

Chaudhary Bansi Lal University, Bhiwani, Haryana

Scheme of Examination and Syllabus for Undergraduate Programme

Course: Computer Applications (Bachelor of Computer Applications (AI and ML) (Under Multiple Entry-Exit, Internship and CBCS-LOCF in accordance to NEP-2020) w.e.f. 2025-2026 in Phased Manner

Semester	Discipline-Specific Courses (DSC)	Paper Code	Nomenclature of Paper	Credit	Minor (MIC) /Vocational (VOC)	Credit	Multidisciplinary Courses (MDC)	Ability Enhancement Courses (AEC)	Skill Enhancement Courses (SEC) /Internship/ Dissertation	Value -Added Courses (VAC)	Total Credits
I	CC-A1	25BCAIML-N-101	Computer Fundamentals	4	24BCAIML-N-104 Office Management Tools	2+1	24UN-BBA-MDC 101	24UN-ENG-AEC101	24BCAIML-SEC -101	24UN-BOT-VAC101 Environmental Science @2 Credit	25
	CC-B1	25BCAIML-N-102	Problem solving Technique using C Language	3+1			Personal Finance@ 3 Credits	Communication Skills in English @ 2 Credit	Fundamentals of Web @ 2+1 Credit		
	CC-C1	25BCAIML-N-103	Computer Organization	4							
II	CC-A2	25BCAIML-N-201	Database Management system	3+1	24BCAIML-N-204 Mathematical Foundation of Computer Science	3	24UN-BBA-MDC 201 Introduction to Entrepreneurship Development @ 3 Credit	24UN-ENG-AEC201	24BCAIML -SEC -201 Front End Engineering @ 2+1 Credit	24UN-PSY-VAC101 Human Values and Ethics @ 2 Credit	25
	CC-B2	25BCAIML-N-202	Object Oriented Programming Using C++	3+1				Business Communication@ 2 Credit			
	CC-C2	25BCAIML-N-203	Software Engineering	4							

Scheme of Examination for BCA (AI/ML)**Semester: 1st (w.e.f. Session 2025-26)**

S r · N o ·	Course/ Paper Code	Title of the Course	Mode of Learni ng	Course Type	Credit			Contact Hours per Week			Examination Scheme				Tot al Mar ks
					Theor y	Practical/ Seminar	Tot al	Theo ry	Practi cal /Semi nar	Tot al	End Semest er Exa m)	Intern al Assessm ent	Prac tical (Exte r nal)	Practi cal (Inter nal)	
1	25BCAIML-N-101	Computer Fundamentals	CL/BL	CC	4		4	4		4	70	30			100
2	25BCAIML-N-102	Problem solving Technique using C Language	CL/BL	CC	3	1	4	3	2	5	50	20	20	10	100
3	25BCAIML-N-103	Computer Organization	CL/BL	CC	4	..	4	4		4	70	30	.		100
4	25BCAIML-N-104	Office Management Tools	CL/BL	MIC	2	1	3	2	2	4	35	15	15.	5	70
5	24UN-BBA-MDC101	Personal Finance	CL/BL	MDC	3	..	3	3	..	3	50	20	.		70
6	24UN-ENG--AEC101	Communication Skills in English	CL	AEC	2	0	2	2		2	35	15			50
10	25BCAIML-SEC -101	Fundamentals of Web	CL	SEC	2	1	3	3	2	5	35	15	15	5	70
11	24UN-BOT-VAC101	Environmental Science	CL	VAC	2	..	2	2	..	2	35	15			50
	Total						25			29					610

CC - Core Course; SEC-Skill Enhancement Course; AEC: Ability Enhancement Course MDC: Multidisciplinary Course VAC: Value Added course

MIC: Minor course

25BCAIML-N-101	Computer Fundamentals	4L:0T:0P	4 Credits
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Maximum Marks:100
External Examination: 70
Internal Assessment: 30
Max. Time: 3 Hrs

Course Objectives

Note: There shall be nine questions in all. Question no. 1 shall be compulsory, consisting of eight short answer type questions covering the entire syllabus. Two questions will be asked from each unit. Students will have to attempt one question from each unit. Each question shall carry equal marks.

Unit I

Evolution of Computers through generations, Characteristics of Computers, Strengths and Limitations of Computers, Classification of Computers, Functional Components of a Computer System, Applications of computers in Various Fields. Types of Software: System software, Application software, Utility Software, Shareware, Freeware, Firmware, Free Software. Memory Systems: Concept of bit, byte, word, nibble, storage locations and addresses, measuring units of storage capacity, access time, concept of memory hierarchy. Primary Memory - RAM, ROM, PROM, EPROM. Secondary Memory - Types of storage devices, Magnetic Tape, Hard Disk, Optical Disk, Flash Memory.

Unit II

I/O Ports of a Desk Top Computer, Device Controller, Device Driver. Input Devices: classification and use, keyboard, pointing devices - mouse, touch pad and track ball, joystick, magnetic stripes, scanner, digital camera, and microphone. Output Devices: speaker, monitor, printers: classification, laser, ink jet, dot-matrix. Plotter. Introduction to Operating System: Definition, Functions, Features of Operating System, Icon, Folder, File, Start Button, Task Bar, Status Buttons, Folders, Shortcuts, Recycle Bin, Desktop, My Computer, My Documents, Windows Explorer, Control Panel.

Unit III

Introduction to networks and internet, history, Internet, Intranet & Extranet, Working of Internet, Modes of Connecting to Internet. Electronic Mail: Introduction, advantages and disadvantages, User Ids, Passwords, e-mail addresses, message components, message composition, mailer features. Browsers and search engines.

Unit IV

Threats: Physical & non-physical threats, Virus, Worm, Trojan, Spyware, Keyloggers, Rootkits, Adware, Cookies, Phishing, Hacking, Cracking. Computer Security Fundamentals: Confidentiality, Integrity, Authentication, Non-Repudiation, Security Mechanisms, Security Awareness, Security Policy, anti-virus software & Firewalls, backup & recovery.

Course Outcomes:

A student will be able to:

1. Understanding the concept of input and output devices, memory of Computers
2. Learn the functional units and classify types of computers, how they process information and how individual computers interact with other computing systems and devices.
3. Understand an operating system and its working, and solve common problems related to operating systems
4. Learn about basic threats on internet.
5. Study to use the Internet safely, legally, and responsibly

Suggested Readings:

1. Byron Gottfried, Schaum's Outline of Programming with C, McGraw-Hill.
2. R.S. Salaria, Programming for Problem Solving, Khanna Publishing House
3. E. Balaguruswamy, Programming in ANSI C, Tata McGraw-Hill.
4. Brian W. Kernighan and Dennis M. Ritchie, The C Programming Language, Prentice Hall of India.

25BCAIML- N-102	Problem solving Technique using C Language	3L:0T:0P	3 Credits
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Maximum Marks:70
External Examination: 50
Internal Assessment: 20
Max. Time: 3 Hrs

Course Objectives

- To understand basic concepts of C
- To enable the students to solve the problems efficiently using different problem-solving methodologies and implement them in C.

Note: There shall be nine questions in all. Question no. 1 shall be compulsory, consisting of eight short answer type questions covering the entire syllabus. Two questions will be asked from each unit. Students will have to attempt one question from each unit. Each question shall carry equal marks.

Unit I

Introduction to programming in C: History, Flowchart, Algorithm and pseudocode, Structure and execution flow of C Program, Documentation of programs, Character Set, Constants and Variables, Identifiers and Keywords, Data Types, Assignment Statement, Input/Output: Basic and Formatted I/O Function, Operators & Expression: Arithmetic, Relational, Logical, Bitwise, Unary, Assignment and Special Operators Operator Hierarchy; Arithmetic Expressions, Evaluation of Arithmetic Expression, Type Casting and Conversion.

Unit II

Decision making and Loop Statements: if statement, if-else statement, nested if statement, else-if ladder, switch and break statement, goto statement, Conditional Operators, Short-circuit in C, Looping Statements: for, while, and do-while loop, jumps in loops, Scope and life of a variable, Storage Classes: auto storage class, extern storage class, static storage class, register storage class.

Unit III

Arrays: One Dimensional arrays - Declaration, Initialization and Memory representation; Two Dimensional arrays -Declaration, Initialization and Memory representation.

Functions: definition, prototype, function call, passing arguments to a function: call by value; call by reference, recursive functions.

Strings: Declaration and Initialization, String I/O, Array of Strings, String Manipulation Functions: String Length, Copy, Compare, Concatenate etc., Search for a Substring.

Unit IV

Pointers in C: Declaring and initializing pointers, accessing address and value of variables using pointers; Pointers and Arrays.

User defined data types: Structures - Definition, Advantages of Structure, declaring structure variables, accessing structure members, Structure members initialization, Array of Structures; Unions - Union definition; difference between Structure and Union.

Course Outcomes

A student will be able to:

- Learn to develop simple algorithms and flow charts to solve a problem.
- Develop problem solving skills coupled with top-down design principles.
- Learn about the strategies of writing efficient and well-structured computer algorithms/programs.
- Develop the skills for formulating iterative solutions to a problem.
- Learn array processing algorithms coupled with iterative methods.
- Learn text and string processing efficient algorithms.
- Learn searching techniques and use of pointers.
- Understand and apply recursive techniques in programming.

Suggested Readings:

1. Byron Gottfried, Schaum's Outline of Programming with C, McGraw-Hill.
2. R.S. Salaria, Programming for Problem Solving, Khanna Publishing House
3. E. Balaguruswamy, Programming in ANSI C, Tata McGraw-Hill.
4. Brian W. Kernighan and Dennis M. Ritchie, The C Programming Language, Prentice Hall of India.

25BCAIML- N-103	Computer Organization	4L:0T:0P	4 Credits
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Maximum Marks:100
External Examination: 70
Internal Assessment: 30
Max. Time: 3 Hrs

Course Objectives

- To understand the basic organization of Digital Computer.
- To understand the working of different parts of the system.
- To understand data flow between different units.

Note: There shall be nine questions in all. Question no. 1 shall be compulsory, consisting of eight short answer type questions covering the entire syllabus. Two questions will be asked from each unit. Students will have to attempt one question from each unit. Each question shall carry equal marks.

Unit I

Digital Computer: Block diagram, its parts and working, Data flow in a digital computer, Number System, Types of Number Systems, Conversion from one number system to another, Binary Arithmetic, Data Types, Complements, Fixed-Point Representation, Floating-Point Representation.

Unit II

Basic Digital Devices: Binary Codes, Error Detection Codes, Logic Gates, Boolean Algebra, Map Simplification, Combinational Circuits, Flip-flops.

Register Transfer and Micro operations: Register Transfer Language, Register Transfer, Bus & Memory Transfer, Arithmetic Micro operations, Logic Micro Operations, Shift Micro Operation.

Unit III

Basic Computer Organization: Instruction codes, Computer Registers, Computer Instructions, Timing & Control, Instruction Cycles, Memory Reference Instruction, Input - Output & Interrupts, Complete Computer Description & Design of Basic Computer.

Processor and Control Unit: Hardwired vs. Microprogrammed Control Unit, General Register Organization, Stack Organization

Unit IV

Instruction Format, Data Transfer & Manipulation, Program Control, RISC, CISC, Pipelining and Parallelism

Memory and I/O Systems: Peripheral Devices, I/O Interface, Data Transfer Schemes, Program Control, Interrupt, DMA Transfer, I/O Processor. Memory Hierarchy, Processor vs. Memory Speed, High-Speed Memories, Cache Memory, Associative Memory, Interleave, Virtual Memory, Memory Management.

Course Outcomes

A student will be able to:

- To make students understand the basic structure, operation and characteristics of digital computers.
- To familiarize the students with arithmetic and logic units as well as the concept of pipelining.
- To familiarize the students with hierarchical memory systems including cache memories and virtual memory.
- To make students know the different ways of communicating with I/O devices and standard I/O interfaces.

Suggested Readings:

1. Computer System Architecture, M. Morris Mano, 3rd Edition, Prentice Hall.
2. Computer Organization and Design, David A. Patterson and John L. Hennessey, Fifth edition, Morgan Kauffman / Elsevier, 2014. 30
3. Computer Architecture: A Quantitative Approach, John L. Hennessy, David A. Patterson, 4th Edition.
4. Computer Organization and Architecture, William Stallings, Prentice Hall.

25BCAIML-N-104	Office Management Tools	2L:0T:0P	2 Credits
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Maximum Marks:50
External Examination: 35
Internal Assessment: 15
Max. Time: 3 Hrs

Course Objectives

Note: There shall be nine questions in all. Question no. 1 shall be compulsory, consisting of eight short answer type questions covering the entire syllabus. Two questions will be asked from each unit. Students will have to attempt one question from each unit. Each question shall carry equal marks.

Unit I

Definition, Functions, Types of Operating System, Basics of Popular Operating Systems, The User Interface Exploring Computer, Icons, taskbar, desktop. Using Menu and Menu-selection, managing files and folders, Control panel - display properties, add/remove software and hardware, Common utilities.

Unit II

Introduction to Word Processing, Menus, Creating, Editing & Formatting Document, Spell Checking, Printing, Views, Tables, Word Art, Mail Merge, Macros, inserting hyperlinks, Searching for text, Modifying page setup, Applying document themes. Applying document style sets, Inserting headers and footers, Table

Unit III

Spread Sheet: Elements of Electronics Spread Sheet, Applications, Creating and Opening of Spread Sheet, Menus, Manipulation of cells Enter texts numbers and dates, Cell Height and Widths, copying of cells, Mathematical, Statistical and Financial function, Drawing different types of charts, Sort and Filter Data. Conditional formatting, Data validation, pivot table, chart

Unit IV

Presentation Software: Creating, Modifying and enhancing a presentation, Type of presentation views, using sound, Animation Working with Objects. Printing,

Suggested Readings:

1. Computer Application in Business –Dr.S.V.Srinivasa Vallabhan, Sultan Chand and Sons, New Delhi
2. MS-Office and Internet by Alexis Leon
3. Computer Application in Business – K.Mohan Kumar, Vijay Nicole imprints Private Limited Dr.S.Rajkumar –Chennai
4. Computer Basics – V.Rajaraman – PHI.

25BCA1ML -SEC -101	Fundamentals of Web	2L:0T:0P	2 Credits
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Maximum Marks:50
External Examination: 35
Internal Assessment: 15
Max. Time: 3 Hrs

Course Objectives

- To learn HTML Tags and make structure of web pages.
- To apply CSS properties to look rich and attractive.
- To learn how to work with Flex and Grid.
- To use Bootstrap to make it responsive.
- To develop a real website by using a commercial approach.

Note: There shall be nine questions in all. Question no. 1 shall be compulsory, consisting of eight short answer type questions covering the entire syllabus. Two questions will be asked from each unit. Students will have to attempt one question from each unit. Each question shall carry equal marks.

Unit I

HTML Anatomy: HTML Structure (<html> tag, Head, Page Title, Body), Headings, Div's, Attributes, Displaying Text, Line Breaks, Unordered Lists, Ordered Lists, Images, Anchor Tag

Tables: Create a Table, Table Rows, Table Data, Table Headings, Table Borders, Spanning Columns & Rows, Table Body

HTML Forms: Input (Text, Email, Password, Range, Checkbox, Radio button, Date & Time), Label, Select Tag.

Unit II

Introduction to CSS: Inline Styles, <style> Tag, the .css file, Linking the CSS File, Tag Name, Class Name, Multiple Classes, ID Name, Classes and IDs, Specificity, Chaining Selectors, Nested Elements, Chaining and Specificity, Multiple Selectors

Box Model: Height and Width, Borders, Border Radius, Padding, Margins, Auto Margin Collapse, Minimum and Maximum Height and Width, Overflow, Resetting Defaults, Visibility, Flow of HTML, Positions (Relative, Absolute, Fixed, Z-Index), Inline Display, Block Display, Inline-Block Display, Float, Clear, Flow of HTML, Positions (Relative, Absolute, Fixed, Z-Index), Inline Display, Block Display, Inline-Block Display, Float, Clear

Font Styling: Text Alignment, Color, Opacity, Background Image Word Spacing, Letter Spacing, Line Height Anatomy, Linking Fonts, Font-Face

Sizing Elements: Relative Measurements, Em, Rem, Percentages (Height, Width, Padding, Margin), Scaling Images and Video

Unit III

Flexbox: display, flex, inline-flex, justify-content, align-items, flex-grow, flex-shrink, flex-basis, flex, flex-wrap, Align-content, flex-direction, flex-flow, Nested Flexboxes,

Grids: Grid Template, Grid Contained, Grid Items, Fraction, Repeat, min max, Grid Gap.

Media Queries - Responsive Web Design, Media Queries, Range, Dots Per Inch (DPI), And Operator, Comma Separated List, Breakpoints

Unit IV

BootStrap: Intro, Need of BootStrap, Download Bootstrap, CDN, Create First Web Page with Bootstrap, Add the HTML5 Doctype, Bootstrap is Mobile First, Containers, Basic Bootstrap Pages, Bootstrap Grids, Bootstrap Grid System, Grid Classes, Basic Structure of a Bootstrap Grid, Equal Columns Unequal Columns, Bootstrap Text / Typography, Default Settings Bootstrap vs. Browser Defaults, Bootstrap Tag Elements, Contextual Colors and Background, Typography Classes, Bootstrap Table, Rounded Corners, Circle, Thumbnail, Responsive Images, Image Gallery, Responsive Embeds.

Course Outcomes

A student will be able to:

- Understand the design principles of Web pages and how they are created.
- Students will be able to apply HTML Tags to create the structure of Web Pages.
- Students will be able to apply CSS properties to make the page rich in look and feel.
- Will be able to use Bootstrap framework for making pages responsive.

Suggested Readings:

1. Head First HTML and CSS – Elisabeth Robson & Eric Freeman
2. Web Design Playground: HTML & CSS the Interactive Way – Paul McFedries
3. Bootstrap 5 Foundations – Daniel Foreman

Lab-I (Based on 25BCA1ML- N-102 Problem solving Technique using C Language)	0L:0T:2P	1 Credits
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Maximum Marks:30
External Examination: 20
Internal Assessment: 10

Course Outcomes: By the end of the course the student will be able to:

- Develop problem solving skills coupled with top-down design principles.
- Develop programs in C by using various conditional and looping structures.
- Develop programs in C by using various conditional and looping structures.
- Work on some real projects used in Industry nowadays.

List of Practical:

Students are advised to do laboratory/practical practice not limited to, but including the following types of problems:

1. To read radius of a circle and to find area and circumference
2. To read three numbers and find the biggest of three
3. To check whether the number is prime or not
4. To read a number, find the sum of the digits, reverse the number and check it for palindrome
5. To read numbers from keyboard continuously till the user presses 999 and to find the sum of only positive numbers
6. To read percentage of marks and to display appropriate message (Demonstration of else-if ladder)
7. To find the roots of quadratic equation
8. To read marks scored by n students and find the average of marks (Demonstration of single dimensional array)
9. To remove Duplicate Element in a single dimensional Array
10. To perform addition and subtraction of Matrices
11. To find factorial of a number
12. To generate Fibonacci series
13. To remove Duplicate Element in a single dimensional Array
14. To find the length of a string without using built in function
15. To demonstrate string functions
16. To read, display and add two m x n matrices using functions
17. To read a string and to find the number of alphabets, digits, vowels, consonants, spaces and special characters
18. To Swap Two Numbers using Pointers
19. To demonstrate student structure to read & display records of n students
20. To demonstrate the difference between structure & union.

Lab-2 (Based on 24BCAIML-SEC -101 Fundamentals of Web)	0L:0T:2P	1 Credits
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Maximum Marks:20
External Examination: 15
Internal Assessment: 5

Course Outcomes: By the end of the course the student will be able to:

- Use tags of HTML practically to build a web page.
- Use CSS for styling the web pages.
- Use to design forms and Tables for a web page.
- Use Flex and Grid for layout of a web page.
- Develop a website with all the HTML, CSS and Bootstrap features.

List of Practical:

1. Build a resume webpage by using HTML elements.
2. Nested List- create a nested list as per the task defined.
3. HTML Table- create a table as per the task defined.
4. HTML Form – create an HTML form as the task given.
5. CSS Typography- design an article using the CSS. Apply the CSS properties as defined in the user stories.
6. CSS Display and Positioning: Change the display or position property of a paragraph element to show that they are rendered side by side.
7. Horizontal Dropdown Menu: Create a dropdown navigation bar using HTML and CSS.
8. CSS display and positioning: Float and Clear
9. Flex Cards: Create a responsive card layout by applying CSS properties as mentioned in user stories.
10. CSS Grid: Create a grid layout as per the user stories.
11. Webpage layout using Flexbox: create a responsive webpage layout using flexbox.
12. Bootstrap Carousel: Make an image carousel using bootstrap and make changes in it using CSS as per the given task.

Lab-3 (Based on 25BCAIML-N-104 Office Management Tools)	0L:0T:2P	1 Credit
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Maximum Marks:20
External Examination: 15
Internal Assessment: 5

Course Outcomes: By the end of the course the student will be able to:

- To create and format documents, apply styles, and use different paragraph options for professional-looking content.
- To acquire essential formulas and functions, sort and filter data, and create charts to visualize data effectively.
- To develop skills in creating engaging presentations, utilizing multimedia, slide transitions, and animations.
- To practice using tables, lists, and headers/footers to organize information systematically.
- To utilize ChatGPT responsibly with proper prompts for practical applications.
- To acquire practical skills and knowledge that will enhance their productivity, communication, and overall proficiency in using computers and popular software applications.

List of Practical:

1. Creating and Formatting Documents: Students will learn how to create new documents, format text, change fonts, apply styles, and use different paragraph formatting options.
2. Headers and Footers: Students will explore adding headers and footers to documents, inserting page numbers, and including relevant information in headers/footers.
3. Tables and Lists: Participants will practice creating tables, formatting them, and using lists (bulleted and numbered) to organize content effectively.
4. Inserting Images and Objects: This practical will involve inserting images, shapes, and other objects into the document and managing their placement and alignment.
5. Basic Formulas and Functions: Participants will learn essential formulas (e.g., SUM, AVERAGE, MAX, MIN) and functions to perform calculations in a spreadsheet.
6. Formatting and Conditional Formatting: Students will practice formatting cells, applying cell styles, and using conditional formatting to highlight data based on specific conditions.
7. Creating Charts: This practical will involve creating various types of charts (e.g., bar, line, pie) to visualize data in a spreadsheet.
8. Data Sorting and Filtering: Participants will learn how to sort data in ascending/descending order and use filtering to display specific data subsets.
9. Data Validation: Students will explore data validation to restrict cell entries and ensure data consistency in the spreadsheet.
10. Creating Slides: Students will learn how to create new slides, select slide layouts, and add content (text, images, shapes) to slides.
11. Slide Transitions and Animations: Participants will practice applying slide transitions and animations to make their presentations visually appealing.
12. Inserting Multimedia: Students will learn to embed videos, audio, and hyperlinks into their presentations.
13. Slide Master: Participants will explore slide master features to create consistent design elements and layouts across all slides.