

**PUNYASHLOK AHILYADEVI HOLKAR
SOLAPUR UNIVERSITY, SOLAPUR**



NAAC Accredited-2015
'B' Grade (CGPA 2.62)

Name of the Faculty: Science and Technology

**Multiple Entry and Multiple Exit Option
(NEP-2020)**

**Syllabus: BCA (Science) Part-I
(NEP-2020)**

**Name of the Programme: BCA (Science)-I
(Sem-I and II)**

(Syllabus to be implemented w.e.f. June 2024)

Punyashlok Ahilyadevi Holkar Solapur University, Solapur

BCA (Science) - I Year Syllabus

(Semester – I and II)

Multiple Entry and Multiple Exit Option (NEP-2020)

With Effect from June 2024

Punyashlok Ahilyadevi Holkar Solapur University, Solapur

BCA (Bachelor of Computer Application)

Preamble:

Bachelor of Computer Applications (BCA) is a four year under Graduate Programme. The Course is designed to bridge the gap between IT industries and Academic institutes by incorporating the latest development, into the Curriculum and to give students a complete understanding within a structured framework. The Course helps the students to build-up a successful Career in Computer Science and for pursuing higher studies in Computer Science.

Objectives of the Programme:

1. Demonstrate the ability to adapt to technological changes and innovations in the discipline.
2. Develop computer programs using functional programming and object-oriented programming paradigms.
3. To train students in professional skills related to Software Industry.
4. To prepare the necessary knowledge base for research and development in Computer Science.
5. To help students build-up a successful career in Computer Science and to produce entrepreneurs who can innovate and develop software products.
6. An ability to apply knowledge of mathematics, statistics and computer science in practice.
7. An ability to enhance not only a comprehensive understanding of the theory but its application too in diverse fields.
8. The program prepares the young professional for a range of computer applications, computer organization, and techniques of Computer Networking, Software Engineering, Web Development, Database management and Advance Java.
9. An ability to design a computing system to meet desired needs within realistic constraints such as safety, security and applicability in multidisciplinary teams with a positive attitude.
10. In order to enhance the programming skills of the young IT professionals, the program has introduced the concept of project development in each language/technology learned during the curriculum.

Eligibility for BCA (Bachelor of Computer Application):

The candidate passing the Higher Secondary Examination Conducted by the Maharashtra State Board of Higher Secondary Education with Arts/Commerce/Science stream or its equivalent or any Diploma of not less than two years.

Programme Outcomes (PO):

These outcomes describe what students are expected to know and can do by the time of graduation. They relate to the skills, knowledge, and behavior's that students acquire in their graduation through the program

Programme Outcomes for BCA (Bachelor of Computer Application):

The BCA (Bachelor of Computer Application) programme enables students to attain, by the time of graduation:

- PO1:** Design and develop software based solutions for real life problems, serving effectively to the requirements of computer field and Society.
- PO2:** Attain sufficient knowledge related to computer domains, possesses technical, soft and hard skills and apply them effectively in team work.
- PO3:** Ability to link knowledge of Computer Science with other two chosen auxiliary disciplines of study.
- PO4:** Display ethical code of conduct in the usage of Internet and Cyber systems.
- PO5:** Ability to pursue higher studies of specialization and to take up technical employment.
- PO6:** Identify, formulate and analyze complex real-life problems in order to arrive at computationally viable conclusions using fundamentals of mathematics, computer sciences, management and relevant domain disciplines.
- PO7:** Ability to operate, manage, deploy, configure computer network, hardware, and software operation of an organization.
- PO8:** Apply standard Software Engineering practices and strategies in real-time software project development.
- PO9:** Design and develop computer programs/computer -based systems in the areas related to algorithms, networking, web design, cloud computing, IoT and data analytics.
- PO10:** Acquaint with the contemporary trends in industrial/research settings and thereby innovate novel solutions to existing problems
- PO11:** The ability to apply the knowledge and understanding noted above to the analysis of a given information handling problem.
- PO12:** The ability to work independently on a substantial software project and as an effective team member.

Punyashlok Ahilyadevi Holkar Solapur University, Solapur
Faculty of Science and Technology
Multiple Entry and Multiple Exit Option (w.e.f. 2024-25) NEP-2020

LEVEL - 4.5

First Year Undergraduate

Subject/ Core Course	Name and Type of the Paper		Hrs./week			Total Marks Per	UA	CA	Credits
	Type	Name	Lect ures	Theory	Practical	Paper			
BCA (Science) - I Semester-I									
Major	DSC1-1	Office Automation	2	--	--	50	30	20	2
	Practical based on DSC1-1		--	--	4	50	30	20	2
	DSC2-1	Programming using 'C'-I	2	--	--	50	30	20	2
	Practical based on DSC2-1		--	--	4	50	30	20	2
	DSC3-1	Python-I	2	--	--	50	30	20	2
	Practical based on DSC3-1		--	--	4	50	30	20	2
Vocational and Skill Enhancement Courses (SEC/VSC)	SEC1	Computational Mathematics	2	--	--	50	30	20	2
Ability Enhancement Course (AEC)	L1-1	English	2	--	--	50	30	20	2
Indian Knowledge System	IKS Major		2	--	--	50	30	20	2
Value Education Courses	VEC1	Constitution of India	2	--	--	50	30	20	2
Co-curricular Courses	CC1		2	--	--	50	30	20	2
Semester-I Total			16	0	12	550	330	220	22
BCA (Science) - I Semester-II									
Major	DSC1-2	Digital System	2	--	--	50	30	20	2
	Practical based on DSC1-2		--	--	4	50	30	20	2
	DSC2-2	Programming using 'C'-II	2	--	--	50	30	20	2
	Practical based on DSC2-2		--	--	4	50	30	20	2
	DSC3-2	Python-II	2	--	--	50	30	20	2
	Practical based on DSC3-2		--	--	4	50	30	20	2
Vocational and Skill Enhancement Courses (SEC/VSC)	SEC2	Basics of Web Technology	2	--	--	50	30	20	2

Generic/ Open Elective Courses	GE1/ OE1	E-Commerce	2	--	--	50	30	20	2
Ability Enhancement Course (AEC)	L1-2	English	2	--	--	50	30	20	2
Value Education Courses	VEC2	Environmental Science	2	--	--	50	30	20	2
Co-curricular Courses	CC2		2	0	--	50	30	20	2
Semester-II Total			16	0	12	550	330	220	22
Grand Total			32	0	24	1100	660	440	44

Abbreviations:

Discipline Specific Course: DSC;

Generic/ Open Electives: OE;

Vocational Skill Courses: VSC;

Skill Enhancement Courses: SEC;

Indian Knowledge System: IKS;

Value Education Courses: VEC;

Vocational Skill and Skill Enhancement Courses: VSEC;

Co-curricular Courses: CC;

Ability Enhancement Courses: AEC;

Skill Enhancement Courses: SEC

Total Credits for BCA (Science)-I (Semester I and II): 44
Medium of instruction: English
I. Practical Examination is the Semester wise after theory Examination. II. Duration of Practical Examination as per respective BOS guidelines. III. 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 complete the courses equivalent to a minimum of 44 credits and an additional. 4credits core NSQF course/Internship.
Course Structure: Lectures and Practical's should be conducted as per the scheme of lectures and practical's indicated in the course structure.
Teaching and Practical Scheme I. Contact session for teaching 60 minutes each. II. One Practical Batch should be of 20 students.
Assessment I. The final practical examination will be conducted by the University appointed examiners internal as well as external at the end of the semester for each lab course and marks will be submitted to the university by the panel. II. The practical examination will be conducted semester-wise to maintain the relevance of the respective theory course with the laboratory course. III. The final examinations shall be conducted at the end of the semester.
Practical Examination: I. Each paper carries 30 Marks. II. Duration of Practical Examination: 2 Hrs. III. Nature of Question Paper: There will be four questions of 10 Marks each. Students will attempt anytwo out of four questions. IV. Certified Journal carries 5 Marks and Viva voce carries 5 Marks.
Standard of Passing: I. Minimum 12 marks in each subject. There shall be separate passing for theory (semester end exam and Internal) and practical also.
Board of Paper Setters /Examiners: For each semester-end examination, there will be a board of Paper setters and examiners for every course. While appointing paper setters/examiners, care should be taken to see that there is at least one person specialized in each unit of the course.
Credit system implementation: As per the University norm's.
Fees Structure: As approved by the PAHS University fee fixation committee.
Intake Capacity: 60

Type: DSC1-1 (Major)

BCA-I (Semester-I)

Course Title: Office Automation

Credits: Theory – (2),

Practical's – (2)

Total Lectures: 30 Hrs.

Contact Hrs. (L): 2

University Evaluation: 30 Marks

Internal Evaluation: 20 Marks

Course Objectives:

- 1) To provide an in-depth training in use of office automation, internet and internet tools. The course also helps the candidates to get acquainted with IT.
- 2) To help the students to understand how to format, edit, and print text documents and prepare for desktop publishing.
- 3) To create various documents newsletters, brochures, making document using photographs, charts, presentation, documents, drawings and other graphic images.
- 4) To work with the worksheet and presentation software..

Course Outcomes: At the end of this course, the student should be able to

- 1) Integrate both graphs and tables created in Microsoft Excel into a laboratory report in Microsoft Word.
- 2) Generate equations, sample calculations, and basic diagrams in Microsoft Word.
- 3) Input experimental data into Microsoft Excel.
- 4) Perform calculations in Microsoft Excel using both manually inputting formulas and built-in Functions.
- 5) Generate simple and effective tables and graphs to describe experimental data in Microsoft Excel.
- 6) Properly format and organize a formal laboratory report in Microsoft Word.

Unit No.	Description	No. of Lectures
I	<p>Introduction to Computer: Applications of Computer, Advantages of Computer, Characteristics of Computer, Hardware and Software.</p> <p>Windows: Desktop icons and their functions: My computer, My documents, Network neighborhood, Recycle Bin, Quick launch tool bar, System tray, Start menu, Task bar, Dialog Boxes: List Box, Spin Control Box, Slide, Drop-down list, Radio button, Check box, Text box, Task Bar - System Tray - Quick launch tool bar - Start button - Parts of Windows -Title bar, Menu bar , Scroll bar, Status bar, Maximize, Minimize, close and Resize and Moving a Window, Keyboard Accelerators: Key board short keys or hotkeys.</p> <p>MS Word: Working with Documents -Opening and Saving files, Editing text documents, Inserting, Deleting, Cut, Copy, Paste, Undo, Redo, Find, Search, Replace, Formatting page and setting Margins, Converting files to different formats, Importing and Exporting documents, Sending files to others, Using Tool bars, Ruler, Using Icons, using help.</p> <p>Formatting Documents: Setting Font styles, Font selection- style, size, colour etc, Type face - Bold, Italic, Underline, Case settings, Highlighting, Special symbols, Setting Paragraph style, Alignments, Indents, Line Space, Margins, Bullets and Numbering.</p> <p>Setting Page style: Formatting Page, Page tab, Margins, Layout settings, Paper tray, Border and Shading, Columns, Header and footer, Setting Footnotes and end notes – Shortcut Keys; Inserting manual page break, Column break and line break, Creating sections and frames, Anchoring and Wrapping, Setting Document styles, Table of Contents, Index, Page Numbering, date and Time, Author etc., Creating Master Documents, Web page.</p> <p>Creating Tables: Table settings, Borders, Alignments, Insertion, deletion, Merging, Splitting, Sorting, and Formula.</p>	18

	<p>Drawing: Inserting Clip Arts, Pictures/Files etc.</p> <p>Tools: Word Completion, Spell Checks, Mail merge, Templates, Creating contents for books, Creating Letter/Faxes, Creating Web pages, Using Wizards, Tracking Changes, Security, Digital Signature. Printing Documents – Shortcut keys.</p>	
II	<p>MS Excel: Spread Sheet and its Applications, Opening Spreadsheet, Menus - main menu, Formula Editing, Formatting, Toolbars, Using Icons, Using help, Shortcuts, Spreadsheet types. Working with Spreadsheets- opening, Saving files, setting Margins, Converting files to different formats (importing, exporting, sending files to others), Spread sheet addressing - Rows, Columns and Cells, Referring Cells and Selecting Cells – Shortcut Keys.</p> <p>Entering and Deleting Data: Entering data, Cut, Copy, Paste, Undo, Redo, Filling Continuous rows, columns, Highlighting values, Find, Search and replace, Inserting Data, Insert Cells, Column, rows and sheets, Symbols, Data from external files, Frames, Clipart, Pictures, Files etc, Inserting Functions, Manual breaks.</p> <p>Setting Formula: Finding total in a column or row, Mathematical operations (Addition, Subtraction, Multiplication, Division, Exponentiation), using other Formulae.</p> <p>Formatting Spreadsheets: Labeling columns and rows, Formatting- Cell, row, column and Sheet, Category-Alignment, Font, Border and Shading, Hiding/ Locking Cells, Anchoring objects, Formatting layout for Graphics, Clipart etc., Worksheet Row and Column Headers, Sheet Name, Row height and Column width, Visibility - Row, Column, Sheet, Security, Sheet Formatting and style, Sheet background, Colour etc, Borders and Shading ,Shortcut keys.</p> <p>Working with sheets: Sorting, Filtering, Validation, Consolidation, and Subtotal.</p> <p>Creating Charts: Drawing. Printing. Using Tools – Error checking, Formula Auditing, Creating and Using Templates, Pivot Tables, Tracking Changes, Security, Customization.</p> <p>MS Power point: Presentation – Opening new presentation, Different presentation templates, setting backgrounds, selecting presentation layouts.</p> <p>Creating a presentation: Setting Presentation style, Adding text to the Presentation.</p> <p>Formatting a Presentation: Adding style, Colour, gradient fills, Arranging objects, Adding Header and Footer, Slide Background, Slide layout. Adding Graphics to the Presentation- Inserting pictures, movies, tables etc into presentation, Drawing Pictures using draw.</p> <p>Adding Effects to the Presentation: Setting Animation and transition effect. Printing Handouts, Generating Standalone Presentation viewer.</p> <p>MS Access: Introduction, Planning a Database, Starting Access, Access Screen, Creating a New Database, Creating Tables, Working with Forms, Creating queries, Finding Information in Databases, Creating Reports, Types of Reports, Printing and Print Preview – Importing data from other databases viz. MS Excel etc.</p>	12

Reference Books:

1. Information Technology in Business: Principles, Practices, and Opportunities by James A Senn, Prentice Hall.
2. Technology and Procedures for Administrative Professionals by Patsy Fulton-Calkins, Thomson Learning.
3. Computer Fundamental MS Office-Including Internet and Web Technology: Anupama Jain, Avneet Mehra
4. The Complete Reference: Virginia Andersen, McGraw Hill
5. MS Office 2007 in a Nutshell: S. Saxena, Vikas Publications

6. MS-Office 2007 Training Guide: S. Jain, BPB Publications
7. Learning Computer Fundamentals, MS Office and Internet and Web Technology: D. Mai dasani. Reading, Vols. 1 and 2. Macmillan, 1975, Bhasker, W. W. S. and Prabhu, N. S.

BCA-I (Semester-I)
Course Title: Practical based on DSC1-1 (Major)
Credits: Practical's – (2)

Total Lectures: 60 Hrs.

Contact Hrs. (L): 4

University Evaluation: 30 Marks

Internal Evaluation: 20

List of Assignments (MS Word)

1. Create a news-paper document with at least 200 words,
 - a. Use margins as, top:1.5, bottom:2, left:2, right:1 inches.
 - b. Use heading “Gandhi Jayanti”, font size: 16, font color: red, font face: Arial Black.
 - c. With first letter “dropped” (use drop cap option) of the first paragraph containing a picture at the right side
 - d. Use three columns from the second paragraph onwards till the half of the page.
 - e. Then use heading “Computer basics”
 - f. Create paragraph using two columns till the end of the page.
2. Create a Mathematical question paper using, at least five equations
 - a. With fractions, exponents, summation function
 - b. With at least one “m*n” matrix
 - c. Basic mathematical and geometric operators.
 - d. Use proper text formatting, page color and page border.
3. Create a flowchart using,
 - a. Proper shapes like ellipse, arrows, rectangle, and parallelogram.
 - b. Use grouping to group all the parts of the flowchart into one single object.
4. Create a table using table menu with,
 - a. At least 5 columns and 10 rows.
 - b. Merge the first row into one cell.
 - c. Merge the second row into one cell, then split the second row into three cells.
 - d. Use proper table border and color.
 - e. Insert proper content into the table with proper text formatting.
5. Create a table using two columns,
 - a. The left column contains all the short-cut keys and right side column contains the function of the short-cut keys.
 - b. Insert a left column using layout option. Name the heading as Serial No.
6. Create two letters with the following conditions in Ms Word and find the difference.
 - a. Write a personal letter to your friend using at least 100 words and two paragraphs. The date must be in top-right corner. Use „justify“ text alignment and 1.5 line spacing for the body of the letter. Letter must contain proper salutation and closing.
 - b. Use step by step mail-merge wizard to design a letter. (Mailing step by step mail merge wizard letters start from a template select template letters select proper template create new document OK)
7. Create a letter, which must be sent to multiple recipients.
 - a. Use Mail-Merge to create the recipient list.
 - b. Use excel sheet to enter the recipient.
 - c. Start the mail merge using letter and directory format. State the difference.

List of Assignments (MS Excel)

1. Create a table “Student result” with following conditions.
 - a. The heading must contain, Sl. No., Name, Mark1, Mark2, Mark3, Total, average and result with manual entry.
 - b. Use formulas for total and average.
 - c. Find the name of the students who has secured the highest and lowest marks.
 - d. Round the average to the nearest highest integer and lowest integer (use ceiling and floor function respectively).
2. Do as directed
 - a. Create a notepad file as per the following fields Slno. name th1 th2 th3 th4 th5 total % grade
 - b. Import this notepad file into excel sheet using „data from text“ option.
 - c. Grade is calculated as, i. If %>=90, then grade A ii. iii. If %>=80 and <90, then grade B If %>=70 and <80, then grade C iv. If %>=60 and <70, then grade D v. If %<60, then grade F

3. Create a sales table using the following data,

Item	Year1	Year2	Year3	Year4
Item1	1000	1050	1100	1200
Item2	950	1050	1150	1200
Item3	1100	1200	1200	1300

- Draw the bar-graph to compare the sales of the three items for four years using insert option.
- Draw a line-graph to compare the sales of three items for four years using insert option.
- Draw different pie-charts for the given data using insert option.
- Use condition, to highlight all the cells having value ≥ 1000 with red color (use conditional formatting).

List of Assignments (MS PowerPoint)

- Create a power-point presentation with minimum 5 slides.
 - The first slide must contain the topic of the presentation and name of the presentation.
 - Must contain at least one table.
 - Must contain at least 5 bullets, 5 numbers.
 - The heading must be, font size:32, font-face: Arial Rounded MT Bold, font-color: blue.
 - The body must be, font size: 24, font-face: Comic Sans MS, font-color: green. f. Last slide must contain “thank you”.
- Create a power-point presentation with minimum 10 slides 23
 - Use word art to write the heading for each slides.
 - Insert at least one clip-art, one picture
 - Insert at least one audio and one video
 - Hide at least two slides
- Create a power-point presentation with minimum
 - 5 slides
 - Use custom animation option to animate the text; the text must move left to right one line at a time.

List of Assignments (MS Access)

- Create a database “Student” with,
 - At least one table named “mark sheet” with field name “student name, roll number, mark1, mark2, mark3, mark4, total”
 - The data types are, student name: text, roll number: number, mark1 to mark4: number, total: number. Roll number must be the primary key.
 - Enter data in the table. The total must be calculated using update query.
 - Use query for sorting the table according to the descending/ascending order of the total marks.
- With addition to the table above,
 - Add an additional field “result” to the “mark sheet” table.
 - Enter data for at least 10 students c. Calculate the result for all the students using update queries, if total ≥ 200 , then pass, else fail.
 - Search the students, whose name starts with “sh”.
 - Show the names and total marks of the students who have passed the examination.

Type: DSC2-1 (Major)

BCA-I (Semester-I)

Course Title: Programming using 'C'-I

Credits: Theory – (2) Practical's – (2)

Total Lectures: 30 Hrs.

Contact Hrs. (L): 2

University Evaluation: 30 Marks

Internal Evaluation: 20 Marks

Course Objectives:

- 1) To understand the various steps in Program development.
- 2) To understand the basic concepts in C Programming Language.
- 3) To learn how to write modular and readable C Programs
- 4) To learn to write programs (using structured programming approach) in 'C' to solve problems
- 5) To build efficient programs in "C" language essential for future programming.

Course Outcomes:

- 1) Able to understand the basic concepts of C programming language.
- 2) Enhance skill on problem solving by constructing algorithms
- 3) Students will be able to comprehend the general structure of C program, concepts of variable, datatype, and operator and be able to create a C program to demonstrate these concepts.
- 4) Able to design and develop various programming problems using C programming concepts.
- 5) Understand and use various constructs of the programming language such as conditionals, iteration.
- 6) Demonstrate the use of strings and string handling functions
- 7) Apply skill of identifying appropriate programming constructs for problem solving.

Unit No.	Description	No. of Lectures
I	<p>Programming Methodology: Definition of Problem , Problem solving steps, Programming planning tools, Definition of Logic, Types of logic- Sequence, Selection, Iteration</p> <p>Algorithm- Definition, Characteristics, Examples of algorithm.</p> <p>Flowchart- Definition, Characteristics , flowchart symbols, Examples converts algorithms to flowchart</p> <p>Pseudo Code- Definition, characteristics, Examples</p> <p>Introduction to 'C': History of 'C' language, Features of 'C' language, Applications of C language, Structure of 'C' program, Compilation and execution of program.</p> <p>'C' Fundamentals: 'C' tokens- Keywords , Identifier, Special symbols ('C' character sets), Variables, Constants, Data types- Primitive, Derived, User defined, Operators- Arithmetic, Logical, Assignment, Relational, Bitwise, Conditional, Increment, Decrement, sizeof, comma operator etc., Type casting or type conversion , Use of 'typedef' and 'enum'.</p> <p>Data input and output operations: Introduction to input and output operations, Introduction to different header files and its use, stdio.h header file functions - printf(), scanf(), getchar(), putchar(), Different format specifier with their use, Different back slash (escape sequence) character constants with their use</p>	12
II	<p>Control Statements: Introduction, Types of control statements Selective or Decision making -Different forms of if statement , switch statement , Conditional (ternary) operator, Iterative or looping statement -While loop , do-while loop , for loop Unconditional branching (jump) Statement - break, continue, goto.</p> <p>Arrays: Introduction of an array, Types of an array -One dimensional array, Two dimensional array, Multidimensional array, Declaration and initialization of an array, Memory allocation of an array.</p> <p>Character array (string)- Declaration, Operation on string, Inbuilt String functions.</p>	18

Reference Books

- 1) Programming in ANSI-C – E. Balgurusamy, 8th edition, MCGraw Hill Publication
- 2) The C programming Language - Ritchie and Kernighan, 2nd Edition, Pearson
- 3) Programming through C Language, Dr. Tulashiram B. Pisal and Mr. Balasaheb J. Kshirsagar, InSc Publishing House(IPH)
- 4) Let Us C - Y.C. Kanetkar, 15th edition, BPB Publication

BCA-I (Semester-I)
Course Title: Practical based on DSC2-1
Credits: Practical's – (2)

Total Lectures: 60 Hrs.

University Evaluation: 30 Marks

Contact Hrs. (L): 4

Internal Evaluation: 20

1. Write a program to check a given number is prime or not
2. Write a program to check a given number is palindrome or not
3. Write a program to check a given number is perfect or not
4. Write a program to check a given number is Armstrong or not
5. Write a program to check a given number is strong or not
6. Write a program to display prime numbers between 1 to 1000
7. Write a program to display the first 100 prime numbers.
8. Write a program to find the smallest and largest element from an array
9. Write a program to search for an element in an array
10. Write a program to display diagonal elements from a given matrix.
11. Write a program to display the transpose of a given matrix.
12. Write a program to display the addition and multiplication of two matrices.
13. Write a program to count vowels from a given string
14. Write a program to find the length of a given string without using the library function.

Type: DSC3-1 (Major)
BCA-I (Semester-I)
Course Title: Python-I
Practical's – (2)

Credits: Theory – (2)

Total Lectures: 30 Hrs.

University Evaluation: 30 Marks

Contact Hrs. (L): 2

Internal Evaluation: 20 Marks

Course Objectives:

1. To learn the fundamentals of python Programming
2. To learn different data structures used in Python
3. To learn different control statements used in logic development.
4. To learn the various operations on the array, list, tuple, string, set, and dictionary.

Course Outcomes:

On completion of this course, the students will be able to:

1. Understand the basic concepts and applications of Python.
2. Design, create, build, and debug python applications.
3. Explore Integrated Development Environment (IDE).
4. Write and apply decision structures for different operations.
5. Write loop structures to perform iterative tasks.

Unit No.	Description	No. of Lectures
I	<p>Introduction to Python: Features of python, steps for execution of python program, python virtual machine, memory management, garbage collection, Installation of python software, setting the path to operating system environment, writing the first python program, executing a python program.</p> <p>Datatypes in python: Datatypes, type conversion- implicit and explicit, comments, literals, constants, Identifiers, naming conventions, operators, operator precedence and associativity, input and output statements, command-line arguments.</p> <p>Control Statements: if statement, if..else statement, if..elif..else statement, while loop, for loop, else suite, infinite loop, nested loops, word indentation, break statement, continue statement, pass statement, assert statement, return statement.</p>	15
II	<p>Functions: Difference between function and method, defining a function, calling function, returning result from a function, returning multiple values from a function, functions are objects, formal and actual arguments, types of arguments, local, nonlocal and global variables, global keyword, recursive functions, anonymous functions or lambdas, using lambdas with filter(), map() and reduce() functions</p> <p>Arrays in Python: Concept of array, advantages of array, creating an array, importing array module, indexing and slicing on arrays, methods of array module, types of arrays.</p> <p>String, List, Tuple, Set and Dictionary: Creating string, manipulating different operations on string, creating list, manipulating different operations on list, list comprehensions, creating tuple, manipulating different operations on tuple, creating set, manipulating different operations on set, creating dictionary, manipulating different operations on dictionary.</p>	15

Reference Books

1. Python: The Complete Reference by Martin C. Brown.
2. Core Python Programming, Dreamtech publications, by R. Nageswara Rao.
3. Python Programming, A modular approach, First Edition, Pearson, by Taneja Sheetal
4. Learning with Python, Dreamtech publications, by Allen Downey
5. Python Programming for the Absolute Beginner by Michael Dawson-Cengage Learning.

BCA-I (Semester I)
Course Title: Practical based on DSC3-1

Credits: Practical's – (2)

Total Lectures: 60 Hrs. **Contact Hrs. (L):**4
University Evaluation: 30 Marks **Internal Evaluation:** 20 Marks

1. Write a Python program to find the sum of a list of numbers using a for loop.
2. Write a Python program to display stars in right angled triangular form using nested for loops.
3. Write a Python program to display a multiplication table from 1 to 10 using nested for loops.
4. Write a Python program to display numbers from 10 to 6 and break the loop when the number about to display 5.
5. Write a Python program to display numbers from 1 to 5 using the continue statement.
6. Write a Python program to find the first occurrence of substring in a given main string.
7. Write a Python program to display elements in a list in reverse order.
8. Write a Python program to accept elements in the form of a tuple and display their sum and average.
9. Write a Python program to create a dictionary with employee details and retrieve the values upon giving keys.

Type: SEC1
BCA-I (Semester-I)
Course Title: Computational Mathematics
Credits: Theory – (2)
Total Lectures: 30 Hrs. Contact Hrs. (L): 2
University Evaluation: 30 Marks Internal Evaluation: 20 Marks

Course Objectives:

1. To introduce the concepts of mathematical logic.
2. To introduce the concepts of relations, counting and functions.
3. To perform the operations associated with counting, functions, and relations.
4. To use Graph Theory for solving problems.
5. To introduce the matrix and its operations.

Course Outcomes:

On completion of this course, the students will be able to:

1. Ability to apply mathematical logic to solve problems.
2. Understand sets, relations, counting, matrix, and graph.
3. Able to use logical notation to define and reason about fundamental mathematical concepts such as relations, counting, matrices and graphs.
4. Able to model and solve real-world problems using graphs and trees.

Unit I **(15)**

Logic and Proofs: Propositional logic, Applications of Propositional logic, propositional equivalences, Predicates and Quantifiers, Rules of inference.

Relations: Relations and their properties, Representing relation, Closures of relations, Partial orderings.

Unit II **(15)**

Counting: The basics of counting, The pigeonhole principle, Permutation and Combinations, Applications of recurrence relations, Solving recurrence relations, Divide and Conquer algorithms and recurrence relations.

Graphs: Graphs and Graphs models, Graph terminology and special types of graphs, Representing graphs and Graph isomorphism, Connectivity, shortest path problems.

Matrices: Introduction, operations, inverse, Rank of a matrix, solution of simultaneous linear equations, Eigen values and Eigen Vectors.

Reference Books:

1. Modern Algebra - S. Arumugam and A. Thangapandi Isaac, Scitech publications, 2005.
2. Invitation to Graph Theory- S.Arumugam and S.Ramachandran, Scitech Publications, 2005, Chennai.
3. Discrete Mathematical Structures with applications to Computer Science Tremblay and Manohar, McGrawHill, 1997.
4. Mathematical Structure for Compute Sience, Discrete Mathematics and its Appications, Judith L.Gersting, W.H.Freeman and Company, Seventh Edition, 2014.

Type: DSC2-1
B.C.A.-I (Semester II)
Course Title: Digital System
Credits: Theory – (2) Practical – (2)
Total Lectures: 30 Hrs. Contact Hrs. (L): 2
University Evaluation: 30 Marks Internal Evaluation: 20 Marks

Course Objectives:

1. To provide a comprehensive introduction to the fundamental axioms, theories and conventions underlying the operation of digital systems.
2. To equip students with the necessary skills which will allow them to analyse, design, test, and simulate the operation of basic digital circuits.
3. To utilize a variety of digital logic design and simulation tools.

Course Outcomes: At the end of this course, the student should be able to

1. Identify a digital system and its main characteristics, and differentiate between digital and analogue systems
2. Describe the concepts of binary numbers and binary encoding, and perform conversions between binary, decimal, and hex numbers and between binary codes
3. Perform basic mathematical operations using binary numbers, and design digital systems capable of performing such operations.
4. Describe theorems and axioms of Boolean Algebra, and utilize them effectively in the process of designing digital systems.
5. Model, analyse, design, test, and simulate the operation of combinational and sequential circuits using analytic and modular methodologies and tools.
6. Explain the concept of memory in digital systems, and design basic memory modules .

Unit I:

[18]

History and Overview: History, applications of digital systems, digital signals and analog signals, advantages and disadvantages of digital systems.

Number System: The binary, decimal and hexadecimal number system, conversion of binary, decimal and hexadecimal number system

Signed and unsigned binary numbers, representing signed binary numbers using the 2's complement method, performing basic mathematical operations using binary numbers (addition, subtraction, multiplication, division), design of adder and subtractor circuits.

Block diagram – ALU, memory unit, control unit, motherboard, SMPS, expansion slots, serial and parallel ports.

Unit II:

[12]

Boolean Algebra fundamentals: definition of boolean algebra and logic gates, types of logic gates(AND, OR, NOT, NAND, NOR, XOR, XNOR), DeMorgan's Theorem, implementation of logic circuits using boolean equation and truth table.

Microprocessor: History and overview, comparative study of 8085, 8086 and Pentium processor, architecture of Pentium microprocessor, features of Pentium microprocessor, applications of Pentium. addressing modes, instruction set, types of programming languages, assembly language programming, applications of Pentium.

Reference Books:

1. Digital Systems: Principles and Applications by Ronald J. Tocci, Neal S. Widmer, and Greg Moss
2. Digital Design: With an Introduction to the Verilog HDL, VHDL, and SystemVerilog by M. Morris R. Mano, and Michael D. Ciletti
3. Fundamentals of Digital Logic with VHDL Design, by Stephen Brown and Zvonko Vranesic
4. Digital Fundamentals, by Thomas L. Floyd
5. Digital Logic Design, by B. Holdsworth
6. System Programming by John J. Donowon
7. System programming and Operating System by Dhamdhare
8. System Software by Beck:

BCA-I (Semester-II)
Course Title: Practical based on DSC1-2

Credits: Practical's – (2)

Total Lectures: 60 Hrs.

Contact Hrs. (L):4

University Evaluation: 30 Marks

Internal Evaluation: 20 Marks

Tools / Software: NASM (Netwide Assembler)/ MASM (Microsoft Macro Assembler) / TASM (Turbo Assembler)etc.

1. Steps for creating source code.

2. Programs Involving Arithmetic and logical operations

I. Write an ALP to add 2 Multibyte no.

II. Write an ALP to subtract two Multibyte numbers.

III. Write an ALP to multiply two 16-bit numbers.

IV. Write an ALP to divide two numbers.

V. Write an ALP to multiply two ASCII no.

VI. Develop and execute and assembly language program to perform the conversion from

BCD to binary.

VII. Write an ALP to convert binary to BCD.

VIII. Write an ALP to find the square of a number.

IX. Write an ALP to find the cube of a number.

Programs Involving Bit manipulation instructions like checking

I. Write an ALP to separate odd and even numbers

II. Write an ALP to separate positive and negative numbers

III. Write an ALP to find logical ones and zeros in a given data

Write an ALP to demonstrate the

I. AND Gate

II. OR Gate

III. NOT Gate

IV. NAND Gate

V. NOR Gate

VI. XOR Gate.

II	<p>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.</p> <p>File Handling: Introduction, Standard input- get char(), getch(), getche(), Standard output- put char(), putch(), putche(), Formatted input- scanf(), sscanf(), fclose(), File modes, Text and binary mode.</p> <p>Macros and Preprocessing: Features of C pre-processor, Macro – Declaration, Expansion, File Inclusion</p>	18
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Reference Books

1. Programming in ANSI C, E. Balagurusamy, McGraw Hill Education India Private Limited.
2. Programming through C Language, Dr. Tulashiram B. Pisal and Mr. Balasaheb J. Kshirsagar, InScPublishing House (IPH), Edition-1st, 2021.
3. The 'C' programming language, Brian Kernighan, Dennis Ritchie, Pearson.

BCA-I (Semester II)

Course Title: Practical based on DSC2-2

Credits: Practical's – (2)

Total Lectures: 60 Hrs.
University Evaluation: 30 Marks

Contact Hrs. (L):4
Internal Evaluation: 20 Marks

1. WAP to find out the factorial of any number.
2. Write a program that swaps two numbers using pointers.
3. Write a program in which a function is passed the address of two variables and then alters its contents.
4. Write a program that takes the radius of a circle as input from the user, passes it to another function that computes the area and the circumference of the circle, and displays the value of the area and circumference from the main() function.
5. Write a program that counts the total number of vowels present in the string.
6. Write a program to find the sum of n elements entered by the user.
7. Write a program to allocate memory dynamically using malloc() and calloc().
8. Write a program to illustrate the difference between structure and union.
9. WAP to pass an array of structure to function.
10. Write a program to copy the content of one file into another file.
11. Write a program to display the content of binary files.
12. Write a program to accept integer numbers in file, find even and odd numbers between them store even numbers into even file and odd number into odd file and display the content of files.

Type: DSC3-2 (Major) BCA-I (Semester-II)

Course Title: Python-II

Credits: Theory – (2) Practical's – (2)

Total Lectures: 30 Hrs.
University Evaluation: 30 Marks

Contact Hrs. (L): 2
Internal Evaluation: 20 Marks

Course Objective:

1. To learn the use of functions in programming.
2. To understand the use of modules and packages in the application hierarchy.
3. To understand python programming using the object-oriented programming principles.
4. To learn handling of various exceptions during the application development.
5. To understand the working with different file operations.

Course Outcomes:

Upon successful completion of this course, students will be able to-

1. Write and implement a functional and modular approach to application development.
2. Design an application using object-oriented paradigm.
3. Create error free applications by applying the exception handling concept.
4. Design an application that contains the use of different files for data processing.

Unit No.	Description	No. of Lectures
I	<p>Functions: Difference between function and method, defining function, calling function, returning result from function, returning multiple values from function, functions are objects, formal and actual arguments, types of arguments, local, nonlocal and global variables, global keyword, recursive functions, anonymous functions or lambdas, using lambdas with filter(), map() and reduce() functions.</p> <p>Modules and packages: what are modules in python, import statement, from...import statement, creating our own modules, importing modules, working with built-in modules- Math module, time module and random module. what are packages, creating and importing module</p>	12
II	<p>Threading: Understanding threads, Class and threads, Creating Threads, Thread Synchronization, Treads Life cycle, Multi-threading.</p> <p>Python Object Oriented: Difference between procedure oriented and object oriented programming. Features of object oriented programming- classes and objects, inheritance, polymorphism, encapsulation, abstraction. Creating class, self-variable, constructor, types of variables, namespaces, types of methods, passing member of one class to another class, inner classes. Types of inheritance, super() method, method overloading, method overriding, abstract classes and interfaces.</p> <p>Exception Handling: Error in python program, exceptions, steps in exception handling using try, except, else and finally blocks, types of exceptions-built-in exceptions and user defined exceptions, assert statement.</p> <p>File Input Output: concept of files, Types of files in python, file modes, closing a file, working with text files containing strings, working with binary files, with statement, pickling and unpickling, seek() and tell() methods, random accessing of binary files, zipping and unzipping files, working with directories.</p> <p>Regular Expressions: Introduction to Regular Expression, Advantages and Operations, Sequence characters in Regular Expression, Powerful pattern matching and searching, Password, email, url validation using regular expression, Pattern finding programs using regular expression</p>	18

Reference Books

1. Python: The Complete Reference by Martin C. Brown.
2. Core Python Programming, Dreamtech publications, by R. Nageswara Rao.
3. Python Programming, A modular approach, First Edition, Pearson, by Taneja Sheetal

BCA-I (Semester-II)
Course Title: Practical based on DSC3-2
Credits: Practical's – (2)

Total Lectures: 60 Hrs.
University Evaluation: 30 Marks

Contact Hrs. (L): 4
Internal Evaluation: 20 Marks

- 1) Write a function to return the addition and subtraction of two numbers using a function return two values.
- 2) Write a python program to demonstrate the different methods of array module.
- 3) Write a python program to demonstrate the types of array.
- 4) Write a python program to understand the positional arguments of a function
- 5) Write a python program to understand the keyword arguments of a function
- 6) Write a python program to understand the default arguments in a function
- 7) Write a python program to understand Variable length arguments in a function.
- 8) Write a python program to understand Anonymous (lambda) Function.
- 9) Write a python program to understand local, non-local and global variables.
- 10) Write a python program to create a module and import it.
- 11) Write a python program to create a package and import it.
- 12) Write a python program to demonstrate the instance method, class method and static method.
- 13) Write a python program to demonstrate inner classes.
- 14) Write a python program to demonstrate Constructors in Inheritance.
- 15) Write a python program to demonstrate method overloading.
- 16) Write a python program to demonstrate method overriding.
- 17) Write a python program to read all the strings from the text file and display them.
- 18) Write a python program to append data to an existing file and display them.
- 19) Write a python program to count a number of lines, words and characters in a file.
- 20) Write a python program to copy an image file into another file.
- 21) Write a python program to apply different manipulation operations of directories.
- 22) Write a python program to handle the ZeroDivisionError exception.
- 23) Write a python program to handle syntax errors given by eval() function.
- 24) Write a python program to handle IOError produced by open() function.
- 25) Write a python program to illustrate the use of raising an exc

Type: SEC2
BCA-I (Semester-I)
Course Title: Basics of Web Designing
Credits: Theory – (2)

Total Lectures: 30 Hrs.
University Evaluation: 30 Marks

Contact Hrs. (L): 2
Internal Evaluation: 20 Marks

Course Objectives:

1. Understand best technologies for solving web client problems
2. Analyze and design real time web applications
3. Develop web based application using suitable client side web technologies

Course Outcomes:

The student will be able to:

- 1) Analyze a web page and identify its elements and attributes.
- 2) Create web pages using HTML and Cascading Style Sheets.
- 3) Build static web pages using HTML, CSS (Client side programming).
- 4) Create XML documents and Schema.

Unit No.	Description	No. of Lectures
I	Overview of HTML : Introduction to Web technology, Introduction to Internet, Requirement for Internet, History of web technology, Introduction to HTML, Overview of basic HTML, Structure of HTML, Creating and opening HTML file, Singular and paired tags, Text form Lists, Image, Image Map, Table, Frame Form, get and post method, input tag.	12
II	HTML5- Introduction to HTML5, Features of HTML5, HTML5 DocType, New Structure Tags, Section, Nav, Article, Aside, Header, Footer, Designing a HTML Structure of Page, New Media Tags, Audio Tag, Video Tag, Canvas and Svg Tag, Introduction to HTML5 Forms, New Attributes, Placeholder Attribute, Require Attribute, Pattern Attribute, Autofocus Attribute, email, tel, url types, number type, date type, range type, voice search, Examples of Form 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.	18

Reference Books

- 1) HTML5 Black Book- Kogent Learning Solutions Inc Dreamtech.
- 2) Beginning JavaScript and CSS Development with jQuery- Richard York.
- 3) Beginning HTML and CSS- Rob Larsen.
- 4) HTML and CSS- The Complete Reference- Thomas A. Powell. (Fifth Edition).
- 5) W3schools.com

Type: GE/OE-1
BCA-I (Semester-I)
Course Title: E-Commerce

Credits: Theory – (2)

Total Lectures: 30 Hrs.

University Evaluation: 30 Marks

Contact Hrs. (L): 2

Internal Evaluation: 20 Marks

Course Objectives:

1. Increasing significance of E-Commerce and its applications in Business and Various Sectors.
2. Mechanism of business transactions through electronic media.
3. To identify Latest Trends in E-Commerce and Digital Marketing, along with Opportunities.
4. Payment transactions in a secured network.
5. Different modes of E-Commerce like Electronic data interchange.

Course Outcomes: After Completion of the subject student should able to

1. Analyze the impact of E-commerce on business models and strategy
2. Describe the major types of E-commerce.
3. Explain the process that should be followed in building an E-commerce presence.
4. Identify the key ethical, social, and security threats in the E-commerce environment.
5. Understand the implementation of Electronic Data Interchange (EDI) in day to day life

Unit No	Content	No. of Lectures
I	<p>Introduction to E-commerce Introduction to E-Commerce, Functions of E-commerce, comparison of traditional commerce and E-Commerce, advantages and disadvantages of E-Commerce Introduction to E-Commerce business models: B2B,B2C,C2C and scope of E-commerce, Benefits of E-Commerce, applications of E-Commerce</p> <p>Electronic Data Interchange(EDI) Concept of EDI, Difference between paper based business and EDI based business. Application area of EDI, Action plan for implementing EDI, And factors influencing the choice of EDI software</p> <p>Electronic Commerce Environment and Opportunities: Background, The Electronic Commerce Environment, Electronic Marketplace Technologies. Modes of Electronic Commerce: Electronic Data Interchange, Migration to Open EDI, Electronic Commerce with www/Internet, Commerce Net Advocacy, web Commerce Going Forward.</p>	15
II	<p>E-Marketing: Introduction to traditional marketing, comparison of traditional marketing and E-marketing, Impact of E-Commerce on market, Marketing issues in E-marketing Promoting your e-business, direct marketing, one to one marketing</p> <p>E-Finance: Meaning of finance, areas of E –Finance, operations in E-Banking - Trading Operations in stock Market trading Importance, advantages of E-trading</p> <p>Master Card/Visa Secure Electronic Transaction: Introduction, Business Requirements, Concepts, payment Processing. E-Mail and Secure Email Technologies for Electronic Commerce: Introduction, The Means of Distribution, A model for Message Handling, E-mail working, Multipurpose Internet Mail Extensions, Message Object Security Services, Comparisons of Security Methods, MIME and Related Facilities for EDI over the Internet.</p> <p>E –Commerce in India: Status of E-commerce in India , Problems and opportunities in E-commerce in India, Future of E-commerce and legal issues involved in e-commerce in india</p>	15

Reference Books

1. E-commerce by C.S.V. Murthy
2. E-commerce by Bajaj and Nag
3. WebCommerce Technology Handbook, by Daniel Minoli, Emma Minoli, McGraw-Hill
4. E-Commerce fundamentals and applications Hendry Chan, Raymond Lee, Tharam Dillon.
5. E-commerce by Laudén

Punyashlok Ahilyadevi Holkar Solapur University, Solapur
Faculty of Science and Technology
Equivalent Subject for Old Syllabus B.C.A. (CS) - I (Semester–I and II)
(NEP-2020)

Semester-I		
Sr. No.	Name of the Old Paper (w.e.f. 2022-2023)	Name of the New Paper (w.e.f. 2024-2025)
1	English Paper I Part-A (communication skill)	English (Sem-I)
2	Fundamental of Computer	No Equivalence
3	Office Automation	Office Automation
4	Programming and Problem Solving using 'C' – I	Programming using 'C'-I
5	Web Programming-I	Basics of Web Designing(Sem-II)
6	Basics of Mathematics	Computational Mathematics
7	Descriptive Statistics	No Equivalence
8	Fundamentals of Electronics	Digital System
9	Linear Electronics	No Equivalence
Semester-II		
Sr. No.	Name of the Old Paper (w.e.f. 2022-2023)	Name of the New Paper (w.e.f. 2024-2025)
1	English Paper I Part-B (communication skill)	English (Sem-II)
2	Introduction to Python Programming	Basics of Python (Sem-I)
3	Operating System	No Equivalence
4	Programming and Problem Solving using 'C' – II	Programming using 'C'-II
5	Web Programming-II	No Equivalence
6	Graph Theory	No Equivalence
7	Probability Theory	No Equivalence
8	Digital Electronics	No Equivalence
9	Introduction of Microprocessor and Interfacing	Digital Electronics and Microprocessor

CA

Punyashlok Ahilyadevi Holkar Solapur University, Solapur
Faculty of Science and Technology. Nature of Question Paper for CBCS Pattern
B.C.A.(Part- I) w.e.f. AY 2024-25

Time:

Internal Evaluation: 20 Marks

Choose any two of the following Home Assignment / Unit Test / Tutorial /Seminar

Pattern of Examination

External Evaluation + Internal Evaluation 30
Marks + 20 Marks = 50 Marks

Passing Criteria –

1. Written Exam – 12 out of 30
2. Continuous Assessment (CA) – 08 out of 20