Syllabus

BSC-CSM (Part I)

Session 2026 Onwards

Semester I

Course code	Course	Subject Title	Credits
BCSM101	Major - I	Information Technology	3
BCSM101(P)	Major-I Lab	Practical based on Information Technology	1
BCSM110	Major II	Descriptive Statistics	3
BCSM110(P)	Major-II Lab	Statistics Lab -1	1
BCSM103	Major III	Algebra and Differential Calculus	4
BCSM111	Minor-I	Office management and secretarial practices	4
BCSM106		Punjabi (Compulsory)	4
BCSM107	AEC-I	English(Composition and Grammer)	2
BCSM 108	IDC	Communication Skill	3
BCSM 109	SEC	Mathematical based practicals	3
BVAC1	VAC	Environment and road safety awareness	2

BCSM-103 ALGEBRA AND DIFFERENTIAL CALCULUS

External Marks: 70
Pass percentage:35%
Int. Assessment: 30

Course Objective: The objective of the course is to help the students to acquire the skills to solve simultaneous linear equations using concept of rank and learn applications of derivatives.

Course Learning Outcomes:

On completion of this course, the student will be able to

CO-1. Learn to find inflexion points of a curve using the concept of derivatives.

CO-2. Learn the concept of diagonalization of a matrix.

CO-3. Understand how to find Eigen values and corresponding eigenvectors for a square matrix.

CO-4. Learn the concept of limit and continuity of a function of single variable.

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 seven 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

Hermitian and skew- Hermitian matrices, Elementary operations on matrices, linear independence and dependence of row and column vectors, row rank, column rank and rank of a matrix and their equivalence, Normal form of a matrix, Theorems on consistency of a system of linear equations (both homogeneous and non-homogeneous). Eigen-values, Eigen-vectors and characteristic equation of a matrix, Cayley-Hamilton theorem and its use in finding inverse of a matrix, Diagonalization

SECTION-B

Differential Calculus: – definition of the limit of a function, Basic properties of limits, Continuous functions and classification of discontinuities,Differentiability, Successive differentiation, Leibnitz theorem,Asymptotes,Curvature, Tests for concavity and convexity, Points of inflexion,Multiple points.

RECOMMENDED *TEXT BOOKS*

1. **K.B. Datta: Matrix and Linear Algebra, Prentice Hall of India Pvt. Ltd., New Delhi, 2000.**

2. **S. R. Knight and H.S. Hall: Higher Algebra, H.M. Publications, 1994.**

3. ***P.K. Jain and S. K. Kaushik, Introduction to Real Analysis, S. Chand & Co. New Delhi, 2000.***

4. ***GorakhPrased Differential Calculus, Pothishala Private Ltd. Allahabad, 19th Edition, 2016***

5. **Shanti Narayan and P.K. Mittal: A Text Book of Matrices, S. Chand & Co., NewDelhi, Revised Edition, 2007**

BCSM 110: DESCRIPTIVE STATISTICS

Max. Marks: 70
Internal Assessment: 20
External Examination: 50

Course Objective:

To impart knowledge about gathering information in a measured and systematic manner to ensure accuracy and facilitate data analysis.

Course Learning Outcomes:

On completion of this course, the student will be able

CO-1. To learn various techniques for graphical representation of data.

CO-2. To understand the concept of correlation and regression of data.

CO-3. To study the basic concepts of data collection and its analysis.

CO-4. To learn the four descriptive measures of frequency distribution: Central Tendency, Dispersion, Skewness and Kurtosis.

INSTRUCTIONS FOR PAPER SETTER/EXAMINER

The question paper covering the entire course shall be divided into three parts, A, B & C. Each of sections A and B will have 4 questions from the respective sections of the syllabus of 8 marks each 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.

Scientific non-programmable calculator is allowed.

INSTRUCTIONS FOR 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.

Section A

Concepts of a population and sample, Quantitative and qualitative data, Nominal, Ordinal and time-series data, Discrete and continuous data, graphical representation of data, frequency distributions for discrete and continuous data, graphical representation of a frequency distribution by histogram, frequency polygon, frequency curve and ogives. Measures of central tendency and dispersion, Measures of skewness and kurtosis, Moments.

Section B

Bivariate data: Scatter diagram, Correlation and regression, Karl Pearson coefficient of correlation, principle of least-square, Lines of regression, Spearman's rank correlation coefficient and definition of partial correlation. Principal of least square and fitting of polynomials and exponential curves.

Books Recommended

1. A.M. Gun, M.K. Gupta and B. Dasgupta, Fundamentals of Statistics, Vol. 2, World Press, Kolkata, 2016.
2. S.C. Gupta and V.K. Kapoor, Fundamentals of Mathematical Statistics, 12th Edition, Sultan Chand and Sons, 2020.
4. R.V. Hogg, A.T. Craig and J.W. McKean, Introduction to Mathematical Statistics, 8th Edition, Pearson Education, 2022.
5. A.M. Mood, F.A. Graybill and D.C. Boes, Introduction to the Theory of Statistics, 3rd Edition, Tata McGraw.

BCSM 110 (P): Statistics Lab-I

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 BCSM110 : Descriptive Statistics