

Course Title:	Statistical Methods-I
Course Code:	STAT-202
Semester:	III
Credit Hours:	3 Credit Hours
Pre-requisites:	STAT-101, STAT-102

Learning Outcomes:

By the end of this course, students will get to:

1. Learn the several types of sampling designs and their applications.
2. Know that how to construct the sampling distributions of various statistics.
3. Understand the concepts and applications of statistical methods employed to draw inferences about the population.
4. Have the basic ideas about rates and ratios.

Course Outline

Unit 1

1.1 Concept of sampling and sampling designs

Sampling designs of Simple random, Stratified, Systematic and Cluster sampling, Judgment and Quota Sampling. Random Numbers and their uses in sampling. Advantages of sampling. Probability and non-probability sampling, sampling and non-sampling error.

1.2 Estimation based on Sampling

Calculation of sample mean, proportion and variance of simple random samples and stratified random samples. Sampling distribution of a statistic and its standard error. Distribution of sample mean, sample proportion, difference between two proportions and means. Central limit theorem with illustration (Proof not required).

Unit 2

2.1 Basics of statistical Inference

Nature of statistical inference, point estimation of parameter, properties of point estimator and its interpretation. Null and alternative hypothesis, simple and composite hypothesis. Type I and Type II errors. Level of significance. P-value and power of test (only concept and definition), Acceptance and rejection regions, one-sided and two-sided tests, test procedure. Inference about single mean and difference between means for paired and un-paired observations for small and large sample sizes. Inference about proportion and difference between two proportions. Determination of sample size. (Application of Normal distribution and t-distribution)

- **Teaching-learning Strategies:**

Class Lecture method, which includes seminars, discussions, assignments and projects. (Audio-visual tools are used where necessary)

- **Assignments-Types and Number with calendar:**

According to the choice of respective teacher.

- **Assessment and Examinations:**

According to the University's Semester Rules.

Sr. No.	Elements	Weightage	Details
1	Midterm Assessment	35%	It takes place at the mid-point of the semester.
2	Formative Assessment	25%	It is continuous assessment. It includes: Classroom participation, attendance, assignments, and presentations, homework, attitude and behavior, hands-on-activities, short tests, quizzes etc.
3	Final Assessment	40%	It takes place at the end of the semester. It is mostly in the form of a test, but owing to the nature of the course the teacher may assess their students based on term paper, research proposal development, field work and report writing etc.

Text Books

1. Beg, M.A., & Mirza, M.D. (2006). *Statistics, Theory and Methods*, Volume II, Carven Book House, Kutechery Road, Lahore.
2. Chaudhry, S.M., & Kamal, S. (2010). *Introduction to Statistical Theory Part II*, Ilmi Kitab Khana, Urdu Bazar, Lahore.

Suggested Readings

1. Blumen. (2011). *Elementary Statistics* (8th ed.). McGraw Hill, New York.
2. Crawshaw, J., & Chambers, J. (2014). *A concise course in advanced level Statistics with worked examples*. Nelson Thornes, Revised Edition.
3. Johnson, R.A., & Wichern, D.W. (2003). *Business Statistics: Decision making with data*. John Wiley & Sons Inc.
4. Levin, J., & Fox, J.A. (2013). *Elementary Statistics in Social Research* (12th ed.). Pearson Education.
5. Levine, D.M., Kschbiel, T.C., & Berenson, M.L. (2009). *Business Statistics: A first course* (5th ed.). Pearson Education.
6. Macfie, B.P., & Nufrio, P.M. (2006). *Applied Statistics for public policy*. Prentice Hall of India.