

St. Xavier's College (Autonomous), Ahmedabad
Syllabus of Semester – II of the following departments under Faculty of Science
based on Under Graduate Curriculum Framework – 2023 (NEP)
to be implemented from the Academic Year 2023-24.

FACULTY OF ARTS

DEPARTMENT OF STATISTICS

Course	Title	Content	Hours/Week	Credit
STMN221C	Mathematical Methods for Statistics – I	U-1: Function, Limit, and Graphs of different curves U-2: Differentiation and its application U-3: Partial Differentiation and its Application U-4: Matrix and Determinants	4 hrs	4

STMN221C Mathematical Methods for Statistics – I

CREDIT DISTRIBUTION, ELIGIBILITY AND PRE-REQUISITES OF THE COURSE

Course Title & Code	Credit Distribution of The Course (Total - 04 Credit)			Eligibility Criteria	Prerequisite(s) of the Course (if any)
	Lecture	Practical	Experiential Learning		
Mathematical Methods for Statistics – I & STMN221C	4	0	0	10 + 2 from a recognized board in any stream	Basic Mathematics, Observation & Analytical Skills

Course Outcomes:

- CO-1 Demonstrate the skill of associating function. To find Limit and identify different Graphs and their Curves.
- CO-2 Demonstrate the skill of finding Differentiation and their applications in economics and psychology.
- CO-3 Identify the need of Partial differentiation for Business and Economics situations. Demonstrate the Homogenous function.
- CO-4 Identify the need of matrix and determination for Business and Economics data. Reflect the Application

Learning Outcomes: After completion of this course, the students will be able to

- (1) Find Functions, limits, and different graphs.
- (2) Find Differentiation, Partial Differentiation, and its application
- (3) Find Matrix and Determinants with applications

Unit: 1 Function, Limit, and Graphs of Different Curves (15Hrs)

- Concept of the function of a single variable (Linear, Quadratic and exponential function only)
- Domain, Co-domain, and Range of a Function.
- Types of a function. A simple example of a function.
- Concept of Limit, Rules of limit (Without proof)
- Simple examples of limit.
- Drawing of graphs using different functions.

Unit: 2 Differentiation and its application (15Hrs)

- Concept of the derivative of a real function,
- Rules of derivative without proof.
- Derivative of the function of types:
 $ax+b$, ax^2+bx+c , $(ax+b)(cx+d)$, $(ax+b)/(cx+d)$, x^n , e^x , $\log x$
- To find the rate of change, To determine whether the function is increasing or decreasing
- To find the Maximum and minimum values of the function.

Unit: 3 Partial Differentiation and its Application (15Hrs)

- Definition of partial derivative involving two variables only up to first and second order.
- Homogenous function
- Euler's theorem (Statement only).
- Simple examples.

Unit: 4 Matrix and Determinants (15Hrs)

- Concept of determinant and its properties (without proof)
- Simple examples of determinants and Cramer's rule
- Concept of matrix
- Types of matrices
- Addition and Multiplication of two matrices
- Transpose, minor and adjoint of matrices
- Inverse of a matrix
- Use of matrices to solve simultaneous equations (for two and three variables only).

Teaching Methodology: Apart from the conventional blackboard teaching, other modes of teaching that will be adopted are power points, group discussions, quizzes, class tests, problem-solving, and assignments.

References:

1. D.S. Sancheti & V. K. Kapoor: Statistics: Theory, Methods & Application”, Sultan Chand & Sons, New Delhi.
2. D. N. Elhance: Fundamentals of statistics”
3. Goon, Gupta, Das Gupta: An outline of statistical Theory” Vol1 and 2, Word press, Calcutta.
4. Mathematics books of standard 11th and 12th science published by NCERT/State boards of Education
5. D.S. Sancheti & V.K. Kapoor: “Business Mathematics” Sultan Chand & Sons, New Delhi.
6. Parimal Mukhopadhyay: “Mathematical Statistics” Books & allied (p) Ltd.