Annexure G-3

FACULTY OF COMPUTER SCIENCE & IT

SYLLABUS

of

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

Credit Based Continuous Evaluation Grading System (CBCEGS)

Session: 2024-25
Batch: 2023-26

The Heritage Institution

KANYA MAHA VIDYALAYA JALANDHAR (Autonomous)

Kanya Maha Vidyalaya, Jalandhar (Autonomous)

SCHEME AND CURRICULUM OF EXAMINATIONS OF THREE YEAR DEGREE PROGRAMME

Bachelor of Arts / Bachelor of Science (Computer Science) / Bachelor of Science (Economics)

Session 2024-25

Bachelor of Arts / Bachelor of Science (Computer Science) / Bachelor of Science (Economics) 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 Semester III/ Bachelor of Science (Computer Science) Semester III / Bachelor of Science (Economics) Semester III	Computer Science (Computer Oriented Numerical and Statistical Methods))	BARM-3134 BCSM-3134 BECM-3134	E C E	3-0-2	3-0-1	4	100	50	30	20	3+3

Kanya Maha Vidyalaya, Jalandhar (Autonomous)

SCHEME AND CURRICULUM OF EXAMINATIONS OF THREE YEAR DEGREE PROGRAMME

Bachelor of Arts / Bachelor of Science (Computer Science) / Bachelor of Science (Economics)

Session 2024-25

Bachelor of Arts / Bachelor of Science (Computer Science) / Bachelor of Science (Economics) Semester-IV											
Course Name	**Program Name**	**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**		
Computer Science (Data Structures)	Bachelor of Arts Semester IV / Bachelor of Science (Computer Science) Semester IV/ Bachelor of Science (Economics) Semester IV	BARM-4134 BCSM-4134 BECM-4134	E C E	3-0-2	3-0-1	4	100	50	30	20	3+3

Bachelor of Arts / Bachelor of Science (Computer Science) /
Bachelor of Science (Economics) Semester- III
Session 2024-25
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 / Bachelor of Science (Computer Science) /
Bachelor of Science (Economics) Semester- III
Session 2024-25
Course Code: BARM-3134
BCSM-3134
BECM-3134

COMPUTER SCIENCE
(COMPUTER ORIENTED NUMERICAL AND STATISTICAL METHODS)
(THEORY)

Examination Time: 3 +3 Hrs.	**Max. Marks: 100**
	Theory: 50
L-T-P: 3-0-1	**Practical:30**
Credits: 4	**CA: 20**

Instructions for Paper Setter -

Eight questions of equal marks (10 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 / Bachelor of Science (Computer Science) /
Bachelor of Science (Economics) Semester- III
Session 2024-25
Course Code: BARM-3134
BCSM-3134
BECM-3134

COMPUTER SCIENCE
(COMPUTER ORIENTED NUMERICAL AND STATISTICAL METHODS) PRACTICAL

Examination Time: 3 +3 Hrs.	**Max. Marks: 100**
	Theory: 50
L-T-P: 3-0-1	**Practical:30**
Credits: 4	**CA: 20**

Practical on Computer Oriented Numerical and Statistical Methods.

Bachelor of Arts / Bachelor of Science (Computer Science) /
Bachelor of Science (Economics) Semester- IV
(Session 2024-25)
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 / Bachelor of Science (Computer Science) /
Bachelor of Science (Economics) Semester- IV
(Session 2024-25)
Course Code: BARM-4134
BCSM-4134
BECM-4134

COMPUTER SCIENCE
(DATA STRUCTURES)
(THEORY)

Examination Time: 3 +3 Hrs.	**Max. Marks: 100**
	Theory: 50
L-T-P: 3-0-1	**Practical:30**
Credits: 4	**CA: 20**

Instructions for Paper Setter -

Eight questions of equal marks (10 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, deques.

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 Strucetures 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 / Bachelor of Science (Computer Science) /
Bachelor of Science (Economics) Semester- IV
(Session 2024-25)
Course Code: BARM-4134
BCSM-4134
BECM-4134

COMPUTER SCIENCE
(DATA STRUCTURES)
(PRACTICAL)

Examination Time: 3 +3 Hrs. **Max. Marks: 100**
Theory: 50
L-T-P: 3-0-1 **Practical:30**
Credits: 4 **CA: 20**

Practical on Data Structures.