B.Sc. (CSM) – III

Semester – 5th (Session 2026 onwards)

Course code	Type	Subject Title	Credits
BCSM501	Major I	Visual Programming	3
BCSM501(P)	Major Lab I	Practicals Based on Visual Programming	1
BCSM502	Major II	Computer Oriented Numerical Methods	3
BCSM502(P)	Major Lab II	Practicals based on computer oriented numerical methods	1
BCSM503	Major III	Abstract Algebra	4
BCSM504A	Minor 4	Home Science	4
BCSM504B	Minor 5	Home Science	4
BCSM505	Compulsory	Punjabi	4
Internship	BIT		4

BCSM502: COMPUTER ORIENTED NUMERICAL METHODS

Max Marks — 70
Internal Exam— 20
External Exam— 50

INSTRUCTIONS FOR THE PAPER SETTER

The question paper covering the entire course shall be divided into three parts: A, B & C. Each of section A and B will have 4 questions from the respective sections of the syllabus of 8 marks and Section C will consist of 1 compulsory question of short – answer type having 9 parts of 2 marks each covering the entire syllabus uniformly.

INSTRUCTIONS FOR THE CANDIDATES

Candidates are required to attempt five question in all, selecting two question from each section A and B and the compulsory section C.
Use of scientific non-programmable calculator is allowed

SECTION-A

Floating point representation of numbers, Arithmetic operations with normalised floating point numbers and its consequences, Errors in numbers, Binary representation of numbers.
Solution of Transcendental and polynomial equations: Bi-section method, Regula-falsi method, Newton-Raphson method, Secant method, Iteration Method.

SECTION - B

Solution to simultaneous linear and algebraic equations: Gauss elimination method, pivoting, ill-conditioned equations, Gauss-Seidal iterative method.
Finite difference and Interpolation: Difference operators, Divided differences, (Definition and properties), relations among operators, Newton-Gregory formulae for forward and backward interpolation, Newton's interpolation formula for divided differences, Lagrange's interpolation formula, truncation error in various interpolation formulae.

TEXT BOOKS

1. S. Balachandra Rao and C.K. Shantha: 'Numerical Methods with Programs in BASIC, FORTRAN & PASCAL' University Press (INDIA) Ltd., Edition, 1992.
2. Bala Guruswamy: 'Computer Oriented Numerical Methods'.
3. H.C. Saxena: 'Calculus of Finite Differences and Numerical Analysis', S. Chand and Sons, Delhi, E.

RECOMMENDED READINGS

1. B.S. Grewal: Numerical Methods, Khanna Publishers, 2004.
2. S.S. Sastri: Introductory Methods of Numerical Analysis, PHI Ltd.

BCSM 502(P): Practicals based on Computer Oriented Numerical Methods

Credit: 1:2H (P)

Max Marks: 30

External Exam: 20

Internal Assessment: 10

Course Outcomes : The students will be able to use the computer software and programming language to perform the statistical method on data.

INSTRUCTIONS FOR PAPER SETTER AND CANDIDATES

The practical paper will consist of three exercises and the candidates will be required to attempt any two exercises.

Lab Course:

The exercises will be based on the syllabus of the paper BCSM502 Computer Oriented Numerical Methods

CSM-503: ABSTRACT ALGEBRA

Time Allowed : 3 hours

Max Marks-100
Internal Exam - 30
External Exam- 70

INSTRUCTIONS FOR THE PAPER SETTER

The question paper will consist of three sections A, B and C. Each of sections A and B will have four questions from the respective sections of the syllabus and section C will consist of one compulsory question having eleven parts of short-answer type covering the entire syllabus uniformly. All questions of sections A and B will carry 12 marks each whereas section C will carry 22 marks.

INSTRUCTIONS FOR THE CANDIDATES

Candidates are required to attempt five questions in all, selecting two questions from each section A and B and the compulsory question of section C. All questions of sections A and B will carry 12 marks each whereas section C will carry 22 marks.

SECTION-A

Group Theory: Semi-groups and groups, Examples: Integers modulo n under addition and under multiplication, Linear groups and finite Direct product of groups., subgroups and cosets, Euler-Fermat theorem, Cyclic Groups. Permutation groups, Cayley's theorem, Group of symmetries. Normal subgroups and Quotient groups, Homomorphisms and its theorems, Isomorphism and its theorems, Automorphisms,

SECTION-B

Ring theory: Definition and examples, the ring of integers modulo n. Elementary properties of rings. Types of rings. Integral domains, division rings and fields. The ring of matrices, the ring of polynomials, ring of endomorphisms of abelian group, Subring and characteristic of ring. Ideals, the Quotient ring of a ring by an ideal, principal ideals examples. Homomorphism, the fundamental theorem and the correspondence theorem. Unique factorization domains, principal ideal domains, Euclidean domains.

TEXT BOOKS

1. Bhattacharya, P.B. and Jain, S.K., Nagpaul S.R. (1983): Basic Abstract Algebra Chapters 4, 5, 9, 10 (Section 1 and 2 only) and Chapter 11.

RECOMMENDED READINGS

1. Herstein, I.N.: Topics in Algebra