

Punyashlok Ahilyadevi Holkar Solapur University, Solapur



Name of the Faculty: Science & Technology

(As per New Education Policy 2020)

Syllabus: Computer Science

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

(Syllabus to be implemented from June 2024)

Punyashlok Ahilyadevi Holkar Solapur University, Solapur

B. Sc. I (Computer Science) Sem. I & II

Introduction:

The Bachelor of Science (4 years) program is a specialized degree focused on Computer Science. It equips students with practical computer skills and prepares them to excel in the ever-evolving world of computing. This program spans eight semesters, completed over four years, and follows a Choice-Based Credit System (CBCS).

Preamble:

The BSc Computer Science Syllabus is steadfast in its commitment to fostering a comprehensive understanding of both theoretical and practical aspects of software and hardware techniques. This course is designed with the primary objective of preparing students for careers centered on problem-solving within the realm of computer science and technology, while also equipping them for advanced studies and research in the field.

Our program aims to provide a robust foundation in computer science, enabling students to offer efficient and effective solutions to a wide range of challenges presented to them. Given the rapid evolution of the software industry and technological innovations, the expectations from both undergraduate and postgraduate students have evolved. Thus, our syllabus has been thoughtfully crafted to align with industry demands, inspire students to pursue higher education and research, attract them to our program over others, and adhere to the requirements of the Credit system.

Throughout these four years of study, we have tailored the syllabus to address these dynamic challenges. It endeavors to encompass the fundamental principles of Computer Science while also incorporating the latest technologies suitable for a BSc level curriculum. Notably, we prioritize the promotion of Open-Source Technologies to the fullest extent possible, recognizing the wealth of knowledge available on the internet.

Furthermore, we emphasize that teachers must harness this extensive online knowledge and, where necessary, adapt their teaching methodologies and content to transcend traditional textbooks. Over the course of these four years, students are

expected to accumulate a wealth of knowledge and skills through our syllabus, commencing with a foundational understanding of computer technology and computer programming in the first year.

Eligibility:

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

Objective of the Program:

1. Cultivate proficient problem-solving skills through computer technology.
2. Foster essential skill sets and analytical acumen to create computer-based solutions for practical challenges.
3. Equip students with professional competencies relevant to the Software Industry.
4. Establish a foundational knowledge base to support research and advancement in Computer Science.
5. Facilitate the construction of successful careers in Computer Science, nurturing students with the ability to innovate and craft software products.
6. Empower students to initiate their own software enterprises.

Program Outcome:

B.Sc. (CS) program has been designed to prepare graduates for attaining the following specific outcomes:

- PO-1. Apply computer science knowledge effectively in practical contexts.
- PO-2. Cultivate a comprehensive understanding of theoretical concepts and their practical application across diverse fields.
- PO-3. Equip students with the expertise required for a wide range of computer applications, including computer organization, Computer Networking

techniques, Software Engineering, Web Development, Database management, and different programming languages.

PO-4. Demonstrate the capability to design computing systems that fulfill specific requirements while adhering to realistic constraints, encompassing safety, security, and multidisciplinary applicability, all while maintaining a positive attitude.

PO-5. Enhance the programming skills of aspiring IT professionals through the integration of project development within each language and technology studied throughout the curriculum.

Program Learning Outcomes:

These outcomes delineate the expectations regarding students' knowledge and capabilities upon graduation. They encompass the skills, knowledge, and behaviors that students amass throughout their academic journey within the program.

Program Learning Outcomes for B.Sc.(Computer Science):

The Bachelor of Science program enables students to attain, by the time of graduation are as follows:

PLO-1 Cultivate the capability to analyze problems, identify computing requirements, and propose appropriate solutions.

PLO-2 Equip students for careers centered on computer science and technology-driven problem-solving.

PLO-3 Enable the development of skills for pursuing advanced studies and conducting research in the field of computer science.

PLO-4 Empower individuals to become innovative entrepreneurs capable of conceiving and developing software products.

- PLO-5 Tailor the curriculum to students' preferences, allowing them to specialize in areas such as machine learning, web development, data science, or video game development.
- PLO-6 Prepare students for a diverse range of career opportunities, including but not limited to Software Engineering, Systems Design, Programming, Applications Design, and Information Systems Design and Analysis.
- PLO-7 Demonstrate the ability to design, implement, and assess computing-based solutions in alignment with the program's discipline.
- PLO-8 Exhibit an understanding of professional responsibilities and exercise sound judgment in computing practice, adhering to legal and ethical principles.
- PLO-9 Demonstrate an ethical code of conduct when utilizing the Internet and cyber systems.
- PLO-10 Apply acquired knowledge and skills to develop in-house applications through project-based work.
- PLO-11 Familiarize yourself with current trends in industrial and research environments, leading to the creation of innovative solutions for existing challenges.

Punyashlok Ahilyadevi Holkar Solapur University, Solapur

Faculty of Science and Technology

Structure as per NEP-2020 LEVEL - 4.5

B.Sc. (Computer Science)-I

Level	Sem.	Major		GE/OE	SEC/ VSC	AES, IKS, VEC	CC	Total Credits	Cumulative Credits
		T	P						
4.5	I	DSE 1-1 (2)	DSE 1-1 (2)	GE1/ OE1 (2)	Sec-1 (2)	L1-1 (2),		22	44 UG Certificate (44)
		DSE 2-1 (2)	DSE 2-1 (2)			IKS (2),			
		DSE 3-1 (2)	DSE 3-1 (2)			VEC1 (2)			
	II	DSE 1-2 (2)	DSE 1-2 (2)	GE2/ OE2 (2)	Sec-2 (2)	L1-2 (2), VEC2(2)	CC1(2)	22	
		DSE 2-2 (2)	DSE 2-2 (2)						
		DSE 3-2 (2)	DSE 3-2 (2)						

Subject/ Core Course	Name and Type of the Paper		Hrs./week			Total Marks/ Paper	UA	CA	Credits
	Type	Name	L	T	P				
Sem-I									
Major	DSC1-1	Programming Using C GO4-0108	2	-	-	50	30	20	2
	DSC1-1 Practical	Practical based on GO4-0108P	-	-	4	50	30	20	2
	DSC2-1	To Be selected from other than Computer Science (T)	2	-	-	50	30	20	2
	Practical	Practical based on DSC2-1	-	-	4	50	30	20	2
	DSC3-1	To Be selected from other than Computer Science (T)	2	-	-	50	30	20	2
	Practical	Practical based on DSC3-1	-	-	4	50	30	20	2
Generic/ Open Elective Courses	GE1/ OE1	To be selected from the Basket of GO4-GE-0108	2	-	-	50	30	20	2
SEC/ VSC	SEC-1	Introduction to Web Design GO4-SEC-0108	-	-	2	50	30	20	2
AES, IKS, VEC	L1-1	English Eng-108	2	-	-	50	30	20	2
	IKS	To be selected from the Basket of IKS Go4-IKS- 0108	2	-	-	50	30	20	2
	VEC-1	India Constitution and Democracy GO4- ICD-108	2	-	-	50	30	20	2
Total			14		14	550	330	220	22
Sem-II									
Major	DSC1-2	Operating System Fundamentals GO4-0208	2	-	-	50	30	20	2
	Practical	Practical based on GO4-0208P	-	-	4	50	30	20	2
Minor	DSC2-2	To Be selected from other than Computer Science	2	-	-	50	30	20	2
	Practical	Practical based on DSC2-2	-	-	4	50	30	20	2
	DSC3-2	To Be selected from other than Computer Science	2	-	-	50	30	20	2

	Practical	Practical based on DSC3-2	-	-	4	50	30	20	2
Generic/ Open Elective Courses	GE2/ OE2	To be selected from the Basket of GO4-GE-0208	2	-	-	50	30	20	2
SEC/ VSC	SEC2	Web Design using Bootstrap and WordPress GO4-SEC-0208	-	-	2	50	30	20	2
AES, IKS, VEC	L1-2	English Eng-208	2	-	-	50	30	20	2
	VEC-2	Environmental studies GO4-ENS-24	2	-	-	50	30	20	2
CC1	CC1	Community Engagement & Services CES-208	2	-	-	50	30	20	2
Total			14	-	14	550	330	220	22
Grand Total			28	-	28	1100	660	440	44

Generic/ Open Elective Courses offered by Computer Science									
Subject/ Core Course	Name and Type of the Paper		Hrs./week			Total Marks Per Paper	UA	CA	Credits
	Type	Name	L	T	P				
Sem-I									
Generic/ Open Elective Courses	GE-1/ OE-1	Office management Tools GO4-GE-0108	2	-	-	50	40	10	2
Sem-II									
Generic/ Open Elective Courses	GE-2/ OE-2	Introduction to Internet and Web Design GO4-GE-0208	2	-	-	50	40	10	2
Total			4			100	80	20	4

Abbreviations:				
L: Lectures	T: Tutorials	P: Practical	UA : University Assessment	CA : College Assessment
Generic/ Open Electives: GE/OE		Skill Enhancement Courses: SEC		
Indian Knowledge System: IKS		Ability Enhancement Courses: AES		
Value Education Courses: VEC		Vocational Skill and Skill Enhancement Courses: VSEC		

Co-curricular Courses: **CC**

Student contact hours per week: 24 Hours (Min.)

Total Credits for B.Sc. (CS)-I (Semester I and II): 44

Medium of instruction: English

- Practical Examination is Semester wise before theory Examination.
- Duration of Practical Examination as per respective BOS guidelines
- Separate passing is mandatory for Theory, Internal and Practical Examination

Exit Option at Level 4.5: Students can exit after Level 4.5 with under certificate course in Computer Programming if he/she completes the courses equivalent to minimum of 44 credits and an additional.4 credits core NSQF course/Internship.

B.Sc. (Computer Science)-I, Level - 4.5 UG Certificate Level							
Sem:		I					
Paper Category:		DSC1-1 (Major)					
Paper Name:		Programming Using C					
Credit:		02		Theory:		2 Hrs./Week	
Marks:	UA:	30	CA:	20	Total:	50	

Course Objectives –

The aim of this course is to prepare learners for a foundational understanding of computers, encompassing:

1. Grasp the principles of structured programming through the utilization of C.
2. Introduce students to the basic principles of programming and familiarize students with the syntax and semantics of the C language.
3. Develop problem-solving skills through practical exercises ranging from simple arithmetic calculations to more complex algorithms and validate, troubleshoot, and run programs effectively.
4. Teach students how to effectively manage memory in C, including dynamic memory allocation and deallocation using functions like malloc(), calloc(), realloc(), and free().
5. Cover file input/output operations in C, including reading from and writing to files using functions like fopen(), fclose(), fread(), and fwrite().

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, operation on string, inbuilt String handling functions, arithmetic operation on string, table of string.

Unit II: Function, Structure and File

[15]

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

Pointer: 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-

Students will able to:

1. Introduce fundamental programming concepts and gain familiarity with C language syntax and semantics.
2. Develop problem-solving skills through a variety of exercises, from basic arithmetic to complex algorithms.
3. Create modular programs using control structures and arrays in 'C'.
4. Formulate user-defined data types such as structures and unions.
5. Learn efficient memory management techniques in C, including dynamic memory allocation and deallocation.
6. Master file input/output operations, including reading and writing to files using standard functions.
7. Validate, troubleshoot, and execute programs proficiently to ensure functionality and correctness.

Reference Books-

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

B.Sc. (Computer Science)-I, Level - 4.5 UG Certificate Level							
Sem:		I					
Paper Category:		Practical (Major)					
Paper Name:		Practical based on DSC1-1					
Credit:		02		Practical:		4 Hrs./Week	
Marks:	UA:	30	CA:	20	Total:	50	

Course Objectives –

The aim of this course is to prepare learners for a foundational understanding of computers, encompassing:

1. Gain a comprehensive understanding of office automation concepts, including its significance, benefits, and applications in modern workplaces.
2. Develop proficiency in using popular office productivity software suites such as Microsoft Office, Google Workspace, or other similar tools.
3. Learn strategies and techniques for efficient document creation, organization, storage, retrieval, and sharing using office automation tools.
4. To develop practical skills in Word, Excel and PowerPoint.
5. Enhance problem-solving skills by solving a variety of programming challenges and exercises using C.
6. Develop a strong foundation in programming fundamentals, including variables, data types, operators, control structures, functions, and arrays, using the C programming language.
7. Learn the principles of modular programming and how to write modular, reusable, and maintainable code using functions and libraries in C.
8. Gain proficiency in Array and strings.
9. Gain proficiency in working with pointers, dynamic memory allocation, and memory management techniques in C.
10. Understand input and output operations in C, including standard input/output functions, file handling operations, and formatting functions.

Practical based on DSC1-1:

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.

Course Outcomes-

Students will able to:

1. Attain a thorough comprehension of office automation concepts, encompassing their significance, advantages, and contemporary workplace applications.
2. Cultivate expertise in utilizing prevalent office productivity software suites like Microsoft Office, Google Workspace, or analogous tools.
3. Acquire strategies and methodologies for optimizing document creation, organization, storage, retrieval, and dissemination through office automation solutions.

4. Develop practical proficiency in utilizing Word, Excel, and PowerPoint applications.
5. Enhance problem-solving capabilities through tackling diverse programming challenges and exercises employing the C language.
6. Establish a robust groundwork in programming fundamentals, covering variables, data types, operators, control structures, functions, and arrays, within the realm of C programming.
7. Acquire knowledge of modular programming principles, enabling the creation of reusable and maintainable code structures utilizing functions and libraries in C.
8. Attain proficiency in handling arrays and strings effectively within C programming contexts.
9. Master working with pointers, dynamic memory allocation, and various memory management techniques pertinent to C programming.
10. Develop a comprehensive understanding of input and output operations in C, encompassing standard input/output functions, file handling operations, and formatting functions.

B.Sc. (Computer Science)-I, Level - 4.5 UG Certificate Level							
Sem:		I					
Paper Category:		SEC1					
Paper Name:		Introduction to Web Design					
Credit:		02		Theory:		2 Hrs./Week	
Marks:	UA:	30	CA:	20	Total:	50	

Course Objectives –

The aim of this course is to prepare learners for a foundational understanding of computers, encompassing:

Grasp the fundamentals of crafting a proficient web page.

1. Gain a comprehensive understanding of Internet technology.
2. Master the Hypertext Markup Language (HTML) for creating the structure and content of web pages, including semantic markup, forms, and multimedia integration.
3. Acquire expertise in Cascading Style Sheets (CSS) for styling and layout of web pages, including selectors, properties, responsive design, and CSS frameworks.
4. Familiarize with the fundamentals of JavaScript programming language, including variables, data types, operators, control structures, functions, and events.
5. Gain expertise in web forms and the intricacies of form validation.
6. Cultivate essential programming skills through JavaScript.
7. Learn to enhance web pages with dynamic behavior using JavaScript, including DOM manipulation, event handling, and asynchronous programming techniques.

Unit I: -Introduction to HTML, HTML5 and CSS

[15]

Introduction: -Brief History of Internet, what is World Wide Web, URL, Domain, Internet Browser, What is Web Page and a Website, How the Website Works? Types of Websites (Static and Dynamic Websites)

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

Students will able to:

1. Develop a comprehensive understanding of Internet technology and its underlying principles.
2. Demonstrate mastery of Hypertext Markup Language (HTML) for structuring and presenting content on web pages, incorporating semantic markup, forms, and multimedia elements.
3. Exhibit proficiency in Cascading Style Sheets (CSS) to style and layout web pages effectively, utilizing selectors, properties, responsive design principles, and CSS frameworks.
4. Attain familiarity with the fundamentals of JavaScript programming, covering variables, data types, operators, control structures, functions, and event handling.
5. Acquire expertise in implementing and validating web forms, understanding the intricacies of form design and validation techniques.
6. Cultivate essential programming skills through practical exercises and projects using JavaScript.
7. Apply JavaScript to enhance web pages with dynamic behavior, including manipulation of the Document Object Model (DOM), event handling, and implementation of asynchronous programming techniques.
8. Students can design web forms and implement form validation.
9. Students can grasp the JavaScript language for client-side development.

Reference Books-

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

B.Sc. (Computer Science)-I, Level - 4.5 UG Certificate Level						
Sem:		II				
Paper Category:		DSC1-2 (Major)				
Paper Name:		Operating System Fundamentals				
Credit:		02		Theory:		2 Hrs./Week
Marks:	UA:	30	CA:	20	Total:	50

Course Objectives –

The aim of this course is to prepare learners for a foundational understanding of computers, encompassing:

1. Gain insights into the core components of an operating system and their respective roles.
2. Explore process management and scheduling mechanisms.
3. Investigate the principles and execution of memory management policies and virtual memory.
4. Comprehend the multifaceted role of an operating system as a resource, file, process, memory, and I/O manager, along with the methods employed for each component's implementation.

Unit I- Introduction Operating System

[20]

Introduction Operating System- 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.

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 II- Memory Management

[10]

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-

Students will able to:

1. Demonstrate an understanding of critical computer system resources and the role of the operating system in their management through policies and algorithms.
2. Comprehend the principles of process management policies and CPU process scheduling.
3. Students are able to evaluate the importance of process synchronization and coordination, overseen by the operating system.
4. Student understands memory management, including allocation policies.
5. Students identify, apply, and assess storage management policies within the framework of diverse storage technologies.

Reference Books-

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

B.Sc. (Computer Science)-I, Level - 4.5 UG Certificate Level							
Sem:		II					
Paper Category:		Practical (Major)					
Paper Name:		Practical based on DSC1-2					
Credit:		02		Practical:		4 Hrs./Week	
Marks:	UA:	30	CA:	20	Total:	50	

Course Objectives –

The aim of this course is to prepare learners for a foundational understanding of computers, encompassing:

1. Gain a comprehensive understanding of fundamental operating system concepts, including processes, threads, memory management, file systems, I/O operations.
2. Practice writing programs to create, manage, and synchronize processes and threads in a multitasking environment.
3. Practice writing programs to perform file management operations such as file creation, deletion, reading, and writing.

Practical based on DSC1-2:

1. Develop a simple shell program that can execute basic commands entered by the user.
2. Write a C program for implementation of Priority scheduling algorithms
3. Write a C program for implementation of Round Robin scheduling algorithms
4. Write a C program for implementation of FCFS scheduling algorithms.
5. Write a C program for implementation of SJF scheduling algorithms.
6. Write a C program to simulate the concept of Dining-Philosophers problem.
7. Write a c program to implement Threading and Synchronization Applications.
8. Develop a simple shell program that can execute basic commands entered by the user.
9. Write a C program to implement banker's algorithm for deadlock avoidance.
10. Write a C program to implement algorithm for deadlock detection.
11. Write a C program for implementation memory allocation methods for fixed partition
12. Write a C program to simulate the following contiguous memory allocation techniques
Worst-fit b) Best-fit c) First-fit
13. Develop a simple shell program that can execute basic commands entered by the user.

14. Write a c program to implement Paging technique for memory management.
15. Write a C program for implementation of FIFO, LRU and LFU page replacement algorithm.

Course Outcomes-

Students will able to:

1. Attain a comprehensive understanding of essential operating system concepts, encompassing processes, threads, memory management, file systems, and I/O operations.
2. Hone programming proficiency by engaging in the creation, management, and synchronization of processes and threads within a multitasking environment.
3. Practice implementing file management operations, including file creation, deletion, reading, and writing, through the development of programs tailored to these functionalities.

B.Sc. (Computer Science)-I, Level - 4.5 UG Certificate Level							
Sem:		II					
Paper Category:		SEC2					
Paper Name:		Web Design using Bootstrap and WordPress					
Credit:		02		Theory:		2 Hrs./Week	
Marks:	UA:	30	CA:	20	Total:	50	

Course Objectives –

The aim of this course is to prepare learners for a foundational understanding of computers, encompassing:

Grasp the fundamentals of crafting a proficient web page.

1. Master the Bootstrap framework for building responsive and mobile-first websites, including understanding the grid system, components, utilities, and customization options.
2. Learn techniques for creating responsive and mobile-friendly web designs using Bootstrap, ensuring optimal viewing experiences across various devices and screen sizes.
3. Acquire expertise in using WordPress as a content management system (CMS) for building and managing dynamic websites, including installation, configuration, themes, plugins, and content creation.
4. Explore advanced customization options in Bootstrap and WordPress, including customizing themes, templates, stylesheets, and integrating third-party plugins and widgets.
5. Learn to integrate multimedia content such as images, videos, and audio into web pages using Bootstrap components and WordPress media features.
6. Explore the integration of e-commerce functionality into WordPress websites using plugins like WooCommerce, including setting up online stores, managing products, and processing transactions.

Unit I: - Bootstrap

(15)

Introduction about Bootstrap, Bootstrap History, Why Use Bootstrap, Downloading Bootstrap, Bootstrap CDN, Downloading the Bootstrap Files, Understanding the File Structure, Layout-Bootstrap Grid System, Creating Fixed Layout, Fluid Layout, Responsive Web Design or Layout,

Bootstrap, Typography, Bootstrap Forms- Form control, Select, Checks & radios, Range, Input group, Floating labels, Layout, Validation, Bootstrap Tables, Lists, Images, Media Objects, Icons

Bootstrap Components-Accordion, Alerts, Badge, Breadcrumb, Buttons, Button group, Card, Carousel, Close button, Collapse, Dropdowns, List group, Modal, Navbar, Navs & tabs, Offcanvas, Pagination, Placeholders, Popovers, Progress, Scrollspy, Spinners, Toasts, Tooltips, **Case Study**-Design e-commerce and your college website

Unit II: - WordPress

(15)

Introduction CMS And WordPress, Why CMS, Advantages and Disadvantages of CMS, com vs. WordPress.org, Creating a WordPress Site, Installing WordPress, Setting up WordPress in Local Server, Logging Into the WordPress, Admin & General Site Settings, Writing Posts & Formatting Text : Posts versus Pages, Creating a New Blog Post, Using the Visual Editor, Pasting Without Formatting & Clearing Formatting, Formatting Headings, Formatting Bulleted & Numbered Lists, Formatting Blockquotes, Publishing a Post, Deleting a Post, Restoring a Post from the Trash (or Deleting it Delete Permanently), Creating Pages, formatting page, Publishing pages, Menu, Installing Themes, adding plugins, Working with Widgets, Case study-Design e-commerce and your college website

Course Outcome-

Students will able to:

1. Develop proficiency in utilizing the Bootstrap framework to construct responsive and mobile-first websites, encompassing mastery of the grid system, components, utilities, and customization features.
2. Get Knowledge of bootstrap built-in components design, grids, fluid grids, and responsive layout and understand global Bootstrap CSS classes for images, typography, tables, grids, forms, buttons, and the reusable bootstrap components including icons, dropdowns, alerts navbars, breadcrumbs, popovers, and many more.
3. Gain expertise in leveraging WordPress as a dynamic content management system (CMS) for website construction and management, encompassing installation, configuration, theme customization, plugin integration, and content creation.

4. Investigate advanced customization possibilities within Bootstrap and WordPress, including the adaptation of themes, templates, stylesheets, and the seamless integration of third-party plugins and widgets.
5. Acquire the skills to integrate multimedia elements such as images, videos, and audio seamlessly into web pages using Bootstrap components and WordPress media functionalities.
6. Explore the incorporation of e-commerce capabilities into WordPress websites through the integration of plugins like WooCommerce, covering aspects such as online store setup, product management, and transaction processing.

Reference Books-

1. Bootstrap 5 Foundations by Daniel Foreman, Foreman Technology LTD; 2nd edition
2. Bootstrap: Responsive Web Development by Jake Spurlock, Shroff; First Edition
3. <https://getbootstrap.com/docs/5.3/>
4. WordPress 4.0 Site Blueprints 2nd Edition: Build Your Own Website Using Best Practices,
5. WordPress 5 Complete: Build beautiful and feature-rich websites from scratch, 7th Edition, by Karol Król, Packt Publishing

B.Sc. (Computer Science)-I, Level - 4.5 UG Certificate Level							
Sem:		I					
Paper Category:		Generic/ Open Elective Courses- GE-1/ OE-1					
Paper Name:		Office management Tools					
Credit:		02		Theory:		2 Hrs./Week	
Marks:	UA:	30	CA:	20	Total:	50	

Course Objectives –

The aim of this course is to prepare learners for a foundational understanding of computers, encompassing:

1. To develop the skills and knowledge necessary to use Microsoft Office and other office tools applications effectively, including Word, Excel and PowerPoint.
2. To understand how to work with data, perform calculations, and analyze information using Excel spreadsheets.
3. To create engaging and visually appealing presentations using PowerPoint.
4. To prepare certificates, documents and resume.

Unit I: - Introduction to Office Suite

[10]

Introduction to Microsoft Office Suite: Need and Use of Office Suite, some available office suites, Overview of Office Suite, Understanding the User Interface, Customizing Settings and Options

Word: - Creating and Formatting Documents, Working with Text, Fonts, and Styles, Document Layout and Design, opening, saving, deleting document, page setting, formatting page, formatting text, adding images, Header footers, border and shading, bull ets, mail merge, Table, graphics, label, Templates, Wizards and Printing Techniques.

Unit II: - Excel and PowerPoint

[20]

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

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, Pivot, Dashboards.

Course Outcomes-

Students will able to:

1. Learners acquires skills and knowledge necessary to use Microsoft Office and other office tools applications effectively, including Word, Excel and PowerPoint.
2. Students able to work with data, perform calculations, and analyze information using Excel spreadsheets.
3. Learners are proficient in creating office documents, presentations, and worksheets.
4. Learners able to create attractive presentations
5. Acquire the capability to design visually appealing certificates and resumes.

Reference Books-

1. MS Office Paperback, Laxmi Publications by S.S. Shrivastava
2. Microsoft Office Bible - John
3. A Conceptual Guide to Open Office
4. <http://windows.microsoft.com/en-in/windows/msoffice-basics-alltopics>
5. <https://documentation.libreoffice.org/>

B.Sc. (Computer Science)-I, Level - 4.5 UG Certificate Level					
Sem:	II				
Paper Category:	Generic/ Open Elective Courses- GE-2/ OE-2				
Paper Name:	Introduction to Internet and Web Design				
Credit:	02	Theory:	30 Periods	Marks:	50

Course Objectives –

The aim of this course is to prepare learners for a foundational understanding of computers, encompassing:

1. To understand basic of web and internet
2. To acquire proficiency in the HTML language.
3. To acquire proficiency in the CSS.
4. To create simple web pages and web site

Unit I: - Basic of Internet and web design

[20]

Introduction: -Brief History of Internet, What is World Wide Web, URL, Domain, Internet Browser, What is Web Page and a Website, How the Website Works?, Responsive Web Designing, Types of Websites (Static and Dynamic Websites)

Introduction to HTML: -Brief Introduction of HTML and HTML5, HTML5 Tags, Basic structure of an HTML5 document, Heading and Paragraphs, Line Breaks Elements of HTML5, Working with Text and text tags, Formatting Tags, Working with Lists, Tables and Frames, Working with Hyperlinks, Images and Multimedia, Working with Forms and controls, Marquee Elements

Unit II: - Introduction to Cascading Style Sheets

[10]

Concept of CSS, Creating Style Sheet, CSS Properties, CSS Types, CSS Styling (Background, Text Format, Controlling Fonts), Working with block elements and objects, Working with Lists and Tables, CSS Id and Class, Box Model(Introduction, Border properties, Padding Properties, Margin properties), Navigation Bar, CSS Color, Two or three sample sites

Course Outcomes-

1. Students know basic about internet and web technology
2. Students can comprehend HTML and CSS, and utilize these skills to craft engaging and interactive web pages.
3. Students can proficiently create visually appealing, straightforward web sites.

Reference Books-

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

Equivalent Subject for Old Syllabus

Sr. No	Name of Old Paper	Name of New Paper
1	Fundamentals of Computers	No Equivalence
2	Programming Using C	Programming Using C
3	Introduction to Web Designing	No Equivalence
4	Operating System	Operating System Fundamentals