

(Annexure G-1)

**FACULTY OF COMPUTER SCIENCE & IT**

**SYLLABUS**

**Of**

**Bachelor of Arts Hons. / Bachelor of Science (Computer Science) Hons. / Bachelor of Science (Economics) Hons.**

**(Semester I- IV)**

**Credit Based Continuous Evaluation Grading System**

**(CBCEGS)**

**Session: 2025-26**



**The Heritage Institution**

**KANYA MAHA VIDYALAYA  
JALANDHAR  
(Autonomous)**

**Kanya Maha Vidyalaya, Jalandhar (Autonomous)**

## DSCs - FOUR YEAR DEGREE PROGRAMME

**Bachelor of Arts (Honours) / Bachelor of Science (Computer Science) (Honours)/**

**Bachelor of Science (Economics) (Honours)**

## Session 2025-26

| Bachelor of Arts (Honours) / Bachelor of Science (Computer Science) (Honours)/<br>Bachelor of Science (Economics) (Honours)                                  |                                                                 |                                             |                              |                |        |       |       |      |    |                             |     |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------|---------------------------------------------|------------------------------|----------------|--------|-------|-------|------|----|-----------------------------|-----|
| Semester-I                                                                                                                                                   |                                                                 |                                             |                              |                |        |       |       |      |    |                             |     |
| Program Name                                                                                                                                                 | Course Title                                                    | Course Code                                 | Course Type                  | Hours per week | Credit |       | Marks |      |    | Examination Time (in Hours) |     |
|                                                                                                                                                              |                                                                 |                                             |                              | L-T-P          | L-T-P  | Total | Total | Ext. |    |                             | CA  |
|                                                                                                                                                              |                                                                 |                                             |                              |                |        |       |       | L    | P  |                             |     |
| Bachelor of Arts Hons. Semester I/<br><br>Bachelor of Science (Computer Science) Hons. Semester I /<br><br>Bachelor of Science (Economics ) Hons. Semester I | Computer Science<br><br>(Computer Fundamentals and PC Software) | BARM-1134<br><br>BCSM-1134<br><br>BECM-1134 | DS C<br><br>DS C<br><br>DS C | 3-0-2          | 3-0-1  | 4     | 100   | 40   | 30 | 30                          | 3+3 |

| Bachelor of Arts (Honours) / Bachelor of Science (Computer Science) (Honours)/<br>Bachelor of Science (Economics) (Honours) Semester-II                    |                                     |             |             |                |        |       |       |      |    |                             |     |
|------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|-------------|-------------|----------------|--------|-------|-------|------|----|-----------------------------|-----|
| Program Name                                                                                                                                               | Course Title                        | Course Code | Course Type | Hours per week | Credit |       | Marks |      |    | Examination Time (in Hours) |     |
|                                                                                                                                                            |                                     |             |             | L-T-P          | L-T-P  | Total | Total | Ext. |    |                             | CA  |
|                                                                                                                                                            |                                     |             |             |                |        |       |       | L    | P  |                             |     |
| Bachelor of Arts Hons. Semester II /<br>Bachelor of Science (Computer Science) Hons. Semester II/<br><br>Bachelor of Science (Economics) Hons. Semester II | Computer Science (Programming in C) | BARM-2134   | DS C        | 3-0-2          | 3-0-1  | 4     | 100   | 40   | 30 | 30                          | 3+3 |
|                                                                                                                                                            |                                     | BCSM-2134   | DS C        |                |        |       |       |      |    |                             |     |
|                                                                                                                                                            |                                     | BECM-2134   | DS C        |                |        |       |       |      |    |                             |     |

**Kanya Maha Vidyalaya, Jalandhar (Autonomous)**

**DSCs - FOUR YEAR DEGREE PROGRAMME**

**Bachelor of Arts (Honours) / Bachelor of Science (Computer Science) (Honours)/**

**Bachelor of Science (Economics) (Honours)**

**Session 2025-26**

| Bachelor of Arts (Honours) / Bachelor of Science (Computer Science) (Honours)/<br>Bachelor of Science (Economics) (Honours) Semester-III                       |                                                                        |                                             |                           |                |        |       |       |      |    |    |                             |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------|---------------------------------------------|---------------------------|----------------|--------|-------|-------|------|----|----|-----------------------------|
| Program Name                                                                                                                                                   | Course Title                                                           | Course Code                                 | Course Type               | Hours per week | Credit |       | Marks |      |    |    | Examination Time (in Hours) |
|                                                                                                                                                                |                                                                        |                                             |                           | L-T-P          | L-T-P  | Total | Total | Ext. |    | CA |                             |
|                                                                                                                                                                |                                                                        |                                             |                           |                |        |       |       | L    | P  |    |                             |
| Bachelor of Arts Hons. Semester III /<br>Bachelor of Science (Computer Science) Hons. Semester III/<br><br>Bachelor of Science (Economics ) Hons. Semester III | Computer Science (Computer Oriented Numerical and Statistical Methods) | BARM-3134<br><br>BCSM-3134<br><br>BECM-3134 | DSC<br><br>DSC<br><br>DSC | 3-0-2          | 3-0-1  | 4     | 100   | 40   | 30 | 30 | 3+3                         |



**Bachelor of Arts (Honours) / Bachelor of Science (Computer Science) (Honours)/  
Bachelor of Science (Economics) (Honours) Semester- I**

**Session 2025-26**

**Course Code: BARM-1134**

**BCSM-1134**

**BECM-1134**

**COMPUTER SCIENCE  
(COMPUTER FUNDAMENTALS AND PC SOFTWARE)**

**Course Outcomes:**

After passing this course the student will be able to:

CO1: comprehend about computer hardware, operating system concepts and various system software.

CO2: Identify various input, output and memory devices.

CO3: Apply office automation software to create professional and academic documents.

CO4: Apply skills to make effective presentations using associated application software.

**Bachelor of Arts (Honours) / Bachelor of Science (Computer Science) (Honours)/  
Bachelor of Science (Economics) (Honours) Semester- I  
Session 2025-26**

**Course Code: BARM-1134**

**BCSM-1134**

**BECM-1134**

**COMPUTER SCIENCE  
(COMPUTER FUNDAMENTALS AND PC SOFTWARE)**

**Examination Time: 3 Hrs.**

**Max. Marks: 100**

**Theory: 40**

**L-T-P: 3-0-1**

**Practical: 30**

**Credits: 4**

**CA: 30**

**Instructions for Paper Setter -**

Eight questions of equal marks (08 marks each) are to be set, two in each of the four sections (A-D). Questions of Sections A-D should be set from Units I-IV of the syllabus respectively. Questions may be divided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any section.

**UNIT I**

Fundamentals of Computer: Introduction to computer, Applications of computer, Components of computers (Input unit, Output Unit, Memory Unit & CPU), type of Software, Translators (compiler, interpreter, assembler), Booting a System.

**UNIT II**

Input and Output Devices: Keyboards, Mouse, Joystick, Track Ball, Light Pen and Data Scanning devices (scanner, OCR, OMR, MICR, Bar Code Reader, Card Reader), Monitor, Printers (laser printer, dot matrix printer, ink jet printer).

Memories: Primary Memory-RAM and ROM. Secondary Memory- Hard Disk.

Introduction to Windows based operating system and Desktop icons.

**UNIT III**

Word Processing: Introduction to word, Parts of window of word (Title bar, menu bar, status bar, and ruler), understanding the Ribbon, Use of Office Button and Quick Access Toolbar, Creation of new documents, opening document.

Page setup, margins, gutters, font properties, Alignment, page breaks, header & footer, deleting, moving, replace, editing text in document, saving a document, spell checker, printing a document.

Creating a table, entering and editing, Text in tables. Changing format of table, height, width of row/column. Editing, deleting Rows, columns in table. Adding picture, page colors and Watermarks, Borders and shading, Templates, Mail Merge.

#### **UNIT IV**

PowerPoint Presentation: Introduction to PowerPoint, starting a new slide, saving presentation, moving/rearranging slides, printing slides.

Applying theme to presentation, Views (slide View, slide sorter, notes view, outline view), Formatting & enhancing text formatting.

Creating a graph, displaying slide show, adding multimedia. Slide transitions, applying Animation, Timing slide display, adding movies & sounds.

#### **References:**

1. Anshuman Sharma, A book of Fundamentals of Information Technology, Lakhanpal Publishers, 5<sup>th</sup> Edition.
2. Prof. Satish Jain, M. Geetha, Kratika, BPB's Office 2010 Course Complete Book, BPB Publications, 2017.
3. Joyce Cox, Joan Lambert and Curtis Frye, Microsoft office Professional 2010 Step by Step, Microsoft Press, 2010.
4. V. Rajaraman, Neeharika Adabala, Fundamentals of Computers, PHI Learning, 2015.
5. P.K. Sinha, Computer Fundamentals, BPB Publications, 2004.

Note: The latest editions of the books should be followed.

**Bachelor of Arts (Honours) / Bachelor of Science (Computer Science) (Honours)/  
Bachelor of Science (Economics) (Honours) Semester- I  
Session 2025-26**

**Course Code: BARM-1134  
BCSM-1134  
BECM-1134**

**COMPUTER SCIENCE  
(COMPUTER FUNDAMENTALS AND PC SOFTWARE)  
(PRACTICAL)**

**Examination Time: 3 Hrs.**

**Max. Marks: 100**

**L-T-P: 3-0-1**

**Theory: 40**

**Credits: 4**

**Practical: 30**

**CA: 30**

**Practical based on PC Software - Office.**

**Bachelor of Arts (Honours) / Bachelor of Science (Computer Science) (Honours)/  
Bachelor of Science (Economics) (Honours) Semester- II  
(Session 2025-26)**

**Course Code: BARM-2134  
BCSM-2134  
BECM-2134**

**COMPUTER SCIENCE  
(PROGRAMMING IN C)**

**Course Outcomes:**

After passing this course the student will be able to:

CO1: Comprehend the working of various programming constructs involved in C Programming.

CO2: Apply various operators and control sequence of program using various control statements.

CO3: Apply programming concepts such as arrays, functions and strings to provide solution in different problem domains.

CO4: Work with pointers, structures and union.

**Bachelor of Arts (Honours) / Bachelor of Science (Computer Science) (Honours)/  
Bachelor of Science (Economics) (Honours) Semester- II  
(Session 2025-26)**

**Course Code: BARM-2134**

**BCSM-2134**

**BECM-2134**

**COMPUTER SCIENCE  
(PROGRAMMING IN C)  
(Theory)**

**Examination Time: 3 Hrs.**

**Max. Marks: 100**

**L-T-P: 3-0-1**

**Theory: 40**

**Credits: 4**

**Practical: 30**

**CA: 30**

**Instructions for Paper Setter -**

Eight questions of equal marks (08 marks each) are to be set, two in each of the four sections (A-D). Questions of Sections A-D should be set from Units I-IV of the syllabus respectively. Questions may be divided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any section.

**UNIT-I**

Data Representation, Introduction to Number Systems and Character Set, Decision tables, Decision Trees, Flow Charts, pseudo codes and, algorithms.

**Programming Using C:** Introduction to C, Applications and Advantages of C, Tokens, Types of Errors Data Types: Basic & Derived Data Types, User Defined Data Types, Declaring and initializing variables.

**UNIT-II**

**Operators and Expressions:** Types of operators (Unary, Binary, Ternary), Precedence and Associativity.

**Data I/O Functions:** Types of I/O function, Formatted & Unformatted console I/O Functions.

**Control Statements:** Jumping, Branching and Looping–Entry controlled and exit controlled, difference between for, while and do–while.

**UNIT-III**

**Arrays:** Types of Arrays, One Dimensional and Two-Dimensional Arrays.

**Strings:** Introduction to Strings and String functions, array of strings.

**Functions:** User Defined & Library Function, Function (Prototype, Declaration, Definition), Methods of passing arguments, local and global functions, Recursion.

#### **UNIT-IV**

**Storage Classes:** Introduction to various storage classes, scope and lifetime of a variable, advantages and disadvantages.

**Pointers:** Introduction, Uses of pointers, Limitations of pointers, Difference between void pointer and Null pointer, Pointer arithmetic, operators not allowed on pointers, Types of Pointer, Passing Pointers to function, concept of pointer to pointer.

**Structure and Union:** Introduction to structure and union, pointers with structure.

#### **References:**

1. E. Balagurusamy, Programming in ANSI C, Tata McGraw-Hill (2002), 5th edition.
2. Stephen G. Kochan, Programming in C, Pearson Education (2015), 4th edition.
3. Rachhpal Singh K.S. Kahlon, Gurminder Singh, Programming in C, Kalyani Publishers (2011).
4. Yashwant Kanetkar, Let us C, BPB Publications (2020), 17th edition.
5. R.S. Salari, Application Programming in C, Khanna Book Publishing (2012), 4th edition.
6. Anshuman Sharma, Learn programming in C, Lakhanpal Publishers (2016), 7th edition.

**Bachelor of Arts (Honours) / Bachelor of Science (Computer Science) (Honours)/  
Bachelor of Science (Economics) (Honours) Semester- II  
(Session 2025-26)**

**Course Code: BARM-2134**

**BCSM-2134**

**BECM-2134**

**COMPUTER SCIENCE  
(PROGRAMMING IN C)  
(PRACTICAL)**

**Examination Time: 3 Hrs.**

**Max. Marks: 100**

**L-T-P: 3-0-1**

**Theory: 40**

**Credits: 4**

**Practical: 30**

**CA: 30**

Lab based on Programming in C.

**Bachelor of Arts (Honours) / Bachelor of Science (Computer Science) (Honours)/  
Bachelor of Science (Economics) (Honours) Semester- III**

**Session 2025-26**

**Course Code: BARM-3134**

BCSM-3134

BECM-3134

**COMPUTER SCIENCE**

**(COMPUTER ORIENTED NUMERICAL AND STATISTICAL METHODS)**

**Course Outcomes:**

After passing this course the student will be able to:

CO1: Solve non-linear and linear equations using different methods.

CO2: comprehend interpolation and numerical integration.

CO3: Calculate different means and deviations using statistical techniques.

CO4: Comprehend correlation, curve fitting and regression for finding solutions to various statistical problems.

**Bachelor of Arts (Honours) / Bachelor of Science (Computer Science) (Honours)/  
Bachelor of Science (Economics) (Honours) Semester- III**

**Session 2025-26**

**Course Code: BARM-3134**

BCSM-3134

BECM-3134

**COMPUTER SCIENCE**

**(COMPUTER ORIENTED NUMERICAL AND STATISTICAL METHODS)**

**(THEORY)**

**Examination Time: 3 Hrs.**

**Max. Marks: 100**

**Theory: 40**

**L-T-P: 3-0-1**

**Practical: 30**

**Credits: 4**

**CA: 30**

**Instructions for Paper Setter -**

Eight questions of equal marks (8 marks each) are to be set, two in each of the four sections (A-D). Questions of Sections A-D should be set from Units I-IV of the syllabus respectively. Questions may be divided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any section. The students can use Non-programmable/ scientific & Non-storage type calculator.

**Unit –I**

**Introduction:** Numerical methods, Numerical methods versus numerical analysis, Errors and Measures of Errors. Bisection method, false position method and Newton Raphson method.

**Simultaneous Solution of Equations:** Gauss Elimination Method, Gauss Jordan method

**Unit -II**

**Interpolation:** Interpolation and Curve Fitting, Newtons Methods: Forward Difference Method, Backward Difference Method and Divided Difference Method.

**Numerical Integration:** Trapezoidal Rule, Simpson's 1/3 Rule Simpson's 3/8 Rule.

**Unit -III**

**Measure of Central Tendency:** Mean Arithmetic, Mean Geometric, Mean Harmonic, Mean, Median and Mode.

**Measure of dispersion:** Range, Mean deviation, Standard deviation, co-efficient of variation.

#### **Unit –IV**

**Correlation:** Meaning, Karl Pearson method, Rank correlation.

**Regression:** Meaning, Linear Regression and its coefficients.

#### **References/ Textbooks:**

1. B.S. Grewal, Numerical Methods in Engineering & Science: With Programs in C, C++ & MATLAB, Khanna Publisher, 2014.
2. V. Rajaraman, Computer Oriented Numerical Methods, Prentice Hall of India Private Ltd., 2009.

Note: The latest editions of the books should be followed.

**Bachelor of Arts (Honours) / Bachelor of Science (Computer Science) (Honours)/  
Bachelor of Science (Economics) (Honours) Semester- III**

**Session 2025-26**

**Course Code: BARM-3134**

**BCSM-3134**

**BECM-3134**

**COMPUTER SCIENCE**

**(COMPUTER ORIENTED NUMERICAL AND STATISTICAL METHODS)**

**PRACTICAL**

**Examination Time: 3 Hrs.**

**Max. Marks: 100**

**L-T-P: 3-0-1**

**Theory: 40**

**Credits: 4**

**Practical: 30**

**CA: 30**

**Lab exercises using a spread sheet tool for:**

1. Iterative Solutions
2. Simultaneous Solution of Equations
3. Interpolation
4. Measure of Central Tendency
5. Measure of dispersion
6. Correlation
7. Regression

**Bachelor of Arts (Honours) / Bachelor of Science (Computer Science) (Honours)/  
Bachelor of Science (Economics) (Honours) Semester- IV**

**(Session 2025-26)**

**Course Code: BARM-4134**

BCSM-4134

BECM-4134

**COMPUTER SCIENCE**

**(DATA STRUCTURES)**

**Course Outcomes:**

After passing course the student will be able to:

CO1: Analyze complexity of algorithms to determine their efficiency.

CO2: Comprehend various hashing method, sorting and searching algorithms.

CO3: Comprehend various operations of stack and queue along with different scenarios.

CO4: Comprehend advanced data structures such as tree and graph.

**Bachelor of Arts (Honours) / Bachelor of Science (Computer Science) (Honours)/  
Bachelor of Science (Economics) (Honours) Semester- IV**

**(Session 2025-26)**

**Course Code: BARM-4134**

**BCSM-4134**

**BECM-4134**

**COMPUTER SCIENCE**

**(DATA STRUCTURES)**

**(THEORY)**

**Examination Time: 3 +3 Hrs.**

**Max. Marks: 100**

**L-T-P: 3-0-1**

**Theory: 40**

**Credits: 4**

**Practical:30**

**CA: 30**

**Instructions for Paper Setter -**

Eight questions of equal marks (8 marks each) are to be set, two in each of the four sections (A-D). Questions of Sections A-D should be set from Units I-IV of the syllabus respectively. Questions may be divided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any section. The students can use Non-programmable/ scientific & Non-storage type calculator.

**UNIT-I**

**Data Structures:** Introduction to elementary data organization, Common Operation on Data Structures, Algorithm Complexity, Big O Notation, Time-Space Tradeoff between Algorithms.

**Arrays:** Array defining, representing arrays in memory, various operations on linear arrays, Multi-Dimensional arrays.

**UNIT-II**

**Linked Lists:** Types of Linked Lists, representing linked list in memory, advantages of using linked lists over arrays, various operations of linked lists.

**Stacks:** Description of stack structure, Implementation of stack, using arrays and linked lists, application of stack-converting, arithmetic expression from infix notation to polish notation and their subsequent evaluation, quicksort technique.

### UNIT-III

**Queues:** Description of queue structure, Implementation of queue using arrays and linked lists, description or priorities of queues, dequeues.

**Sorting and Searching:** Sorting Algorithms, bubble sort, selection sort, insertion sort, quick sort, merge sort, heap sort, searching Algorithms, linear search and binary search.

### UNIT-IV

**Trees:** Description of Tree Structure and its Terminology, Binary Trees and Binary Search Trees and their representation in Memory, Heapsort.

**Graphs:** Description of Graph Structure, Implement Graphs in Memory using Adjacency Matrix, Path Matrix, graph traversal techniques - DFS, BFS.

### References / Textbooks:

1. Seymour Lipschutz, Data Structures with C (Schaum's Outline Series), McGraw Hill Education (2017), 1st Edition
2. Reema Thareja, Data Structures Using C, Oxford Publication (2014), 2nd Edition
3. Sahni Horowitz, Fundamentals of Data Structures in C (2008), 2nd Edition
4. Narasimha Karumanchi, Data Structures and Algorithms made easy, Careermonk Publications (2016), 5th Edition
5. S.K. Srivastava and Deepali Srivastava, Data Structures through C, BPB Publications (2004)
6. Yedidyah Langsam, Augestein and Tanenbaum, Data Structures using C and C++, Pearson Education India (2015), 2nd Edition

**Bachelor of Arts (Honours) / Bachelor of Science (Computer Science) (Honours)/  
Bachelor of Science (Economics) (Honours) Semester- IV**

**(Session 2025-26)**

**Course Code: BARM-4134**

BCSM-4134

BECM-4134

**COMPUTER SCIENCE**

**(DATA STRUCTURES)**

**(PRACTICAL)**

**Examination Time: 3 +3 Hrs.**

**Max. Marks: 100**

**L-T-P: 3-0-1**

**Theory: 40**

**Credits: 4**

**Practical:30**

**CA: 30**

Lab Exercises based on Implementation of Data Structures using C:

- Searching (binary search, linear search)
- Sorting: Bubble Sort, selection sort, insertion sort, quick sort, merge sort, heap sort.
- Linked list
- Stacks (Using Arrays)
- Queues (Using Arrays)
- Trees – Traverse the BST
- Graphs-transversal, finding the shortest path