Course Title	Introduction to Statistics
Course Code	STAT-103
Pre-Requisite	NA
Degree Program (BS / MS / PhD)	BS

Course Objectives

This course will help students understand and explain:

1. Descriptive Analysis; Graphical
2. Descriptive Analysis; Quantitative
3. Measures of Central Tendency
4. Measures of Variation
5. Measures of Association
6. Inferential Statistics; Sampling Distribution

Learning Outcomes

After the completion of the course, the students will be able to:

1. Perform graphical profiling of data and analyzing patterns in univariate and multivariate data.
2. Perform quantitative profiling of univariate and multivariate data.
3. Use Induction to generalize from sample to population

Contents

Week	Topic
1	• Why Study Statistics? What Is Meant by Statistics? • Types of Statistics • Descriptive Statistics • Inferential Statistics • Types of Variables • Levels of Measurement: Nominal-Level Data: Ordinal-Level Data: Interval-Level Data: Ratio-Level Data • Statistics, Graphics, and Ethics • Misleading Statistics • Association Does Not Necessarily Imply Causation

	• Graphs Can Be Misleading: Become a Better Consumer and a Better Producer of Information: Ethics
2	• Constructing a Frequency Distribution • Class Intervals and Class Midpoints • Relative Frequency Distribution • Graphic Presentation of a Frequency Distribution • Histogram
3	• Frequency Polygon • Cumulative Frequency Distributions • Other Graphic Presentations of Data • Line Graphs • Bar Charts • Pie Charts
4	• Describing Data: Numerical Measures • The Population Mean • The Sample Mean • Properties of the Arithmetic Mean • The Weighted Mean • The Median • The Mode • The Relative Positions of the Mean, Median and Mode • **Quiz 1: Topics Covered So Far**
5	• The Geometric Mean • Why Study Dispersion? • Measures of Dispersion: Range • Mean Deviation • Variance and Standard Deviation • Interpretation and Uses of the Standard
6	• Describing Data: Displaying and Exploring Data • Dot Plots, Quartiles, Deciles, and Percentiles • Box Plots • Skewness • Kurtosis

7	• Describing the Relationship between Two • Variables, Detecting Outliers from the data
8	• What Is a Probability? • Approaches to Assigning Probabilities • Classical Probability • Empirical Probability • Subjective Probability • Some Rules for Computing Probabilities: Rules of Addition
9	• **Mid-Term Exam Week**
10	• Rules of Multiplication • Contingency Tables • Tree Diagrams • Principles of Counting • The Multiplication Formula • The Permutation Formula • The Combination Formula
11	• What Is a Probability Distribution? Random Variables • Discrete Random Variable Continuous Random Variable • The Mean, Variance, and Standard Deviation of a Probability Distribution • Mean Variance and Standard Deviation of Binomial Probability Distribution
12	• How Is a Binomial Probability Distribution Computed: Binomial Probability Tables. • Cumulative Binomial Probability Distributions: Poisson Probability Distribution
13	• Continuous Probability Distributions • The Family of Uniform Distributions: The Family of Normal Probability Distributions • The Standard Normal Distribution • The Empirical Rule

	• Finding Areas under the Normal
14	• Sampling Methods and then Central Limit Theorem • Sampling Methods • Reasons to Sample • Simple Random Sampling
15	• Construction of sampling distribution of sample mean
16	• Review of topics after the midterm exam and presentations.

Readings List (including Books, Journals, Papers Articles, & Websites whatever is applicable)

a. Douglas, A, L, Mason, Robert, D. M & Marchal, William, G "Basic Statistics for Business and Economics". McGraw-Hill 6th Edition, 2007
b. Paul Newbold, William L. Carlson & Betty Thorne. Statistics for Business & Economics, 8th Edition (Pearson-Prentice Hall), 2013.
c. Wonnacott, Thomas H., and Ronald J. Wonnacott, 1990. *Introductory Statistics for Business and Economics*, 4th ed., Wiley.
d. Haider, M. "Getting Started with Data Science: Making Sense of Data", IBM Press, Pearson, 1st Edition, 2016.