UNIVERSITY OF THE PUNJAB, LAHORE

Course Title: Quantitative Methods-II
Course Code: BSC-112 Credit Hours: 03
Program: BS Commerce Semester: 02

Course Objectives:

This course provides basic overview of the statistical methods and analysis of data. After studying the course, students would be able to analyze historical data for decision making. This course also provides an insight into basic probability theory and sampling procedures.

Prerequisites:

1 Quantitative Methods 1

Unit-1

1. Basics of statistics: Collection and tabulation of data
   1.1. Studying statistics and its applications in business
   1.2. Understanding various methods of data collection
   1.3. Learning to organize and summarize data in a frequency distribution
   1.4. Presenting data using simple bar charts, multiple bar charts and component bar chart
   1.5. Using a pie chart, histogram, frequency polygons, ogives, stem and leaf plots, and box and whisker plots and analyzing data

Unit-2

2. Measures of central tendency and dispersion
   2.1. Learning to calculate measures of central tendency: mode, median, arithmetic mean, geometric mean, and harmonic mean
   2.2. Understanding pros and cons of different measures of central tendency
   2.3. Understanding and using measures of dispersion: standard deviation, variance, range
   2.4. Using measures of dispersion to ascertain degree of variation or variability in a distribution

Unit-3

3. Index numbers
   3.1. Understanding index numbers, their types, uses and limitations
   3.2. Using different methods to calculate index numbers
   3.3. Applying index numbers to purchasing power and inflating or deflating a series

Unit-4

4. Methods of lease square and regression
   4.1. Understanding and using scatter diagrams and their limitations
   4.2. Understanding basics of a regression line and uses
   4.3. Using least square linear regression to construct a regression line and analyze it
   4.4. Using regression line to forecast value of dependent variable if value of independent variable is provided

Unit-5

5. Correlation
   5.1. Understanding basic concept of correlation and calculating and analyzing correlation coefficient and coefficient of determination
   5.2. Understanding and using rank order correlation and analyzing it
   5.3. Counting techniques and probability theory
   5.4. Using counting techniques like mn counting rule, and factorials
   5.5. Using permutations and combinations to see total numbers of outcomes
   5.6. Understanding probability and other basic terminology of probability theory

Unit-6

6. Addition law for mutually exclusive and non- mutually exclusive events
   6.1. Multiplication laws for dependent and independent events
   6.2. Using addition rule to calculate probability
   6.3. Understanding different between mutually exclusive and non-mutually exclusive events
   6.4. Using multiplication rule to calculate conditional probability
   6.5. Understanding difference between dependent and independent events

Unit-7

7. Binominal distribution and Poisson distribution
   7.1. Understanding assumptions of binominal distribution and using it in calculation of probabilities
   7.2. Understanding properties of Poisson distribution and using it in calculation of probabilities

Unit-8

8. Hyper-Geometric distribution and normal distribution
   8.1. Understating uses of hypergeometric distribution and using it to calculate probabilities
   8.2. Understanding uses of normal distribution and use of its tables
   8.3. Using normal distribution to calculate probabilities

Unit-9

9. Sampling theory: Simple random sampling
   9.1. Understanding basics of sampling theory: population, sample, sampling space
   9.2. Understanding and using simple random sampling
   9.3. Sampling distribution of a mean and standard error of a mean
   9.4. Sampling with and without replacement
   9.5. Understanding and developing a sampling distribution for sampling mean, and calculating mean and standard deviation of a sampling distribution
   9.6. Understanding and calculating standard error of mean
   9.7. Using appropriate sampling technique to calculate probabilities for sampling mean

Unit-10

10. Testing hypothesis for population mean, difference between population means and population proportion and between two population properties
    10.1. Using hypothesis testing and significance criteria
    10.2. Performing hypothesis test of population means based on small and large samples

10.3. Performing hypothesis tests of the difference between two population means based on small and large samples
10.4. Performing hypothesis tests of the difference between two population properties

Unit-11

11. Understanding to select appropriate distributions i.e. z or t for constructing confidence interval for a population mean
    11.1. Single proportion variance based on test of Chi-square
    11.2. Confidence interval for estimating population means, proportions, and variance, and differences between proportion means, proportion and variance
    11.3. Using Chi-Square distribution to test goodness of fit and independence
    11.4. Constructing confidence interval for population means and differences of means
    11.5. Constructing confidence interval for population means and difference of proportion and variance
    11.6. Determination of sample size for the study of population mean and proportion
    11.7. Calculating sample size for an interval estimate of population mean and proportion

Teaching-Learning Strategies

- Lectures
- Handouts (hard or soft copies)
- Group Discussions
- Presentations
- Assignments

Assignments

- Short tests
- Quizzes
- Term Paper
- Research Papers

Assessment and Examinations: As per University Rules

- **Mid-Term** Written Paper **35 %**
- **Final Examination** Written Paper **40 %**
- **Sessional** Quizzes and Tests, Assignment and Presentations, Attendance, Class Participations and Discipline etc. **25 %**

Textbooks

1. Bowra, Z. A. (2020). Business Statistics and Mathematics, Azeem Academy, Lahore

Suggested Readings

Books

- Mirza, S.H. (latest edition). Business Mathematic for Management and Finance,
- L W Stafford, Business Mathematics.
- Richard Lacava, Business Statistics.
- Nasir Ali Syed, and G H Gill, Statistics and Business Mathematics, Fair Publication, Lahore

Journal Articles/ Reports/ Web Sources

- https://www.khanacademy.org/math
- https://www.mathsisfun.com/index.htm
- https://www.intmath.com/
- https://www.ixl.com/math/
- https://www.mathplanet.com/