

Sardar Patel University, Mandi (H.P.)- 175001

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Department of Computer Science



Scheme & Syllabus of Bachelor of Computer Application

Based on NEP 2020

Effective from 2026-27 onwards

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Programme: Bachelor of Computer Application

[PEOs, PSOs and POs]

Program Educational Objectives (PEOs)

The PEOs will enable students to

PEO-1: Develop a robust foundation in Computer Science, Information Technology, and Mathematical Sciences through the integrated study of programming, software engineering, database systems, networking, and emerging computing paradigms, fostering a comprehensive understanding of contemporary computing ecosystems.

PEO-2: Cultivate advanced analytical, computational, software engineering, and problem-solving competencies to design, develop, evaluate, and deploy innovative, scalable, and secure computing solutions for complex real-world challenges.

PEO-3: Foster critical inquiry, innovation, leadership, effective communication, collaborative engagement, ethical reasoning, and professional integrity for successful participation in multidisciplinary academic, industrial, research, and entrepreneurial environments.

PEO-4: Prepare graduates for higher education, research, entrepreneurship, and diverse professional careers in software engineering, artificial intelligence, data science, cloud computing, cybersecurity, web and mobile application development, and allied computing disciplines.

PEO-5: Promote lifelong learning, technological innovation, digital transformation, environmental consciousness, and social responsibility to contribute meaningfully towards sustainable development and the continual advancement of the global digital society.

Program Specific Outcomes (PSOs)

The B.Sc.(Computer Science) with Physical Sciences programme is designed to

PSO-1: Apply advanced principles of Computer Science, Information Technology, and Mathematical Sciences to analyse, model, design, develop, and optimize robust software systems and intelligent computing solutions.

PSO-2: Demonstrate proficiency in programming paradigms, software engineering methodologies, database management systems, web technologies, computer networks, cloud platforms, and contemporary software development frameworks for the development of reliable computing applications.

PSO-3: Employ computational, algorithmic, statistical, and analytical techniques to process, interpret, visualize, and manage complex datasets, facilitating evidence-based decision-making and intelligent problem-solving.

PSO-4: Integrate interdisciplinary knowledge with emerging technologies to address contemporary challenges in artificial intelligence, machine learning, cybersecurity, cloud computing, Internet of Things (IoT), data analytics, intelligent automation, and digital transformation.

PSO-5: Exhibit professional competence through ethical practices, effective communication, collaborative leadership, project management, innovation, and entrepreneurial acumen while addressing societal and industrial computing challenges.

Programme Outcomes (POs)

After successfully completing the programme, the students will be able to:

PO1: Advanced Computing Knowledge

Demonstrate comprehensive knowledge of Computer Science, Information Technology, Mathematics, and allied disciplines to analyse, design, and develop innovative computing solutions.

PO2: Computational Thinking and Problem Solving

Apply computational thinking, algorithmic design, logical reasoning, mathematical modelling, and scientific methodologies to identify, analyse, and solve complex computing problems.

PO3: Software Design and Development

Design, develop, implement, validate, deploy, and maintain efficient, scalable, secure, and reliable software systems by employing contemporary software engineering principles and development methodologies.

PO4: Modern Computing Tools and Technologies

Utilize contemporary programming languages, integrated development environments, databases, cloud platforms, software frameworks, virtualization technologies, version control systems, and open-source tools to develop computing solutions.

PO5: Data Analytics and Intelligent Computing

Apply concepts of data science, artificial intelligence, machine learning, business analytics, and data visualization to extract meaningful insights and support intelligent decision-making.

PO6: Systems, Networks, and Cybersecurity

Demonstrate proficiency in operating systems, computer networks, cloud computing, cybersecurity principles, digital security practices, and distributed computing to build secure and resilient computing environments.

PO7: Research, Innovation, and Scientific Inquiry

Apply scientific inquiry, computational experimentation, software engineering practices, and innovative thinking to investigate computing problems and develop sustainable technology-driven solutions.

PO8: Professional Ethics and Digital Responsibility

Adhere to professional ethics, intellectual property rights, cybersecurity principles, digital governance, legal compliance, data privacy regulations, and responsible computing practices.

PO9: Communication and Interpersonal Competence

Communicate technical and professional information effectively through reports, documentation, presentations, and collaborative interactions with diverse stakeholders.

PO10: Leadership, Teamwork, and Project Management

Demonstrate leadership qualities, collaborative teamwork, project planning, resource management, and decision-making skills while working effectively in multidisciplinary and multicultural environments.

PO11: Lifelong Learning and Technological Adaptability

Engage in continuous learning, professional development, independent research, and adaptation to emerging technologies, evolving industry practices, and global technological advancements.

PO12: Interdisciplinary Integration and Sustainable Development

Integrate knowledge from Computer Science, Information Technology, Mathematics, business, engineering, and allied disciplines to develop innovative, sustainable, and socially responsible technology-enabled solutions.

PO13: Employability, Entrepreneurship, and Global Professionalism

Demonstrate technical competence, entrepreneurial acumen, innovation, leadership, and global professional skills required for higher education, research, startups, software industries, public services, and lifelong career success.

Break-Down of Credits-Semester wise

Course Type/ Semester	DSC	DSE	MDC	SEC	AEC	VAC	INP/APT/PRT/COM or Vocation Course	DIS	Total
I	12	-	3	3	2	-	-	-	20
II	12	-	3	3	-	2	4	-	24
Exit option with UG Certificate after securing 44 credits along with entry option to second year or third semester									
III	8 (MJ)+4 (MN)	-	3	3	2	2	-	-	22
IV	8 (MJ)+4 (MN)	4	-	-	2	2	-	-	20
Exit option with UG Diploma after securing 86 credits along with entry option to third year or fifth semester									
V	8 (MJ)+4 (MN)	8	-	-	2	-	-	-	22
VI	8 (MJ)+4 (MN)	8	-	-	-	-	-	-	20
Award of 3Year Bachelor's Degree after completion of 128 credits									

Abbreviations: DSC-Discipline Specific Core, DSE- Discipline Specific Elective, MDC-Multidisciplinary Course, SEC-Skill Enhancement Course, AEC-Ability Enhancement Course, VAC-Value Added Course, MJ-Major, MN-Minor, INP/APT/PRT/COM-Internship / Apprenticeship/ Project/ Community Outreach.

Important Notes

- In the first semester, students will be offered three different subjects within the same stream: A, B, and C
- The student will be required to give his/her Major and Minor at the end of the second semester. Such choices, including DSCs made at the end of the second semester, shall remain in effect until the VI semester.
- The DSCs of another discipline for the first two semesters of students who opt for Major programmes will be treated as Minors.
- MDCs must be selected from a broad discipline/pool of MDCs other than Major and Minor disciplines/subjects
- AEC/VAC/SEC-3 should be chosen from a pool of courses. Every discipline shall provide these courses, some of which will be offered discipline-specific, while the rest can be open to students of all other disciplines. However, the two SECs (SEC-1 & SEC-2) must be chosen from the discipline-specific (Core and Minor).
- Internship / Apprenticeship/ Project/ Community Outreach will be determined at the end of the first semester to enable students to carry out some INP/APT/PRT/COM activities during winter vacation.
- To pursue an Honours & Honours with research in the 4th year, students will have to successfully complete 3-year UG Degree and choose only one discipline in both semesters, in which s/he have studied 6 DSCs and 5 DSEs in the first three years.
- A student who secures 75% or more marks in aggregate till semester 6 (up to a 3-year degree) shall be eligible for a 4-year degree Honours with Research, provided SPU has approved the college to offer it.
- The Dissertation and Project will start in the VII semester. However, the evaluation and assessment will be conducted in both the VII and VIII semesters.
- As permitted under the UGC Guidelines for Multiple Entry and Exit in Academic Programmes offered in Higher Education Institutions, students will be allowed to enter/re-enter in the odd semesters and after even semesters, provided they fulfill the minimum requirements for entry and exit
- A student shall be eligible to appear in the end-semester examination only if he/she has a minimum of 75% attendance. The terms and rules governing condoning can be found in the Examination Section of the Ordinance.

Semester wise Scheme

Semester-I

S. No.	Course Code	Category	Course Title	L	T	P	C	CH	Theory Assessment		Practical Assessment		Total
									IA	ESE	IA	ESE	
1	BCA-DSC-101	DSC	Fundamentals of Computers and Office Productivity Tools	4	0	0	4	4	30	70	-	-	100
2	BCA-DSC-102	DSC	Programming using C	4	0	0	4	4	30	70	-	-	100
3	BCA-DSC-103	DSC	Programming using C-Lab	0	0	4	4	8	-	-	30	70	100
4	BCA-MDC-101	MDC	Accounting	3	0	0	3	3	25	50	-	-	75
5	BCA-SEC-101	SEC	Fundamentals of Computers and Office Productivity Tools -Lab	0	0	3	3	6	-	-	25	50	75
6	BXXX-AEC-101	AEC	To be chosen from corresponding Pool	2	0	0	2	2	15	35	-	-	50
Total							20	27					
Cumulative Credits							20						

Abbreviations: L-Lecture, T-Tutorial, P-Practical, C-Credits, CH-Contact Hours, IA-Internal Assessment, ESE- End Semester Examination

Note:

- XXXX*- Short form of the department whose MDC is offered in the curriculum

Semester-II

S. No.	Course Code	Category	Course Title	L	T	P	C	CH	Theory Assessment		Practical Assessment		Total
									IA	ESE	IA	ESE	
1	BCA - DSC-201	DSC	Internet and Web Technologies	4	0	0	4	4	30	70	-	-	100
2	BCA- DSC-202	DSC	Data Structures	4	0	0	4	4	30	70	-	-	100
3	BCA - DSC-203	DSC	Data Structures - Lab	0	0	4	4	8	-	-	30	70	100
4	BCA- MDC- 201	MDC	To be chosen from Mathematics Pool	3	-	-	3	3	25	50	-	-	75
5	BCA - SEC-201	SEC	Internet and Web Technologies- Lab	0	0	3	3	6	-	-	25	50	75
6		I/A/P/C-1	As per SPU Guidelines	-	-	-	4	4	30	70	-	-	100
7		VAC	To be chosen from VAC Pool	2	-	-	2	2	15	35	-	-	50
Total							24	35					
Cumulative Credits							44						

Note:

- Exit option with UG Certificate after securing 44 credits(*with 4 credits of I/A/P/C/ or work-based vocational course offered during winter/summer term), along with entry option to second year or third semester

Syllabus of Bachelor of Computer Application Programme

Fundamentals of Computers and Office Productivity Tools

BCA-DSC-101

S. No.	Course Code	Course Title	L	T	P	C	CH	Course Type
1	BCA-DSC-101	Fundamentals of Computers and Office Productivity Tools	4	0	0	4	60	Core
Prerequisite		Students should have a basic understanding of computer fundamentals, digital literacy, and information technology concepts covered up to the +2 level.						
Course Coordinator		Dr.						

i. Course Objectives:

1. To provide a fundamental understanding of computer systems, operating systems, digital technologies, and information management concepts.
2. To develop practical skills in the use of office productivity tools, AI-assisted applications, and digital collaboration platforms for creating, managing, analyzing, and presenting information effectively in academic and professional environment

ii. Course Outcomes: On completion of this course, the students are expected to

CO1	Student will understand the fundamentals of computer systems, memory, storage devices, operating systems, cloud computing, cybersecurity, and basic programming concepts.
CO2	Utilize AI productivity tools, collaboration platforms, and word processing software to create, edit, format, and manage professional documents efficiently.
CO3	Apply spreadsheet software for data organization, analysis, visualization, and reporting using formulas, functions, charts, and pivot tables.
CO4	Design and deliver effective presentations using presentation software by integrating multimedia, visual elements, collaboration features, and modern presentation design principles.

iii. Syllabus:

Section	Contents	Contact Hours
1	Introduction to Computers: Characteristics, Evolution, Types (Microcomputers ,Mainframes, Supercomputers), Block Diagram of a Computer. Memory & Storage: RAM, ROM, Cache Memory, SSD, USB Flash Drives, Cloud Storage (Basics). Input & Output Devices: Keyboard, Mouse, Touch Screen, Monitors (LCD, LED), Printers (Inkjet, Laser).	15 Hours

	Software & Operating Systems: System Software (Operating Systems), Application Software, Overview of Windows & Linux. Cloud Computing Fundamentals :SaaS, PaaS, IaaS, Public/Private Cloud Cyber Security: Awareness, Password Management and Digital Safety Basic Programming Concepts: Introduction to Machine Language, Assembly Language, High-Level Languages.	
2	AI Productivity Tools :ChatGPT, Copilot, Gemini. Collaboration Tools: Microsoft Teams, Slack, Zoom, Google Workspace Word Processing Software (Microsoft Word / Google Docs / LibreOffice Writer): Introduction to Word Processing and Its Features; Creating, Saving, and Opening Documents; Formatting Text: Font, Paragraph, Styles, Page Layout; Working with Tables, Columns, and Lists; Insert Images, Shapes, Charts, and Hyperlinks; Header, Footer, Page Numbering, Watermark; Spell Check, Grammar Check, and Thesaurus; Mail Merge and Automated Letter Writing; Printing Documents and Exporting to PDF	15 Hours
3	Data Analytics Dashboards and Data Visualization Basics: Introduction to data analytics, dashboards, and data visualization. Overview of common charts, graphs, and their applications in reporting and decision-making. Spreadsheet Software (Microsoft Excel / Google Sheets / LibreOffice Calc): Introduction to Spreadsheets and Their Uses; Creating, Saving, and Formatting Worksheets; Working with Rows, Columns, and Cells; Data Entry, Sorting, and Filtering; Formulas and Functions (SUM, AVERAGE, IF, VLOOKUP, HLOOKUP); Creating and Formatting Charts and Graphs; Conditional Formatting and Data Validation; Pivot Tables and Data Analysis Basics; Importing and Exporting Data.	15 Hours
4	Presentation Graphics Software (Microsoft PowerPoint / Google Slides / LibreOffice Impress): Introduction to Presentation Software; Creating and Managing Slides; Formatting Text, Themes, and Backgrounds; Inserting Images, Shapes, Tables, and Charts; Using Animations and Slide Transitions; Adding Multimedia: Audio and Video; Custom Slide Shows and Slide Master View; Printing Handouts and Exporting Presentations; Best Practices for Effective Presentations. Presentation Design Principles; SmartArt and Infographics; Collaboration and Cloud-Based Presentation Tools; Presenter View and Delivery Techniques; AI-Assisted Presentation Creation; Interactive Presentations and Hyperlinks; Accessibility and Sharing Options. Embedding Online Content and Web Resources; Presentation Ethics and Copyright Considerations.	15 Hours

iv. Suggested readings:

Text book:

1. Pradeep K. Sinha, Priti Sinha, “Computer Fundamentals”. BPB Publications.
2. Peter Weverka, “Microsoft Office 2021 All-in-One for Dummies”, Wiley, 2023.
3. Reema Thareja, *Fundamentals of Computers*, Oxford University Press.

Reference book:

1. Rajaraman, V., “Fundamental of Computers”. Prentice Hall India, New Delhi.
2. Joan Lambert, Curtis Frye, “Microsoft Office Step by Step (Office 2021 and Microsoft 365)”, Pearson, 2023.
3. Michael Miller, *AI for Everyone: Understanding and Using Artificial Intelligence in Everyday Life*, Que Publishing.
4. Bernard Marr, Data Strategy – Covers AI, data analytics, dashboards, cloud technologies, and modern digital transformation concepts.

v. Evaluation Pattern:

Components	Internal Assessment	Semester End Examination
Marks	30	70
Total Marks	100	

vi. Components of Internal Evaluation:

S. No.	Type of Assessment	Marks
1	Assignments & Presentations	10 marks
2	Class Test and House Test	5+10 Marks
3	Attendance (The marks would be given in the following manner: (75%-79.9%:1 Mark : 1; 80%-84.9%: 2; 85%-89.9%: 3; 90%-94.9%: 4 and 95%-100%: 5).	5 marks

vii. Instructions for the Paper Setter:**1. Pattern of Mid Semester Examination**

S. No.	Particulars	Details
1	Maximum Marks	10 Marks
2	Number of Sections	2 (Section A & Section B)
3	Section A	Consists of five short-answer questions. All questions are compulsory. Each question carries 1 mark.

2. Pattern of End Semester Examination

Part	Section/Block	Questions Set	Questions to be Attempted	Marks per Question	Marks to be Attempted
A	Section/Block I	2	Any 1	14	14
B	Section/Block II	2	Any 1	14	14
C	Section/Block III	2	Any 1	14	14
D	Section/Block IV	2	Any 1	14	14
E	All Sections/Blocks (I, II & III)	10 Short-Answer Questions/MCQ	Any 7	2	14
Total	—	18 Questions	—	—	70 Marks

viii. Pass marks

S. No.	Requirement	Minimum Percentage
1	Pass in each individual component (CCE, ESE)	35%
2	Pass in aggregate of the subject	40%

Programming in C

BCA-DSC-102

S. No.	Course Code	Course Title	L	T	P	C	CH	Course Type
1	BCA-DSC-102	Programming using C	4	0	0	4	60	Core
Prerequisite		Students should have a basic understanding of computer fundamentals, logical reasoning, and elementary mathematical concepts acquired at the +2 level.						
Course Coordinator		Dr.						

i. Course Objectives:

- To introduce the fundamental concepts of structured programming and algorithmic problem-solving using the C programming language.
- To develop programming proficiency in designing, implementing, testing, and debugging efficient C programs using data types, control structures, functions, arrays, pointers, and file handling techniques.

ii. Course Outcomes: On completion of this course, the students are expected to

CO1	Understand the fundamentals of C programming, including syntax, data types, and operators.
CO2	Implement input/output operations and control statements for efficient program flow.
CO3	Utilize arrays and strings for data storage and manipulation in C programs.
CO4	Develop modular programs using functions, recursion, and pointers.
CO5	Apply dynamic memory allocation, storage classes, and structures in programming.
CO6	Perform file handling operations to read, write, and manage data in text and binary files.

iii. Syllabus:

Section	Contents	Contact Hours
1	Introductory Concepts: Types of Programming Languages; Introduction to C and Its Features; Structure of a C Program; Desirable Program Characteristics (Readability, Maintainability, Efficiency), Secure Coding Practices and Error Handling C Fundamentals: C Character Set, Identifiers, and Keywords; Data Types, Constants, and Variables; Declarations and Symbolic Constants; Operators and Expressions (Arithmetic, Unary, Relational, Logical, Assignment, Conditional Operators, Library Functions)	15 Hours
2	Data Input and Output: Character Input/Output (getchar(), putchar()); Formatted Input/Output (scanf(), printf()); String Input/Output (gets(), puts()). Control Statements: Branching: if, if-else, nested if, switch-case; Looping: for, while, do-while; Nested Control Statements; Jump Statements: break, continue, goto.	15 Hours

	Arrays and Strings: Defining and Declaring Arrays; Processing One-Dimensional and Multidimensional Arrays; Passing Arrays to Functions; String Handling Functions (strlen(), strcpy(), strcat(), strcmp()).	
3	Functions in C: Function Definition and Declaration; Function Prototypes; Passing Arguments to Functions (Call by Value, Call by Reference); Recursion in C. Pointers: Fundamentals of Pointers; Pointer Declarations and Operations; Passing Pointers to Functions; Pointers and One-Dimensional Arrays; Arrays of Pointers.	15 Hours
4	Dynamic Memory Allocation: malloc(), calloc(), realloc(), free(). Storage Classes: Automatic, External, Static, and Register Storage Classes. Structures and Unions: Defining and Using Structures; Arrays of Structures, Nested Structures; Unions and Differences from Structures File Handling in C: File Operations (fopen(), fclose(), fprintf(), fscanf(), fputs(), fgets()); File Modes and Working with Text and Binary Files.	15 Hours

iv. Suggested readings:

Text book:

1. Byron Gottfried, "Programming with C", Schaum's Outlines, Tata McGraw Hill.

Reference book:

1. Mullis Cooper, "Spirit of C": Jacob Publications.
2. Yashwant Kanetkar, "Let us C": BPB.
3. Kerninghan B.W. & Ritchie D. M., "The C Programming Language": PHI

v. Evaluation Pattern:

Components	Internal Assessment	Semester End Examination
Marks	30	70
Total Marks	100	

vi. Components of Internal Evaluation:

S. No.	Type of Assessment	Marks
1	Assignments & Presentations	10 marks
2	Class Test and House Test	5+10 Marks
3	Attendance (The marks would be given in the following manner: (75%-79.9%:1 Mark : 1; 80%-84.9%: 2; 85%-89.9%: 3; 90%-94.9%: 4 and 95%-100%: 5).	5 marks

vii. Instructions for the Paper Setter:

1. Pattern of Mid Semester Examination

S. No.	Particulars	Details
1	Maximum Marks	10 Marks
2	Number of Sections	2 (Section A & Section B)
3	Section A	Consists of five short-answer questions. All questions are compulsory. Each question carries 1 mark.

2. Pattern of End Semester Examination

Part	Section/Block	Questions Set	Questions to be Attempted	Marks per Question	Marks to be Attempted
A	Section/Block I	2	Any 1	14	14
B	Section/Block II	2	Any 1	14	14
C	Section/Block III	2	Any 1	14	14
D	Section/Block IV	2	Any 1	14	14
E	All Sections/Blocks (I, II & III)	10 Short-Answer Questions/MCQ	Any 7	2	14
Total	—	18 Questions	—	—	70 Marks

viii. Pass marks

S. No.	Requirement	Minimum Percentage
1	Pass in each individual component (CCE, ESE)	35%
2	Pass in aggregate of the subject	40%

Programming in C – Lab

BCA-DSC-103

S. No.	Course Code	Course Title	L	T	P	C	CH	Course Type
1	BCA-DSC-103	Programming in C – Lab	0	0	4	4	120	Core
Prerequisite		Students should have a basic understanding of C programming fundamentals, algorithms, and structured programming concepts.						
Course Coordinator		Dr.						

i. Course Objectives: The basic objective of this course is to develop practical skills in word processing, spreadsheets, presentations, and digital productivity tools for academic and professional applications.

ii. Course Outcomes: On completion of this course, the students are expected to

CO1	Develop fundamental programming skills in C, including data types, operators, and expressions.
CO2	Implement input/output operations, control statements, and looping constructs to solve real world problems.
CO3	Utilize arrays and strings for data manipulation and apply functions for modular programming.
CO4	Demonstrate the use of pointers for efficient memory management and data handling.
CO5	Apply dynamic memory allocation techniques and work with structures and unions for complex data management.
CO6	Perform file handling operations to read, write, and manage data using text and binary files.

iii. Syllabus:

Section	Contents	Contact Hours
1	Lab 1 Introduction to the C programming environment, setting up compilers, and writing a simple C program Lab 2 Understanding data types, variables, and constants through hands-on coding exercises Lab 3 Implementing arithmetic, relational, and logical operators in basic programs Lab 4 Writing programs to demonstrate assignment and conditional operators Lab 5 Using library functions for mathematical and character operations	30 Hours

2	Lab 6 Writing programs to take user input and display formatted output using scanf() and printf() Lab 7 Implementing character input/output functions: getchar(), putchar(), gets(), puts() Lab 8 Developing programs using branching statements (if, if-else, nested if, switch-case) Lab 9 Implementing looping constructs (for, while, do-while) with real-world applications Lab 10 Using jump statements (break, continue, goto) in program execution Lab 11 Creating, processing, and passing arrays to functions for numerical computations Lab 12 Implementing string handling functions and performing string operations	30 Hours
3	Lab 13 Defining and calling functions with and without arguments Lab 14 Demonstrating function prototypes, call by value, and call by reference Lab 15 Writing recursive functions for mathematical problems such as factorial and Fibonacci series Lab 16 Using pointers to access and manipulate variables and arrays Lab 17 Implementing array of pointers and pointer arithmetic operations Lab 18 Allocating and deallocating memory dynamically using malloc(), calloc(), realloc(), and free()	30 Hours
4	Lab 19 Defining and using structures for storing multiple data types Lab 20 Creating and manipulating arrays of structures and nested structures Lab 21 Implementing unions and understanding their differences from structures Lab 22 Performing file operations such as reading, writing, appending data in text and binary files Lab 23 Working with file handling functions including fopen(), fclose(), fprintf(), fscanf(), fputs(), and fgets() Lab 24 Developing mini-projects to integrate file handling, dynamic memory, and structures	30 Hours

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iv. Suggested Readings:

Text Book:

1. Byron Gottfried, “Programming with C”, Schaum’s Outlines, Tata McGraw Hill.

Reference Book:

1. Mullis Cooper, “Spirit of C”: Jacob Publications.
2. Yashwant Kanetkar, “Let us C”: BPB.
3. Kerninghan B.W. & Ritchie D. M., “The C Programming Language”: PHI

v. Evaluation Pattern:

Components	Internal Assessment	Semester End Examination
Marks	30	70
Total Marks	100	

vi. Components of Internal Evaluation:

S. No.	Type of Assessment	Marks
1	File record	10
2	Performance	10
3	Attendance	10

vii. Instructions for End Semester Exam:

S. No.	Type of Assessment	Marks
1	Performance	20 Marks
2	Written	20 Marks
3	Viva-Voce	20 Marks
4	Practical File/Record	10 Marks
	Total	70 Marks

Note:

1. For being Practical exam there will be no external paper setting by the Examination Branch.

Fundamentals of Computers and Office Productivity Tools – Lab

BCA-SEC-101

S. No.	Course Code	Course Title	L	T	P	C	CH	Course Type
1	BCA-SEC-101	Fundamentals of Computers and Office Productivity Tools - Lab	0	0	3	3	90	Core
Prerequisite		Students should have a basic understanding of computer fundamentals, digital literacy, and information technology concepts covered up to the +2 level.						
Course Coordinator		Dr.						

- i. **Course Objectives:** The basic objective of this course is to develop practical skills in word processing, spreadsheets, presentations, and digital productivity tools for academic and professional applications.

- ii. **Course Outcomes:** On completion of this course, the students are expected to

CO1	Create, format, and enhance professional documents using word processing software, including advanced features like mail merge and document automation.
CO2	Utilize spreadsheet software for data management and analysis by applying formulas, functions, charts, pivot tables, and conditional formatting.
CO3	Design and deliver effective presentations using multimedia elements, slide transitions, animations, and layout customization for impactful communication.
CO4	Apply advanced office productivity tools for document automation, data visualization, and multimedia integration.

iii. Syllabus:

Section	Contents	Contact Hours
1	Lab 1 Introduction to Word Processing a. Navigating the Word interface, toolbars, and menu options. b. Creating, saving, and opening documents in different formats (DOCX, ODT, PDF). c. Using AI productivity tools (ChatGPT, Copilot, Gemini) for document drafting and editing assistance. Lab 2 Text Formatting and Page Layout a. Applying font styles, colors, and effects. b. Adjusting paragraph alignment, line spacing, indentation, and page breaks. Lab 3 Working with Tables, Lists, and Columns a. Creating and formatting tables, bulleted and numbered	30 Hours

	lists, and multi-column layouts. Lab 4 Inserting Objects and Hyperlinks - Adding images, shapes, SmartArt, and hyperlinks. - Embedding online resources and cloud-based content links. Lab 5 Advanced Word Processing Features - Using headers, footers, page numbering, and watermarks. - Checking spelling, grammar, and using thesaurus tools. Lab 6 Mail Merge and Document Automation - Creating a mail merge document for letters, labels, and emails. - Using Excel as a data source for merging. - Sharing and collaborating on documents using Google Workspace and Microsoft 365.	
2	Lab 7 Introduction to Spreadsheets - Understanding rows, columns, cells, and worksheets. - Creating, saving, and opening spreadsheets. Lab 8 Data Entry, Formatting, and Editing - Entering and formatting text, numbers, and dates. - Using cell styles, themes, and conditional formatting. Lab 9 Basic Formulas and Functions - Performing arithmetic operations in spreadsheets. - Using basic functions: SUM, AVERAGE, MAX, MIN, COUNT. - Using IF, VLOOKUP, and HLOOKUP functions. Lab 10 Data Sorting, Filtering, and Validation - Sorting and filtering data using AutoFilter and advanced filters. - Applying data validation (drop-down lists, input restrictions). Lab 11 Working with Charts and Graphs - Creating bar, line, pie, and scatter charts. - Customizing chart styles, labels, and colors. - Introduction to data visualization and dashboard creation.	30 Hours

	Lab 12 Pivot Tables and Data Analysis a. Creating and modifying pivot tables. b. Performing basic data analysis using pivot charts. Lab 13 Importing, Exporting, and Printing a. Importing data from CSV, text files, and databases. b. Exporting data to different formats (PDF, CSV). c. Adjusting print settings: margins, headers, footers, and page layout.	
3	Lab 14 Introduction to Presentation Software a. Navigating the PowerPoint/Google Slides interface. b. Creating and managing slides. Lab 15 Formatting and Customizing Presentations a. Applying themes, slide layouts, and background styles. b. Using font and paragraph formatting options. c. Applying presentation design principles. Lab 16 Inserting and Managing Multimedia a. Adding images, tables, charts, SmartArt, and shapes. b. Inserting audio and video clips. c. Creating infographics and visual content. Lab 17 Animations and Slide Transitions a) Applying animations to text and objects. b) Using slide transitions for visual effects. c) Creating interactive presentations using hyperlinks and action buttons. Lab 18 Custom Slide Shows and Slide Master a. Using the Slide Master view for design consistency. b. Creating custom slide shows and presenter notes. c. Using Presenter View and delivery tools. Lab 19 Finalizing and Exporting Presentations a. Printing handouts and notes. b. Exporting presentations in different formats (PPTX, PDF, video). c. Collaborating through cloud-based presentation tools. d. Creating AI-assisted presentations and applying accessibility, copyright, and presentation ethics guidelines.	30 Hours

iv. Suggested Readings:

Text Book:

1. Peter Weverka, "Microsoft Office 2021 All-in-One for Dummies", Wiley, 2023

Reference Book:

1. Joan Lambert, Curtis Frye, "Microsoft Office Step by Step (Office 2021 and Microsoft 365)", Pearson, 2023.

v. Evaluation Pattern:

Components	Internal Assessment	Semester End Examination
Marks	25	50
Total Marks	75	

vi. Components of Internal Evaluation:

S. No.	Type of Assessment	Marks
1	File record	10
2	Performance	10
3	Attendance	5

vii. Instructions for End Semester Exam:

S. No.	Type of Assessment	Marks
1	Performance	10 Marks
2	Written	20 Marks
3	Viva-Voce	10 Marks
4	Practical File/Record	10 Marks
	Total	50 Marks

Note:

1. For being Practical exam there will be no external paper setting by the Examination Branch.

Accounting
BCA-MDC-101

S. No.	Course Code	Course Title	L	T	P	C	CH	Course Type
1	BCA-MDC-101	Accounting	3	0	0	3	45	Core
Prerequisite		Students should have a basic understanding of elementary mathematics, numerical aptitude, and business concepts acquired at the +2 level.						
Course Coordinator		Dr.						

i. Course Objectives:

- To provide a comprehensive understanding of the fundamental concepts, principles, and procedures of financial accounting.
- To develop the ability to record, classify, summarize, and interpret financial transactions for effective business reporting and decision-making.

ii. Course Outcomes: On completion of this course, the students are expected to

CO1	Understand the fundamental principles and conventions of accounting and cost accounting.
CO2	Record financial transactions using the double-entry system and prepare key financial statements.
CO3	Analyze and interpret final accounts, including trading, profit and loss accounts, and balance sheets.
CO4	Apply cost concepts, classification, and marginal costing techniques for business decision-making

iii. Syllabus:

Section	Contents	Contact Hours
1	Accounting: Meaning, Definition and objects of Accounting, Accounting Principles, Accounting concepts and Conventions, Principle of Double Entry System, Journal Entry, Ledger, Cash Book and Subsidiary books.	15 Hours
2	Trial Balance, Errors; types of errors and rectification of errors. Final Account: Manufacturing Account, Trading and Profit & Loss Account. Balance Sheet; Marshalling of Balance Sheet, types of Balance Sheet; vertical and horizontal.	15 Hours
3	Type of Accounting; Financial Accounting, Cost Accounting and Management Accounting. Distinction of Financial Accounting and Cost Accounting from Management Accounting. Nature and scope of Cost Accounting, Cost Concept and classification of costs. Preparation of Cost	15 Hours

	Sheet (Statement of Cost). Marginal Costing (BEP and Cost Volume Profit analysis).	
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iv. Suggested Readings:

Text & Reference Books:

1. Maheswari, S. N., "Fundamentals of Accounting", Vikas Publishing House.
2. Anthony, R.H. and Roece, J. S., "Accounting Principles", Homewood Illinois.
3. Hongren, Charles J. and Faster, "Cost Accounting: A Managerial Emphasis", Prentice Hall International.
4. Gupta, R. L., "Advanced Financial Accounting", Sultan Chand and Company.
5. Financial Accounting, Cost Accounting and Management Accounting, VK Global Publications Pvt. Ltd.
6. Financial Accounting, Cost Accounting and Management Accounting, Kalyani Publishers

v. Evaluation Pattern:

Components	Internal Assessment	Semester End Examination
Marks	25	50
Total Marks	75	

vi. Components of Internal Evaluation:

S. No.	Type of Assessment	Marks
1	Assignments & Presentations	10 marks
2	Class Test/House Test	10 Marks
3	Attendance (The marks would be given in the following manner: (75%-79.9%:1 Mark : 1; 80%-84.9%: 2; 85%-89.9%: 3; 90%-94.9%: 4 and 95%-100%: 5).	5 marks

vii. Instructions for the Paper Setter:

1. Pattern of Mid Semester Examination

S. No.	Particulars	Details
1	Maximum Marks	10 Marks
2	Number of Sections	2 (Section A & Section B)
3	Section A	Consists of five short-answer questions. All questions are compulsory. Each question carries 1 mark.

2. Pattern of End Semester Examination

Part	Section/Block	Questions Set	Questions to be Attempted	Marks per Question	Marks to be Attempted
A	Section/Block I	2	Any 1	10	10
B	Section/Block II	2	Any 1	10	10
C	Section/Block III	2	Any 1	10	10
D	Sections/Blocks (I, II & III)	5 Short-Answer Questions	All compulsory	2	10
D	All Sections/Blocks (I, II & III)	10 MCQ	All compulsory	1	10
Total	—	21 Questions	—	—	50 Marks

viii. Pass marks

S. No.	Requirement	Minimum Percentage
1	Pass in each individual component (CCE, ESE)	35%
2	Pass in aggregate of the subject	40%

Internet and Web Technologies
BCA-DSC-201

S. No.	Course Code	Course Title	L	T	P	C	CH	Course Type
1	BCA-DSC-201	Internet and Web Technologies	4	0	0	4	60	Core
Prerequisite		Students should have a basic understanding of computer fundamentals, Internet concepts, programming logic, and problem-solving techniques acquired through introductory computing courses.						
Course Coordinator		Dr.						

i. Course Objectives:

- To introduce the fundamental concepts, technologies, and standards of the Internet and World Wide Web, including client-side and server-side web development.
- To develop the knowledge and practical skills required to design, develop, and deploy interactive, responsive, and dynamic web applications using HTML, CSS, and PHP.

ii. Course Outcomes: On completion of this course, the students are expected to

CO1	Explain Internet technologies, web architecture, protocols, cloud deployment, web hosting, and web security concepts.
CO2	Develop static and interactive web pages using HTML, CSS, JavaScript, and DOM manipulation techniques.
CO3	Create server-side web applications using PHP by implementing variables, functions, form handling, validation, and JSON data processing.
CO4	Design database-driven web applications using PHP and MySQL, incorporating AJAX, version control tools, and secure web development practices

iii. Syllabus:

Section	Contents	Contact Hours
1	Introduction to the Internet and its applications, evolution of the World Wide Web (WWW), difference between WWW and the Internet. Intranet vs Internet. Internet protocols: HTTP, HTTPS, FTP, SMTP, IMAP, and POP3. Types of web pages: static, dynamic, and active. Introduction to web servers, URL structure, web browsers, search engines, DNS, proxy servers, and client-server architecture. Cloud Deployment and Web Hosting Basics . Introduction to Web Security and SSL (Secure Sockets Layer) Certificates	15 Hours
2	Structure of HTML documents, HTML tags and attributes, semantic elements, and formatting text (font, color, size). Creating and using HTML lists, tables, forms, images, and inserting links, comments, and horizontal rules. Introduction to CSS: external, internal, and inline styles, CSS rules, class selector, div & span tags. Styling properties: font, list, color, text	15 Hours

	alignment, and background images. Introduction to JavaScript and DOM (Document Object Model) Manipulation.	
3	Introduction to PHP, identifiers, variables, data types, scope of variables, operators, control structures (conditional statements and loops), functions, arrays, super globals (\$_GET, \$_POST, \$_SESSION,\$_COOKIE), handling user input, and form validation in PHP.JSON (JavaScript Object Notation) Handling in PHP	15 Hours
4	Advanced PHP concepts: file handling (reading, writing, uploading files), session and cookie management, error handling and debugging, object-oriented PHP (OOP), connecting PHP with MySQL, performing CRUD operations, prepared statements, and security measures (SQL injection prevention, XSS protection).AJAX (Asynchronous JavaScript and XML) with PHP for Dynamic Web Applications Version Control using Git and GitHub	15 Hours

iv. Suggested readings:

Text Books:

1. Raj Kamal, Internet and Web Technologies, Tata McGraw-Hill.
2. Ramesh Bangia, Multimedia and Web Technology, Firewall Media.
3. Jon Duckett, *JavaScript and jQuery: Interactive Front-End Web Development*, Wiley.

Reference Books:

1. Naveen Kumari, Internet Technologies, Eagle Prakashan, 2015.
2. Uttam K. Roy, Web Technologies, Oxford University Press.
3. Steven Holzner, The Complete Reference PHP, Tata McGraw-Hill.
4. A.S. Godbole & A. Kahate, Web Technologies, 3rd Edition, Tata McGraw-Hill, 2017.
5. R. Greenlaw & E. Hepp, Fundamentals of Internet and WWW, 2nd Edition, Tata McGraw-Hill, 2007.
6. B. Patel & L.B. Barik, Internet & Web Technology, Acme Learning Publisher.
7. Jackson, Web Technologies, Pearson Education, 2008.
8. Wendy Willard, HTML Beginner's Guide, Tata McGraw-Hill.
9. Ivan Bayross, Web Technologies Part II, BPB Publications.
10. Robin Nixon, *Learning PHP, MySQL & JavaScript: With jQuery, CSS & HTML5*, O'Reilly Media

v. Evaluation Pattern:

Components	Internal Assessment	Semester End Examination
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Marks	30	70
Total Marks	100	

vi. Components of Internal Evaluation:

S. No.	Type of Assessment	Marks
1	Assignments & Presentations	10 marks
2	Class Test and House Test	5+10 Marks
3	Attendance (The marks would be given in the following manner: (75%-79.9%:1 Mark : 1; 80%-84.9%: 2; 85%-89.9%: 3; 90%-94.9%: 4 and 95%-100%: 5).	5 marks

vii. Instructions for the Paper Setter:

1. Pattern of Mid Semester Examination

S. No.	Particulars	Details
1	Maximum Marks	10 Marks
2	Number of Sections	2 (Section A & Section B)
3	Section A	Consists of five short-answer questions. All questions are compulsory. Each question carries 1 mark.

2. Pattern of End Semester Examination

Part	Section/Block	Questions Set	Questions to be Attempted	Marks per Question	Marks to be Attempted
A	Section/Block I	2	Any 1	14	14
B	Section/Block II	2	Any 1	14	14
C	Section/Block III	2	Any 1	14	14
D	Section/Block IV	2	Any 1	14	14
E	All Sections/Blocks (I, II & III)	10 Short-Answer Questions/MCQ	Any 7	2	14
Total	—	18 Questions	—	—	70 Marks

viii. Pass marks

S. No.	Requirement	Minimum Percentage
1	Pass in each individual component (CCE, ESE)	35%
2	Pass in aggregate of the subject	40%

Data Structure
BCA-DSC-202

S. No.	Course Code	Course Title	L	T	P	C	CH	Course Type
1	BCA-DSC-202	Data Structure	4	0	0	4	60	Core
Prerequisite		Students should have successfully completed the Programming in C course and possess a sound understanding of programming fundamentals, algorithms, functions, arrays, pointers, and structured programming concepts.						
Course Coordinator		Dr.						

i. Course Objectives:

- To develop a comprehensive understanding of fundamental data structures, algorithmic design principles, and computational complexity for efficient problem-solving.
- To equip students with the knowledge and practical skills required to implement, analyze, and evaluate linear and non-linear data structures using appropriate programming techniques for real-world computing applications.

ii. Course Outcomes: On completion of this course, the students are expected to

CO1	Recognize and understand the usage of common data structures and analyze their efficiency using time complexity concepts.
CO2	Implement and use common data structures such as arrays, linked lists, stacks, queues, trees, heaps, and hash tables.
CO3	Analyze various data structures, their operations, and their applications in real-world computing problems.
CO4	Evaluate and select appropriate data structures, searching techniques, sorting methods, and hashing mechanisms for solving simple and complex computational problems.

iii. Syllabus:

Section	Contents	Contact Hours
1	Introduction to data structures: Concept, Data type, ADT, Need of Data Structure, Types of Data Structure- Linear Vs. non-linear data structure, Single and Multi-dimensional Arrays, Array Initialization, Array manipulations, Sparse Matrices. Algorithm Analysis and Time Complexity (Big-O Notation)	15 Hours
2	Stacks- Implementing stack using, Applications of stack, Prefix, Infix and Postfix expressions using stack,	15 Hours

	Limitations of Array representation of stack, Queues -Array representation of Queue, De-queue, Applications of Queue, Priority Queues; Linked Lists -Singly, Doubly and Circular Lists.Real-World Applications of Stacks, Queues, and Linked Lists	
3	Introduction to Tree, Binary Trees, Binary Search Trees, Operations on BST – create, Insert, delete,Tree traversals-preorder, inorder, postorder, Threaded Binary Trees and AVL Trees.Heap Trees and Priority Queues	15 Hours
4	Searching- Linear Search, Binary Search, Comparison of Linear and Binary Search, Sorting -Bubble Sort, Selection Sort, Insertion Sort, Shell Sort, Comparison of Sorting Techniques. Hashing and Hash Tables	15 Hours

iv. Suggested readings:

Text book:

1. Seymour Lipschutz, “Data Structures Schaums Series”, Prentice Hall India, New Delhi.

Reference books:

1. E.Horowitz and Shani, “Fundamentals of Computer algorithms”,
2. A.Aho, J.Hopcroft and J.Ullman, “The Design and Analysis of algorithms”,

v. Evaluation Pattern:

Components	Internal Assessment	Semester End Examination
Marks	30	70
Total Marks	100	

vi. Components of Internal Evaluation:

S. No.	Type of Assessment	Marks
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1	Assignments & Presentations	10 marks
2	Class Test and House Test	5+10 Marks
3	Attendance (The marks would be given in the following manner: (75%-79.9%:1 Mark : 1; 80%-84.9%: 2; 85%-89.9%: 3; 90%-94.9%: 4 and 95%-100%: 5).	5 marks

vii. Instructions for the Paper Setter:

1. Pattern of Mid Semester Examination

S. No.	Particulars	Details
1	Maximum Marks	10 Marks
2	Number of Sections	2 (Section A & Section B)
3	Section A	Consists of five short-answer questions. All questions are compulsory. Each question carries 1 mark.

2. Pattern of End Semester Examination

Part	Section/Block	Questions Set	Questions to be Attempted	Marks per Question	Marks to be Attempted
A	Section/Block I	2	Any 1	14	14
B	Section/Block II	2	Any 1	14	14
C	Section/Block III	2	Any 1	14	14
D	Section/Block IV	2	Any 1	14	14
E	All Sections/Blocks (I, II & III)	10 Short-Answer Questions/MCQ	Any 7	2	14
Total	—	18 Questions	—	—	70 Marks

viii. Pass marks

S. No.	Requirement	Minimum Percentage
1	Pass in each individual component (CCE, ESE)	35%
2	Pass in aggregate of the subject	40%

Data Structure Lab
BCA-DSC-203

S. No.	Course Code	Course Title	L	T	P	C	CH	Course Type
1	BCA-DSC-203	Data Structure Lab	0	0	4	4	120	Core
Prerequisite		Students should have a basic understanding of C programming, algorithms, and fundamental data structure concepts.						
Course Coordinator		Dr.						

i. Course Objectives:

- To develop practical skills in implementing linear and non-linear data structures using the C programming language for efficient data organization and manipulation.
- To enhance problem-solving and algorithmic thinking by designing, implementing, testing, and analyzing data structure algorithms for real-world computational applications.

ii. Course Outcomes: On completion of this course, the students are expected to

CO1	Implement linear and non-linear data structure operations using C programs
CO2	Solve problems implementing appropriate data structures
CO3	Implement sorting using relevant data structures
CO4	Implement searching and sorting algorithms using relevant data structures

iii. Syllabus:

Section	Contents	Contact Hours
1	Lab 1 Implement Two dimensional arrays using C language. Lab 2 WAP to convert the Sparse Matrix into non-zero form and vice-versa. Lab 3 WAP to reverse the order of the elements in the stack using additional stack. Lab 4 WAP to reverse the order of the elements in the stack using additional Queue. Lab 5 WAP to implement Diagonal Matrix using one-dimensional array. Lab 6 WAP to implement Lower Triangular Matrix using one-dimensional array. Lab 7 WAP to implement Upper Triangular Matrix using one-dimensional array.	30 Hours

2	Lab 8 Implement Circular Linked list. Lab 9 Write a c program using Stack operations using Linked List implementation. Lab 10 Perform Queues operations using Circular Array implementation. Lab 11 Create and perform different operations on Double-ended Queues using Linked List.	30 Hours
3	Lab 12 WAP to create a Binary Search Tree and include following operations in tree: (a) Insertion (b) Deletion by copying (c) Deletion by Merging (d) Search a no. in BST (e) Display its preorder, postorder and inorder traversals Recursively (f) Display its preorder, postorder and inorder traversals Iteratively (g) Display its level-by-level traversals (h) Count the non-leaf nodes and leaf nodes (i) Display height of tree (j) Create a mirror image of tree (k) Check whether two BSTs are equal or not Lab 13 WAP to create a Binary Tree as per inorder traversal, and implement operations like finding the successor / predecessor of an element, insert an element, inorder traversal. Lab 14 WAP to implement various operations on BST Tree.	30 Hours
4	Lab 15 WAP to implement Linear Search. Lab 16 WAP to implement Binary Search. Lab 17 WAP to implement Bubble Sort. Lab 18 WAP to implement Selection Sort. Lab 19 WAP to implement Insertion Sort.	30 Hours

iv. Suggested Readings:

Text Book:

1. Seymour Lipschutz , “Data Structures Schaums Series”, Prentice Hall India, New Delhi.

Reference Books:

1. E.Horowitz and Shani, “Fundamentals of Computer algorithms”
2. A.Aho, J.Hopcroft and J.Ullman, “The Design and Analysis of algorithms”

v. Evaluation Pattern:

Components	Internal Assessment	Semester End Examination
Marks	30	70
Total Marks	100	

vi. Components of Internal Evaluation:

S. No.	Type of Assessment	Marks
1	File record	10
2	Performance	10
3	Attendance	10

vii. Instructions for End Semester Exam:

S. No.	Type of Assessment	Marks
1	Performance	20 Marks
2	Written	20 Marks
3	Viva-Voce	20 Marks
4	Practical File/Record	10 Marks
	Total	70 Marks

Note:

1. For being Practical exam there will be no external paper setting by the Examination Branch.

Internet and Web Technologies- Lab
BCA-SEC-201

S. No.	Course Code	Course Title	L	T	P	C	CH	Course Type
1	BCA-SEC-201	Internet and Web Technologies- Lab	0	0	3	3	90	Core
Prerequisite		Students should have a basic understanding of computer fundamentals, Internet concepts, HTML, CSS, and programming logic.						
Course Coordinator		Dr.						

i. Course Objectives:

- To provide hands-on experience in the design, development, testing, and deployment of responsive and interactive web applications using contemporary web technologies.
- To develop proficiency in implementing client-side and server-side scripting, database integration, and secure web development practices for building dynamic web-based solutions.

ii. Course Outcomes: On completion of this course, the students are expected to

CO1	Develop interactive and responsive web pages using HTML for structure and CSS for styling and layout design.
CO2	Implement dynamic web applications using PHP with variables, functions, control structures, and form handling techniques.
CO3	Integrate PHP with MySQL databases to perform CRUD operations while ensuring data security and efficiency.
CO4	Apply advanced PHP concepts such as file handling, session management, OOP, and security measures to build scalable web applications.

iii. Syllabus:

Section	Contents	Contact Hours
1	Lab 1: Introduction to HTML - Basic HTML document structure - Understanding tags, elements, attributes - Formatting text (headings, paragraphs, bold, italic, underline) Exercise: Create a simple webpage with headings and paragraphs Lab 2: Working with Lists, Tables, and Forms - Ordered, unordered, and definition lists - Creating tables (rows, columns, headers, merging cells)	30 Hours

	- HTML Forms (text inputs, radio buttons, checkboxes, select dropdowns, textarea, buttons) Exercise: Build a Contact Form with validation Lab 3: Inserting Images, Links, and Comments - Adding images (tag, alt attributes) - Internal & external links () - Adding comments (<!-- comment -->) - Exercise: Create an Image Gallery with navigation Lab 4: Introduction to CSS - CSS Selectors (id, class, element) - External, internal, and inline CSS - Styling text (fonts, colors, sizes) - Exercise: Style a webpage with different fonts and colors Lab 5: Styling with CSS - Box model (margin, padding, border) - Background images and colors - CSS positioning (relative, absolute, fixed, sticky) - Exercise: Create a webpage layout using div and span Lab 6: Responsive Design & Mini Project - Media queries for responsive design - Creating a mobile-friendly layout - Mini-Project: Personal Portfolio Website	
2	Lab 7: Introduction to PHP & Setup - Install XAMPP/WAMP - Running PHP scripts (.php file) - PHP Syntax, Echo & Print Exercise: Print "Hello, World!" using PHP Lab 8: Variables, Data Types, and Operators - Declaring variables - Data types (string, integer, float, boolean, array) - Operators (arithmetic, comparison, logical) - Exercise: Create a basic calculator	30 Hours

	Lab 9: Conditional Statements & Loops • If, else, elseif, switch-case • Loops (for, while, do-while, foreach) • Exercise: Display even and odd numbers using loops Lab 10: Functions and Arrays • Creating and using functions • Passing arguments, returning values • Arrays (indexed, associative, multidimensional) • Exercise: Store student marks in an associative array and calculate total and average Lab 11: Superglobals & Form Handling • \$_GET, \$_POST, \$_SESSION, \$_COOKIE • Handling form submission • Sanitizing user input • Exercise: Create a login form with \$_POST method Lab 12: Form Validation & Mini-Project • Validating required fields, email, numbers • Displaying validation errors • JSON (JavaScript Object Notation) encoding and decoding in PHP • Mini-Project: User Registration Form with validation	
3	Lab 13: File Handling • Reading and writing files • Uploading and processing files • Exercise: Create a profile upload system Lab 14: Sessions and Cookies • Creating and managing sessions • Setting and retrieving cookies • Exercise: Build a simple e-commerce cart system Lab 15: Error Handling and Debugging • Using try-catch • Logging errors to a file • Exercise: Implement custom error handling	30 Hours

	Lab 16: Object-Oriented PHP (OOP) • Classes, objects, constructors • Inheritance, encapsulation • Exercise: Build a user management system with OOP Lab 17: Connecting PHP with MySQL (CRUD Operations) • Database connection (mysqli & PDO) • Performing CRUD (Create, Read, Update, Delete) • Mini-Project: Student Record Management System Lab 18: Security Measures & Final Project • Preventing SQL Injection with prepared statements • Cross-site scripting (XSS) protection • AJAX (Asynchronous JavaScript and XML) with PHP • Version Control using Git and GitHub • Final Project: Blog System with Authentication & CRUD	
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iv. Suggested Readings:

Text Books:

1. Raj Kamal, Internet and Web Technologies, Tata McGraw-Hill.
2. Ramesh Bangia, Multimedia and Web Technology, Firewall Media.

Reference Books:

1. Naveen Kumari, Internet Technologies, Eagle Prakashan, 2015.
2. Uttam K. Roy, Web Technologies, Oxford University Press.
3. Steven Holzner, The Complete Reference PHP, Tata McGraw-Hill.
4. A.S. Godbole & A. Kahate, Web Technologies, 3rd Edition, Tata McGraw-Hill, 2017.
5. R. Greenlaw & E. Hepp, Fundamentals of Internet and WWW, 2nd Edition, Tata McGraw-Hill, 2007.
6. B. Patel & L.B. Barik, Internet & Web Technology, Acme Learning Publisher.
7. Jackson, Web Technologies, Pearson Education, 2008.
8. Wendy Willard, HTML Beginner's Guide, Tata McGraw-Hill.
9. Ivan Bayross, Web Technologies Part II, BPB Publications.
10. Ivan Bayross, Web Enabled Commercial Application Development Using HTML, JavaScript, DHTML, and PHP, 4th Edition, BPB Publications, 2013.
11. Kogent Learning, Web Technologies: HTML, JavaScript, PHP, Java, JSP, AJAX Black Book, Wiley India Pvt. Ltd.
12. Naramore & Boronczyk, Beginning PHP, Apache, MySQL Web Development, Wiley India Pvt. Ltd.

v. Evaluation Pattern:

Components	Internal Assessment	Semester End Examination
Marks	25	50
Total Marks	75	

vi. Components of Internal Evaluation:

S. No.	Type of Assessment	Marks
1	File record	10
2	Performance	10
3	Attendance	5

vii. Instructions for End Semester Exam:

S. No.	Type of Assessment	Marks
1	Performance	10 Marks
2	Written	20 Marks
3	Viva-Voce	10 Marks
4	Practical File/Record	10 Marks
	Total	50 Marks

Note:

- 1. For being Practical exam there will be no external paper setting by the Examination Branch.**