Department of Computer Science
Rajarshi Shahu Mahavidyalaya, Latur
(Autonomous)

Syllabus for

B.Sc.-I (Computer Science)

CBCS Pattern

Academic Year 2018-2019

B. Sc. I (Computer Science) Semester I
Curriculum Structure

Course Code	Core Course	Title of the course with paper number	Hours/ Week	Marks (50)		Credits
				Internal	End Semester	
U-COS-141	CCCOS-1 Section -A	Paper-I Fundamentals of Computer	03	20	30	02
U-COS-142	CCCOS-1 Section -B	Paper-II Basics of Computer Programming	03	20	30	02
U-COS-143	CCCOSP-1	Laboratory Course -I	03	20	30	01
		Total Credits				05

Student Stay Hours: 9/Week

B. Sc. I (Computer Science) Semester II

Course Code	Core Course	Title of the course with paper number	Hours/ Week	Marks (50)		Credits
				Internal	End Semester	
U-COS-241	CCCOS-2 Section -A	Paper-III Programming in C	03	20	30	02
U-COS-242	CCCOS-2 Section -B	Paper-IV Data Structure	03	20	30	02
U-COS-243	CCCOSP-2	Laboratory Course-II	03	20	30	01
		Total Credits				05

Student Stay Hours: 9/Week

Course: Fundamentals of Computer
Course Code: U-COS-141
CCCOS-1
Paper-I (A)

Total Marks:50   **Lectures: 45**

Learning Objectives:

1. To understand the basics of computer system, its architecture, database and Networks.
2. To understand the basic concepts, terminology of IT and familiar with the use of IT tools.
3. Adequately explain functioning of computer components.
4. To Learn and explore new IT techniques in various applications
5. Student will develop a vocabulary of key terms related to the computer and to software program
6. Explain role of Operating system in computer system and applications of computer networks.

Course Outcomes:
1. Student will be able to identify the components of a personal computer system
2. Student will be able to demonstrate input/output functions
3. Student will be able to demonstrate window and menu commands and how they are used
4. Student will be able to demonstrate how to organize files and documents on a USB/hard drive Student will be able to compose, format and edit a word document
5. Student will be able to send email messages (with or without attachments)
6. Students will be able to navigate and search through the internet

UNIT I: Introduction to Computers and Data Representation   [13]

Introduction
Basic structure, ALU, Memory, CPU, I/O devices
Generations of computer
Evolution of computer
Classification of computers: Notebook computers, personal computers,
Workstation, micro, mini, mainframe, super computers
Computer Codes.
Introduction to number system: Decimal, Binary, Octal, Hexadecimal
and conversions.
Binary Arithmetic, Floating point numbers.

UNIT II: Input/Output Devices and Memory   [10]

Input Devices: Keyboard, Point & Draw Devices, Data Scanning devices, Digitizer,
Electronic Card   Reader, Voice Recognition   devices
Output Devices: Monitor, Printer, Plotter, Screen Image projector, voice response
system.
Memory

RAM, ROM, PROM, EPROM, EEPROM
Base Memory, Extended memory, expanded memory, Cache memory Storage
devices: Tape, FDD, HDD, CD ROM

UNIT III: Computer Software and Introduction to OOPs   [12]

Definition of software
Types of software
Operating System
Main function of operating system
Files and directories
Types of OS
Introduction to DOS
Introduction to Windows
What is OOPs?
Basics of OOPs

UNIT IV: Computer Networks and Introduction to Internet   [10]

Definition of computer network
Network types: LAN, MAN and WAN
Network Topologies: Star, Ring, Hybrid Network
Wireless Networks
Different Search Tools
Web Browsers
Definition, Uses of Internet
Basic Services: Electronic mail, File Transfer Protocol, Telnet

Reference Books:

1. Fundamentals of Computers By V. Rajaraman
2. Computers and Common Sense By R. Hunt and Shelly Y.
3. Fundamentals of Computers By P. K. Sinha
4. MS-Dos 6.22- Russell A Stultz (BPB Publication)

Course: Basics of Computer Programming
Course Code: U-COS-142
CCCOS-1 (B)
Paper-II

Total Marks:50   **Lectures: 45**

Learning Objectives:

1. To develop Problem Solving abilities using computers
2. To teach basic principles of programming Languages
3. To develop skills for writing simple programs using 'C'
4. To gain experience about structured programming
5. To help students to understand the implementation of C language

Course Outcomes:

1. Students will be able to design an algorithmic solution for a given problem.
2. Students will be able to draw flowcharts for the solution.
3. Students will be able to write a maintainable C program for a given algorithm.
4. Students will be able to write well documented and indented program according to coding standards.
5. Students will be able to execute the C program.

Unit- I Algorithm and Flowchart   [10]

Algorithm – definition, characteristics
Space complexity, time complexity
Problem solving and write a Simple Algorithm
Flow chart and its symbol
Problem solving with flow

Unit- II Introduction To 'C' Programming   [12]

History
Compilers and Interpreters
Keywords
Identifiers
Variables
Constants – character, integer, float, string, escape sequences
Data types – built-in and user defined
Operators and Expressions Operator types (arithmetic, relational, logical, assignment, bitwise, conditional, other operators), Simple programs using printf( ) and scanf( )

Unit- III Selection and Control Structures [13]

Selection statements:
    if statement
    Conditional / Ternary operator statement (? :)
    Switch statement
    Loop Control structures: While, do-while, for Nested structures break and continue

UNIT- IV SEARCHING AND SORTING TECHNIQUES [10]
    Linear Search
    Binary Search
    Bubble Sort
    Selection Sort
    Insertion Sort

References:

1. The C Programming Language, Brian W. Kernighan, Dennis M. Ritchie,
     PHI Learning

2. Programming in ANSI C, E. Balaguruswamy, Tata Mc-
    Graw Hill Publishing Co.Ltd.-New Delhi

B. Sc. – I [Computer Science] Semester I
Course: Laboratory Course -I
Course Code: U-COS-143
CCCOSP-1

Learning Objectives:

1. To learn the working knowledge of hardware and software of computer.
2. To learn the basic concepts of DOS Operating System.
3. To learn the various features of MS-Office.
4. To write and execute the simple programs in 'C' language.
5. To familiarize the students with the network devices and the internet.

Course Outcomes:

1. Student will be able to execute DOS commands and create batch file.
2. Student will be able to demonstrate how to organize files and documents on a USB/hard drive.
3. Student will be able to compose, format and edit a word document
4. Student will be able to write and execute simple programs in 'C' language
5. Student will be able to send email messages and navigate and search through the internet

Practical List

1. Introduction to DOS (Booting Process, Use of basic commands like date, time, dir, copy con , type, ren etc.)

2. Creating a directory structure in DOS (Using commands md, cd, rd, copy) and creation of batch file.

3. Introduction to Windows Operating System (File operations using windows explorer, Internet explorer, desktop related operations etc.)

4. Introduction to MS –Word.

5. Introduction to MS- Power Point.

6. Introduction MS-Excel

7. Practical on Internet

8. Write an algorithm and draw flowchart to check whether given number is positive or negative and implement it.

9. Write an algorithm and draw a flowchart to print A to Z and implement it.

10. Write an algorithm and Flowchart to print 10, 9, ..., 1 and implement it.

11. Assignment to demonstrate decision making statements (if and if-else, nested structures, witch case)

12. Assignment to demonstrate use of simple loops.

13. Assignment to demonstrate use of nested loop.

14. Programs for linear Search and Binary Search

15. Programs for Bubble Sort, Selection Sort, Insertion Sort

B. Sc. – I [Computer Science] Semester II
Course: Programming in C
Course Code: U-COS-241
CCCOS-2 (A)
Paper-III

Total Marks:50   **Lectures: 45**

Learning Objectives:
1. To develop Programming ability.
2. To teach various concepts like Arrays, Functions, Structures, Unions of programming languages.
3. To handle File Management functions in C language.
4. To develop the logic to create the programs using 'C'.

Course Outcomes:
1. Students will be able to develop programs in C language.
2. Students will be able to write programs using arrays, functions, structure and unions.
3. Students will be able to write programs for file management.
4. Students will be able to apply own logic to develop programs in c language.

Unit- I Basics of C Language and Arrays   **[12]**

       Control statements
       Looping statements
       Introduction to array
       Declaration and initialization of arrays
       Accessing array elements
       Memory representation of array
       Arrays and its types
       String handling Functions.

Unit- II Functions, Structure and Union   **[12]**

       Introduction
       Types of functions
       Defining functions
       Arguments
       Function prototype
       Calling function
       Returning function results
       Call by value and call by reference
       Recursion
       Introduction to Structure
       Declaration of structure
       Accessing Structure Elements
       How structure elements are stored?

Array of Structure
Introduction to Union
Declaration of Union
Accessing Union Elements
How union elements are stored

UNIT- III Storage Classes and Pointers [13]

Automatic storage class
Register storage class
Static storage class
External storage class
Introduction to Pointers
Pointer declaration, initialization
Dereferencing pointers
Pointer arithmetic
Pointer to pointer
Arrays and pointers

UNIT- IV File Management in C [10]

Defining and opening a file - closing file
I/O operations on files
Error handling during I/O operations
Random access to files
Command line arguments

References:
1. E. Balaguruswamy, "Programming In C ", TMH Publications
2. Yashwant Kanetkar, "Let Us C"
3. Dennis Ritchie, "The C Programming Language"

B. Sc. – I [Computer Science] Semester II
Course: Data Structure
Course Code: U-COS-241
CCCOS-2 (B)
Paper-IV
Data Structure

Total Marks:50   **Lectures: 45**

Learning Objectives:

1. To provide the students with solid foundations in the basic concepts of programming: data structures and algorithms.

2. To understand basic computational concepts and elementary data structures

3. To translate well-structured plans into working programs

4. To analyze simple problems involving text and numbers

Course Outcomes:

1. Students Know about the basic concepts of Function, Array and Link-list.
2. Understand how several fundamental algorithms work particularly those concerned with Stack, Queues, Trees and various Sorting algorithms.
3. Design new algorithms or modify existing ones for new applications and able to analyze the space and time efficiency of most algorithms.

UNIT- I INTRODUCTION TO DATA STRUCTURE AND ARRAYS   [10]

Definition,
Classification of data structure: primitive and non-primitive.
Operations of data structures
Introduction of Array
Representation of array in computers memory
Array Operations:
    Traversing
    Insertion
    Deletion

UNIT- II Linked List   [13]

Definition,
Components of linked list,
Representation of linked list in computers memory
Advantages and disadvantages of linked list

Types of linked list: Singly linked list, Doubly linked list, Circular linked list and Circular doubly linked list.
Operations on singly linked list: creation, insertion, deletion, search and display

UNIT- III Stack and Queue   [12]

Definition of Stack
Array representation of stack
Operations on stack- PUSH and POP

Definition of Queue
Types of queue: Simple queue, circular queue, double ended queue (deque) priority queue
Operations on Queue-Insertion and Deletion

UNIT- IV Tree and Graph   [10]

Definition: Tree, Binary tree, complete binary tree,
Binary search tree,
Traversal of Binary Tree: Preorder, Inorder and Postorder.
Graphs - terminology
Representation of Graph
Graph traversals (DFS and BFS)

References:

1. Data Structure Using C -Yashwant Kanetkar-BPB Publication
2. Data Structures Using C -Tennenbaum
3. Data Structure- Lipsctuz Schum Outline Series

B. Sc. – I [Computer Science] Semester II
Course: Laboratory Course -II
Course Code: U-COS-242
CCCOSP-2

Learning Objectives:

1. Know about the basic concepts of Function, Array and Link-list.
2. Understand how several fundamental algorithms work particularly those concerned with Stack, Queues, Trees and various Sorting algorithms.
3. Design new algorithms or modify existing ones for new applications and able to analyze the space & time efficiency of most algorithms.

Course Outcomes:

1. Students will be able to write programs using arrays, functions, structure and unions.
2. Students will be able to write programs for storage classes and file management.
3. To access how the choices of data structure and algorithm methods impact the performance of program.
4. To solve problems based upon different data structure and also write programs.
5. Choose an appropriate data structure for a particular problem.

Practical List

1. Write and execute a program to check the number is odd or even.

2. Write and execute a program to calculate the factorial of given number.

3. Write and execute a program to demonstrate one dimensional array.

4. Write and execute a program for addition of 2*2 matrix.

5. Write and execute a program for multiplication of 2*2 matrix .

6. Write and execute a program to demonstrate string handling functions

7. Write and execute a program to demonstrate Storage classes (All classes)

8. Write and execute a program to demonstrate Pointers.

9. Write and execute a program to demonstrate Functions (call by value and call by reference).

10. Write and execute a program to demonstrate Structure and Union.

11. Write and execute a program to demonstrate file opening and closing.

12. Write and execute a program to demonstrate command line arguments.

13. Write and execute a program to demonstrate stack operations.

14. Write and execute a program to demonstrate Queue operations.

15. Write and execute a program to implement linked list.