M. G. Science Institute, Ahmedabad

Autonomous | Affiliated to Gujarat University, Ahmedabad

(Managed by The Ahmedabad Education Society)

Department of Statistics

Bachelor of Science (Hons.) in Statistics

B.Sc. (Hons.) Statistics

4 Year, 8 Semester Full-Time Programme

Choice Based Credit System (CBCS) & Grading System

Outcome-Based Education Pattern

(Effective from Academic Year 2024-25)

Detailed Syllabus for Each Course B.Sc. (Hons.) Statistics

STE354 Statistics For Mathematics-II

Semester: III	Course Title: Statistics For Physics-II (T)	Credit: 2
Course No.: STMDC354		Hours: 2/week

Course Outcomes: On successful completion of the course the learner will be able to

CO	COGNITIVE ABILITIES	COURSE OUTCOMES
CO 1	REMEMBERING	Recall basic concepts of random variables, probability distributions, correlation, and regression.
CO 2	UNDERSTANDING	Explain properties of discrete and continuous probability distributions with illustrations.
CO 3	APPLYING	Apply probability distributions and statistical measures to solve real-life problems.
CO 4	ANALYSING	Analyse relationships between variables using correlation and regression methods.
CO 5	EVALUATING	Evaluate the fit of regression models and appropriateness of probability distributions for given datasets.
CO 6	CREATING	Construct regression equations and probability models for practical applications.

CO / PSO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	2	1	0	0
CO2	1	1	0	2	0
CO3	1	2	3	0	0
CO4	2	1	2	2	1
CO5	0	0	0	0	0
CO6	0	0	0	0	0

Unit	Detailed Syllabus	No. of Hours of Teaching
I	**Random Variable (Univariate and Bivariate)** Random Variable (rv) with its types, probability mass function pmf), probability density function (pdf), cumulative distribution function (cdf) with illustrations. Expectation of Random variables with properties, Concept of Joint Distributions, Joint probability mass function and Joint probability density function. Marginal and conditional distributions, independence of random variables, conditional expectation and conditional variance. Product moments.	15
II	**Discrete Probability Distribution-I** Bernoulli distribution, Binomial distribution, Poisson distribution: Derivation, basic properties of these distributions – Mean and Variance, Applications and examples of these distributions.	15
III	**Continuous Probability Distribution-I** Uniform / Rectangular Distribution, Exponential Distribution, Derivation, basic properties of these distributions – Mean and	15

	Variance. Normal Distribution: Definition, Basic properties of Normal distribution: Mean, Variance, Application and examples of Normal Distribution.	
IV	**Correlation and Regression** Bivariate data, plotting of bivariate data, Scatter diagram, Karl Pearson correlation coefficient for bivariate data, its properties, coefficient of determination, rank correlation, correlation ratio and related results. Principle of Least squares, fitting of Linear, Parabolic, exponential and geometric curves. concept of regression, Determination of equation of regression lines for two random variables, properties of regression coefficients and related results.	15

Suggested Reference Books:

1. Applied Statistics, Publisher: Books & Allied (P) Ltd. Mukhopadhyay P. (2015).
2. Basic Statistics, Agarwal, B. L., New Age International (P) Ltd.
3. Introduction to the theory of Statistics, Mood, A. M., Greybill, F.A., Boes, D.C., McGraw Hill.
4. Fundamentals of Mathematical Statistics, S. C. Gupta and V. K. Kapoor, Sultan Chand and Sons, New Delhi.
5. Statistical Methods, Tata Mcgraw Hill Publishing. Das (2009).
6. Statistical analysis: Graphs and diagrams, S. M. Nair and M. Garg, Spectrum Books (P) Ltd, New Delhi.