

Punyashlok Ahilyadevi Holkar Solapur University, Solapur



Name of the Faculty: Science & Technology

CHOICE BASED CREDIT SYSTEM

Syllabus: Computer Science

Name of the Course: B.Sc. I (Sem.– I & II)

(Syllabus to be implemented from June 2022)

Punyashlok Ahilyadevi Holkar Solapur University, Solapur

B. Sc. (Computer Science) - I year

Syllabus (Semester – I and II)

(Choice Based Credit System)

With Effect from June 2022

Preamble :

The aim of the BSc Computer Science Syllabus has always consider the theoretical and practical knowledge of software and hardware techniques. The objective of the course is to prepare students to undertake careers involving problem solving using computer science and technologies, or to pursue advanced studies and research in computer science. With this strong foundation of computer science, the computer science students are expected to contribute efficient and effective solutions for the various problems that are given to them. With the advancement in software industry and technological innovations, the industry demands from graduate and postgraduate students are changing. We try to designed the syllabus which consider the industry expectations, to inspire the students to take-up higher education as well as research, to attract student over other courses and finally to fulfill the expectations of Credit system. The syllabus for these three years will be designed keeping these challenges in mind. The syllabus aims to cover core concepts of Computer Science and also to cover the latest technologies which can be accommodated at BSc level. One such step is that we would like to promote Open Source Technologies as much as possible. With so much of knowledge available on Internet, it is also the responsibility of teachers to make use of them in teaching, go beyond the books and make necessary changes in the approach and the contents. Students during these three years are expected to accumulate maximum knowledge and skills through this syllabus. In this year students acquires basic knowledge of computer technology and computer programming.

Objective of the Programme :

1. To develop problem solving abilities using a computer.
2. To build the necessary skill set and analytical abilities for developing computer based solutions for real life problems.
3. To train students in professional skills related to Software Industry.
4. To prepare necessary knowledge base for research and development in Computer Science.
5. To help students build-up a successful career in Computer Science and to produce entrepreneurs who can in-novate and develop software products.
6. To help students for starting their own software industry.

Programme Outcome:-

1. Develop ability to analyze a problem, identify and define the computing requirements, which may be appropriate to its solution.
2. To prepare students to undertake careers involving problem solving using computer science and technologies.
3. Develop ability to pursue advanced studies and research in computer science.
4. To produce entrepreneurs who can innovate and develop software product
5. Depending on the chosen pathway, you can focus on particular areas of interest such as machine learning, web development, data science and video games.
6. The study program is designed to prepare students for a wide variety of careers. The most profound positions that our graduates are well prepared to occupy (or have already been engaged in) may be classified into the following professional disciplines: Software Engineering, Systems Design, and Programming, Applications design and programming and Information-Systems design and analysis.
7. Design, implement, and evaluate a computing-based solution to meet a given set of computing requirements in the context of the program's discipline.
8. Recognize professional responsibilities and make informed judgments in computing practice based on legal and ethical principles.
9. Development of in-house applications in terms of projects

Eligibility for B. Sc.

The candidate passing the Higher Secondary Examination Conducted by the Maharashtra State Board of Higher Secondary Education with Science stream or its equivalent examination.

Medium of Instruction: English

Punyashlok Ahilyadevi Holkar Solapur University, Solapur

Faculty of Science and Technology

Choice Based Credit System (CBCS), (w.e.f.2022-23)

Revised Structure for B. Sc-I

Subject/ Core Course	Name and Type of the Paper		No. of pa- pers/ Prac- tical	Hrs/week			Total Marks Per Paper	UA	CA	Credits	
	Type	Name		L	T	P					
Class :	B.Sc.- I Semester – I										
Ability En- hancement Compulsory Course (AECC)		English Paper I Part-A (communi- cation skill)		4.0			50	40	10	2.0	
Core Courses (*Students can opt any Four Subjects from the Twelve Subjects Listed below.		DSC 1A	Fundamentals of Computers	2.5	--	--	50	40	10	4.0	
			Programming Using C	2.5	--	--	50	40	10		
		DSC 2A	Paper-I	2.5	--	--	50	40	10	4.0	
			Paper-II	2.5	--	--	50	40	10		
		DSC 3A	Paper-I	2.5	--	--	50	40	10	4.0	
			Paper-II	2.5	--	--	50	40	10		
		DSC 4A	Paper-I	2.5	--	--	50	40	10	4.0	
		Paper-II	2.5	--	--	50	40	10			
Total				24	--	--	450	360	90	18	
Class :	B.Sc.- I Semester – II										
Ability En- hancement Course(AECC)		English Paper I Part-B (communi- cation skill)		4.0			50	40	10	2.0	
Core Courses (*Students can opt any Four Subjects from the Twelve Subjects Listed below.		DSC 1B	Introduction to Web Designing	2.5	--	--	50	40	10	4.0	
			Operating Sys- tem	2.5	--	--	50	40	10		
		DSC 2B	Paper-III	2.5	--	--	50	40	10	4.0	
			Paper-IV	2.5	--	--	50	40	10		
		DSC 3B	Paper-III	2.5	--	--	50	40	10	4.0	
			Paper-IV	2.5	--	--	50	40	10		
		DSC 4B	Paper-III	2.5	--	--	50	40	10	4.0	
		Paper-IV	2.5	--	--	50	40	10			
		Democracy, Elections and Good Governance		3			50	40	10	NC	
Total (Theory)				24	--	--	450	360	90	18	
Core Practical		DSC 1 A & 1B	Practical I	--	--	4	100	80	20	4.0	
		DSC 2 A & 2B	Practical I	--	--	4	100	80	20	4.0	
		DSC 3A & 3B	Practical I	--	--	4	100	80	20	4.0	
		DSC 4A & 4B	Practical I	--	--	4	100	80	20	4.0	
Total (Pract.)							16	400	320	80	16
Grand Total				48		16	1300	1040	260	52	

*Core Courses: Chemistry/Physics/ /Mathematics/Statistics/Botany/Zoology/ Microbiology/ Electronics/Computer Science
Geology/ Geography/Psychology

Summary of the Structure of B.Sc. Program as per CBCS pattern

Class	Semester	Marks-Theory	Credits-Theory	Marks-Practical	Credits-Practical's	Total - credits
B.Sc.-I	I	450	18	--	--	18
	II	450	18	400	16	34
B.Sc.-II	III	300	12	--	--	12
	IV	300	12	600	24	36
B.Sc.-III	V	450	18	--	--	18
	VI	450	18	400	16	34
Total		2400	96	1400	56	152
	SEC sem.- III & V	200	8			8

B.Sc. Programme :

Total Marks : Theory + Practicals = 2400(+200) +1400 =3800+200

Credits : Theory + Practicals = 96(08) + 56 = 152+08

Numbers of Papers	Theory: Ability Enhancement Compulsory Course (AECC)	04
	Theory: Discipline Specific Core Paper (DSC)	20
	Theory: Discipline Specific Elective paper (DSE)	02
	Skill Enhancement Course (SEC)	04

Total : Theory Papers	(Core paper-22)	30
: Practical Papers		11

Abbreviations:

L: Lectures T: Tutorials P: Practical UA : University Assessment CA : College Assessment CC: Core Course AEC : Ability Enhancement Course DSE : Discipline Specific Elective Paper SEC : Skill Enhancement Course, AIC: Additional Interdisciplinary Courses

Note: Each theory papers of 50 Marks should be of two Units.

Each theory papers of 100 Marks should be of four Units.

Each theory paper Unit is of 15 Lectures.

Practical paper of 100 Marks is of at least 20 practical.

Paper-I: - Fundamentals of Computers

[Credits: Theory-(2.5), Practicals-(2)]

Total Theory Lectures-30

Course Objectives –

1. The objective of this course is to make the learner ready to understand basic of computer.
2. To learn different types of languages used in Computer system
3. To Learn basic steps to solve programs
4. Learner are ready to create document, create presentations and do some calculations.
5. Learner are ready to create attractive certificates.

Unit I:-Introduction to Computer

(10)

Introduction to computers, Evolution of personal computers; Generation of computers; type of computers, Elements of a computer processing system- Hardware & Software, various categories of software;

Computer organization Overview-

Block diagram of CPU, various types of I/O devices, primary and secondary storage devices and media; various type of displays and other peripherals used in PCs.

Programming languages (Machine Languages, Assembly Languages, High level languages), Compiler, Assembler, Interpreter.

Algorithm, Flowcharts, Pseudo code

Unit II:- Office Automation

(20)

Word:-Introduction to MS Word, opening, creating, saving, deleting document, page setting, formatting page, formatting text, adding images, Header footers, border and shading, bullets, mail merge, Table, graphics, label, Templates, Wizards and Printing Techniques.

Excel: -Introduction to excel, File management in excel, operations related to workbook, formatting sheet, adding formulate and functions, charts and maps, data menu, view menu, work with multiple worksheets, importing and exporting of data.

PowerPoint:Introduction and Applications of Power Point, create a New Presentation, Adding Slides, Clip Arts, Smart art, Charts, Text, images and other objects, Templates and Master Slides, Giving Animation effects, Links and Action buttons, creating certificate

Course Outcomes-

- 1) Apply knowledge of computer to identify types of computer system and ready to understand basic of computer.
- 2) Learner are now understands different types of computer languages
- 3) Learner can understand steps to solve programs
- 4) Learner can understand to create office documents, create presentations and create worksheet.
- 5) Learner are able to create attractive certificates design.

Reference Books-

1. Computer Fundamentals : Concepts, Systems & Applications- 8th Edition-BPB Publication-by Priti Sinha, Pradeep K., Sinha
2. Fundamentals Of Computers-6th Edition- Eastern Economy Edition Books - PHI Learning- By V. Rajaraman, Neeharika Adabala
3. Computer Fundamentals- Pearson- 1st Edition- By Anita Goal
4. Fundamentals of Information Technology - Kalyani Publishers; 3rd edition- by Srivastava Chetan
5. Computer Fundamentals: Architecture and Organization-4th Edition- New Age International Pvt. Ltd., Publishers-By B. Ram
6. MS-Office Paperback - First edition- Laxmi Publications-by S.S. Shrivastava

Paper-II: - Programming Using C

[Credits: Theory-(2.5), Practicals-(2)]

Total Theory Lectures-30

Course Objectives –

1. To understand structured programming approach using C.
2. To develop the basic concepts and terminology of programming in C.
3. To implement algorithms in the 'C' language.
4. To test, debug and execute programs.

Unit I:-Introduction to 'C' (15)

Basic of C:-History, Features of C, Structure of 'C' programming, C-Tokens, Data types, Operators, Control Statements-Conditional control statements, Looping, Unconditional control statements

Arrays and String-Array definition and declaration, Types of array, Accessing Array, array manipulation, searching, insertion, deletion of an element from an array, basic matrix operations, dynamic array, String-Declaration and Initialization of String, operation on string, inbuilt String handling functions, arithmetic operation on string, table of string.

Unit II: -Function, Structure and File (15)

Function and Pointer- Definition, declaration, function prototypes, Local and global variables, User defined functions, recursion, passing array and string to function, Storage classes

Pointers-Definition and declaration, Pointer and array, Call by value and Call by reference,

Structures and Union-Definition and declaration, Array of structures, passing structure to function, Pointer to structure, Nested structure, self-referential structure, Size of and typedef, Definition and declaration of union, difference between structure, union and array.

File Handling-Defining, opening and closing of file, operations on file, Standard input and output functions, formatted input and output functions, file opening modes, Random access of file, command line argument.

Course Outcomes-

1. Explore programming language.
2. Develop modular programs using control structures and arrays in 'C'.
3. Develop user define data type like structure and union.
4. Learner are write programs for file handling in 'C'.

Reference Books-

1. Let Us C -18th Edition- BPB Publications-by Yashavant Kanetkar
2. C Programming Language- Pearson- 2nd Edition- Dennis Ritchie
3. Programming in C- Oxford University Press- - 2nd Edition -by Ghosh Manas and Pradip Dey
4. Programming In Ansi C- 8th Edition-Tata McGraw-Hill -By Balagurusamy

Paper-III: - Introduction to Web Designing

[Credits: Theory-(2.5), Practicals-(2)]

Total Theory Lectures-30

Course Objectives-

1. Understand the principles of creating an effective web page.
2. Learn the language of the web: HTML and CSS.
3. Learn web form
4. Learn form validation
5. Develop basic programming skills using Javascript.

Unit I:- Introduction to HTML, HTML5 and CSS

(15)

HTML:-Introduction to HTML, Overview of basic HTML , Structure of HTML, Creating and opening HTML file, Singular and paired tags, Text formatting tag, Anchor tag, Lists, Image, Image Map, Table, Frames and Frameset, HTML Form

HTML5: Introduction to HTML5, Need of HTML5, DOCTYPE Element, Tags-Section, Article, aside, header, footer, nav, dialog, figure etc.

Events in HTML5, Input tag (Type, Auto focus, placeholder, required etc. attributes.) in HTML5, Graphics in HTML5,Media tags in HTML5

Introduction to CSS:- Introduction to CSS, Use of CSS, Types of CSS, Selectors, Properties, Values.CSS Properties: - Background, Text, Fonts, Link, List, Table, Box Model, Border, Margin, Padding, Display, Positioning, Floating, Opacity, Media type, Backgrounds and Borders Image, Values and Replaced Content, Text Effects,2D/3D, Transformations, Animations, Multiple Column Layout, User Interface, CSS interact with JavaScript.

Unit II:- JavaScript

(15)

Introduction to JavaScript, JavaScript Variables & Data types, Operators, Built in functions in JavaScript, Control structure in JavaScript, DOM, Math, Array, History, Navigator, Location, Windows, String, Date, Document objects, user defined function, Validation in JavaScript, event & event handling in JavaScript.

Course Outcomes-

1. Student can able to design simple and attractive web pages.
2. Student can understand HTML, HTML5 and CSS and using these technique students will develop interactive web pages.
3. Students can able to design web form and form validation
4. Student can understand JavaScript language for client side development.

Reference Books:-

1. HTML 5 Black Book: Covers CSS3, Javascript, XML, XHTML, AJAX, PHP and jQuery- Dreamtech Press- 2nd Edition- by Kogent Learning Solutions Inc.
2. Beginning JavaScript and CSS Development with JQuery-Wrox Press-by Richard York
3. Beginning HTML and CSS Paperback – John Wiley & Sons - illustrated Edition- by Rob Larsen
4. HTML & CSS: The Complete Reference- McGraw-Hill Digital-Fifth Edition- By Thomas Powell.

Paper IV:-Operating System

[Credits: Theory-(2.5), Practicals-(2)]

Total Theory Lectures-30

Course Objectives-

1. To understand the main components of an OS & their functions.
2. To study the process management and scheduling.
3. To understand the concepts and implementation Memory management policies and virtual memory.
4. To understand the working of an OS as a resource manager, file system manager, process manager, memory manager and I/O manager and methods used to implement the different parts of OS

Unit 1: Introduction Operating System (15)

Definition Operating systems, Types of Operating Systems-Batch, Multiprogramming, Time Sharing, Real-Time, Distributed, Parallel., OS Service, System components, System Calls

Process Management: - Concept of Process, Process states, Process Control Block, Context switching, Operations on Process, Threads - Types of threads, Benefits of threads.

Concept of Process Scheduling- Types of Schedulers, Scheduling criteria, Scheduling algorithms Preemptive and Non-preemptive , FCFS, SJF, Round Robin, Priority Scheduling, Multilevel Queue Scheduling, Multilevel-feedback Queue Scheduling.

Process Synchronization and Deadlocks: - The Producer Consumer Problem, Race Conditions, Critical Section Problem, Semaphores, and Classical Problems of Synchronization: Reader-Writer Problem, Dining Philosopher Problem.

Deadlock-Concept of deadlock, Dead Lock Characterization, Resource Allocation Graph, Methods of deadlock Handling- Deadlock Prevention, Deadlock Avoidance -banker's algorithm, Deadlock detection and Recovery.

Unit 2: Memory Management (15)

Memory Management: - Logical and Physical address Space, Dynamic Loading, Overlays, Swapping,

Memory allocation: Contiguous Memory allocation - Fixed and variable partition - Internal and External fragmentation and Compaction, Paging, Segmentation. Basics of Virtual Memory, Demand paging, Page fault, Page Replacement policies: Optimal (OPT), First in First Out (FIFO), Least Recently used (LRU), Thrashing.

Disk Management: disk scheduling (FCFS, SSTF, SCAN, C-SCAN).

Course Outcomes-

- 1) Describe the important computer system resources and the role of operating system in their management policies and algorithms.
- 2) Understand the process management policies and scheduling of processes by CPU
- 3) Evaluate the requirement for process synchronization and coordination handled by operating system
- 4) Describe and analyze the memory management and its allocation policies.
- 5) Identify use and evaluate the storage management policies with respect to different storage management technologies.

Reference Books:

1. Systems Programming and Operating Systems- McGraw Hill Education India Pvt Ltd-2nd edition -by Dhananjay M. Dhamdhere.
2. Modern Operating Systems- Pearson-4th Edition-By by Andrew Tanenbaum
3. Operating System Concepts- John Wiley & Sons Inc- 9th edition- By Siberchatz and Galvin.

Practical on Paper-I: - Fundamentals of Computers

1. Demonstration of peripherals
2. DOS – external and internal commands, batch files commands
3. Windows Operating System – Windows explorer, program manager, control panel, print manager, Creating folders, files, icons, shortcuts
4. MS – WORD – Creating new documents, typing, deleting, selecting text, undo, Redo, formatting text – auto format, formatting characters, drop caps, Paragraphs, line spacing, margins, page setup, headers and footers
5. MS – WORD- Writer’s tools – spelling checker, auto format, auto correct, find and replace Mail merge – Data source, Main document, creating mail merge document.
6. MS – EXCEL - Creating worksheet, Graphs, resizing graphs, formulas, if Statement, types of functions
7. MS-PowerPoint-Creating presentation, slideshow, adding slides, inserting clip arts, smart art, images, sound files, linking etc.
8. Creating Certificate in Power point and word
9. Creating Resume
10. Creating Banner in word and PowerPoint
11. Internet – creating e – mail accounts, browsing.
12. Demonstration of different charts using excel.
13. Demonstration of different slide show technique
14. Demonstration of different page formatting in word and excel
15. Creating Certificate in word

Practical on Paper-II: - Programming Using C

1. Write a Program to convert the Temperature in centigrade degree to the Fahrenheit degree.
2. Write a program to find out First Fifty Prime numbers.
3. Write a program to convert given Binary number into its Octal / Decimal, Hexadecimal Equivalent.
4. Write a program to display Fibonacci series.
5. Write a Recursive function to find out the Factorial of Given Number.
6. Write a program to remove blank lines from a file.
7. Write a program to count the no. of character, words, lines and spaces in a given text file.
8. write a program to calculate Matrix Addition, Multiplication using Functions as well as without Function.
9. Write a program to find given string is Palindrome or not using function.
10. Write a program that accepts the Roll No, Name, Marks obtained in three tests of 'N' students & display the total and Average in tabular format.
11. Write a program for Armstrong number
12. Write a program for matrix inverse and transpose
13. Write a program to store book information in file
14. Write a program to access arrays using pointer.
15. Write a program to implement strcmp, strlen, strcpy functions.

Practical on Paper-III: - Introduction to Web Designing

1. Design HTML page to display student Information
2. Design HTML page for all types of lists.
3. Design HTML page for Image map, table, and frameset tags.
4. Create a web page using the Internal/Linked/External style sheet using Text formatting properties, CSS Borders, Margin Properties, Color properties, Use DIV and SPAN tag properties.
5. Write a JavaScript code working with functions: the alert Box, the confirm Box, the prompt Box etc.
6. Write JavaScript program to check given number is
 - a. even or odd,
 - b. Prime or not
 - c. Palindrome or not.
 - d. perfect or not
 - e. Armstrong or not
7. Write a JavaScript code block using objects: String Object, Boolean Object, Number Object, Date Object, Math Object, History Object, Screen Object, Location Object etc.
8. Write a JavaScript to convert the Temperature in centigrade degree to the Fahrenheit degree.
9. Write a JavaScript to find out First Fifty Prime numbers.
10. Write a JavaScript to validate form. Use email validation, pin code validation, require validation.
11. Write a JavaScript to demonstrate window object.
12. Write a JavaScript to demonstrate Navigation object.
13. Write a JavaScript for addition of n numbers in array
14. Design web page to demonstrate internal linking of document.
15. Design small website containing 10 web pages.

Practical on Paper IV:-Operating System

1. Write a C program for implementation of Priority scheduling algorithms
2. Write a C program for implementation of Round Robin scheduling algorithms
3. Write a C program for implementation of FCFS scheduling algorithms.
4. Write a C program for implementation of SJF scheduling algorithms.
5. Write a C program to simulate the concept of Dining-Philosophers problem.
6. Write a c program to implement Threading and Synchronization Applications.
7. Write a C program to implement banker's algorithm for deadlock avoidance.
8. Write a C program to implement algorithm for deadlock detection.
9. Write a C program for implementation memory allocation methods for fixed partition
10. Write a C program to simulate the following contiguous memory allocation techniques
 - a) Worst-fit
 - b) Best-fit
 - c) First-fit
11. Write a c program to implement Paging technique for memory management.
12. Write a C program for implementation of FIFO, LRU and LFU page replacement algorithm.
13. Write a C program for creating and deleting directory.
14. Write a C program to display current date and time.
15. Write a C program to implement dir command

Equivalent Subject for Old Syllabus

Sr. No.	Name of the Old Paper	Name of the New Paper
1)	Paper-I- Fundamentals of Computer	Paper-I- Fundamentals of Computers
2)	Paper-II- Programming Using C-I	Paper-II- Programming Using C
3)	Paper-III Introduction to Web Designing	Paper-III Introduction to Web Designing
4)	Paper-IV- Programming Using C-II	Paper-II- Programming Using C
5)		

For Science faculty: CA- Contineous Assessment (Internal Examinations) of Total Marks: 10

Pattern / Examination nature may be as follows:

One internal examination of 10 marks or two examinations of 5 marks each.

Open book examination / Home Assignment / Classroom test / Seminar / Field Work report / Project Report etc.