sorting of array, finding maximum and minimum element from array.
11. Problem which involve manipulation of two dimensional arrays like addition, subtraction, multiplication of arrays.
12. Problem which involve manipulate arguments to main().
13. General String manipulation problem.
14. Problem based on Standard string Library functions.
15. Problem based on Storage classes.
16. Searching and Sorting Algorithm is implement in C Language