Code	Subject Title	Cr. Hrs	Semester
STAT-201	Statistics-III	3	III
Year	Discipline		
2	Statistics-I,II,III, Mathematics-II		

Code	Subject Title	Cr. Hrs	Semester
STAT-202	Statistics Lab-III	1	III
Year	Discipline		
2	Statistics-I,II,III, Mathematics-II		

Course Outline

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. 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).

Statistical Inference

Nature of statistical inference, point and interval estimation of parameter, properties of point estimator, confidence interval 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).

Inference about Variance

Introduction and application of Chi-square distribution: Interval estimation and test of hypothesis about population variance (Interval estimation for variance – single sample).

Introduction and application of F-distribution: test of hypothesis for equality of two variance.

Recommended Books

1. Chaudhry, S.M. & Kamal, S. (2010). Introduction to Statistical Theory Part II, Ilmi Kitab Khana, Urdu Bazar, Lahore.
2. Macfie, B.P. and Nufrio, P.M. (2006). Applied Statistics for public policy, Prentice Hall of India.
3. Crawshaw, J and Chambers, J. (2001). A concise course in advanced level Statistics with worked examples, Nelson Thornes, 4th Edition.
4. Medhi, J. (1992). Statistical Methods: An Introductory text, New Age International Publishers.

5. Levin, J. and Fox, J.A. (2006). Elementary Statistics in Social Research, 10th edition, Pearson Education.
6. Beg, M.A. and Mirza, M.D. (2006). Statistics, Theory and Methods, Volume II, Carven Book House, Kutechery Road, Lahore.
7. Graybill, Iyer & Burdick (1998). Applied Statistics, A first course in inference. Prentice Hall, New Jersey.
8. Moore D.S., McCabe G.R., (1997). Introduction to the Practice of Statistics, 3rd Edition, Will Freeman & Co., New York.
9. Blumen (1997), Elementary Statistics, 3rd Edition, McGraw Hill, New York.
10. Chaudhry, R.M. (1998). Polymer Modern Statistics, Polymers.
11. Johnson, R.A. and Wichern, D.W. (2003). Business Statistics: Decision making with data, John Wiley & Sons Inc.
12. Levine, D.M., Kschbiel, T.C. and Berenson, M.L. (2003). Business Statistics: A first course, 3rd edition, Pearson Education.