Gujarat University
B. Sc. Semester – III – Statistics (Multidisciplinary)
Effective from June - 2024

Prerequisite:

B.Sc. Statistics is an undergraduate course that deals primarily with statistics, probability, and permutations. Students who are thinking of pursuing a BSc Statistics must have completed cleared semesters I and II with statistics subject as major, minor or multidisciplinary. A fundamentally sound knowledge of probability theory, random variables and probability distributions is desirable. Knowledge and exposure to any statistical tool is recommended. Students must have basic know how of numerical or qualitative information, methods of collecting numerical or qualitative information through attributes, graphical presentation and some primary measures, like arithmetic mean, median, mode.

Co-requisite

Fundamental knowledge about use of scientific calculator and functionality of computers is necessary. Knowledge and basic understanding of MS – Office is recommended.

Vision and Outcome

The aim of introducing statistics as a subject and scientific tool as well, at an undergraduate level is to provide students a strong theoretical foundation, which is on par with other institutions and colleges with reputation of national level. At the same time, enough care is taken to emphasize on the course contents that enhance the ability of students to gain knowledge of open-source statistical software. This enables students' understanding in dealing with real life problems from statistical viewpoint. The weightage is given to fieldwork and projects that make students develop statistical thinking and work independently.

Outcomes

	Students will demonstrate an understanding of major concepts in statistics.
Programme Outcome	Students tend to think critically and apply their understanding to develop ability to design, collection, presentation, analyse and interpret of data based problems of real life situations.

Programme Specific Outcome	The ability to identify type of observable phenomena and probability distributions that are associated with observable phenomena. This helps them to collect the relevant data and to verify different properties of associated probability distribution. The design and execution of the proper statistical analysis reveals their understanding of good analytical skills and proper handling of statistical data.

Course   Outcomes

Statistics **MDC – STA - 234T** **Statistics for Physics**	This course is designed to enable students to understand the purpose of extension of one dimensional random variables to Two or Three or Multi- dimensional random variables. At under graduate level, study is restricted to Three random variables. The students can establish association among variables and its measure in terms of correlation. The outcomes are 1. Develop understanding about bivariate data, association through scatter diagram, least square principle for error minimization, correlation coefficient 2. Multiple and partial correlation coefficient Independent and dependent variable, and establish the relation between them by computing correlation coefficient and association of attributes.
Statistics **MDC - STA-234P** **(Practical)**	To Develop understanding about bivariate data, association through scatter diagram, least square principle for error minimization, correlation coefficient is introduced. To understand and identify cause and effect relationship, association as linear or curvilinear between two random variables, correlation analysis along with its coefficients are introduced. For prediction analysis of dependent variable is characterized by regression analysis and other related aspects are introduced and discussed through numerical data. Students learn how to analyse and interpret results for a valid data set. This paper is based on Theory papers MDC- STA - 234T

Course Structure with Credits, Lecture Hours and Marks

Course Code	Course Title	Credit	Lecture Hours Per Week	Exam Hours	Marks		
					Internal	**External**	**Total**
MDC– STA - 234T	Statistics for Physics	**2**	**2**	**1.5**	**25**	**25**	**50**
MDC- STA – 234P	Practical	**2**	**4**	**1.5**	**25**	**25**	**50**

Gujarat University
NEP (2020)
Syllabus for B.Sc. Semester III (Statistics – Multidisciplinary (MDC))
MDC-STA-234 T
<u>Statistics for Physics</u>
Effective from June, 2024

HOURS: 2 / week   *CREDIT: 2*

Unit I: Correlation Analysis
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.

Unit II: Regression Analysis
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.

MDC- STA - 234 P
PRACTICALS BASED ON MDC- STA - 234 T
HOURS: 4 / week   *CREDIT: 2*

Part A (Manual)
1. Plotting of bivariate data. Scatter diagram
2. Calculation of correlation coefficient by karl pearson formula
3. Rank correlation coefficient.
4. Problems based on properties of regression coefficient
5. Fitting of straight line, second degree parabola.
6. Fitting of curve reducible to straight line.
7. Problems based on multiple and partial correlation
8. Problems based on multiple and partial correlation regression.

Part B (Computer)
1. Plotting of bivariate data. Scatter diagram
2. Calculation of correlation coefficient by Karl Pearson formula
3. Rank correlation coefficient.
4. Problems based on properties of regression coefficient
5. Fitting of straight-line, second-degree parabola.
6. Fitting of curve reducible to straight line.
7. Problems based on multiple and partial correlation
8. Problems based on multiple and partial correlation regression.

Reference Books:

1. Hogg, R.V. and Craig, A.T. (1972): Introduction to Mathematical Statistics, Amerind Publishing Co.
2. Mood, A.M., Greybill, F.A. and Bose, D.C. (1974): Introduction to the Theory of Statistics, McGraw Hill.
3. Mukhopadhyay, P. (1996): Mathematical Statistics, New Central Book Agency.
4. Rohtagi, V.K. (1967): An Introduction to Probability Theory and Mathematical Statistics, John Wiley and Sons.
5. Hoel, P.G. (1971): Introduction to Mathematical Statistics, Asia Publishing House.
6. Meyer, P.L. (1970): Introductory Probability and Statistical Applications, Addison Wesley.
7. Gupta, S.C., and Kapoor, V.K. Fundamentals of Mathematical Statistics, Sultan Chand Publications.
8. Goon, A.M., Gupta, M.K. and Das Gupta, B. (1991): Fundamentals of Statistics, Vol. I, WorldPress, Calcutta.
9. A First Course in Probability - Sheldon.M.Ross, (Mc Millian publishing Co.) Introduction to Probability and Statistics for Engineers and Scientists-S.M. Ross

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FBLD (Flip Blended Learning Design Template)

- Any One Unit from the above syllabus can be discussed by the faculty through online mode.
- Online mode can be SWAYAM MOOC Course or any other suggested by the UGC or Gujarat University.