

**INTI INTERNATIONAL UNIVERSITY****COURSE STRUCTURE****COURSE: STA1102 QUANTITATIVE METHODS (4 cr)****PREREQUISITE:**

None

**COURSE DESCRIPTION:**

This course consists of topics from descriptive statistics, probability and statistical inferences, forecasting techniques, index numbers and chi-square analysis. Descriptive statistics covers organizing, presenting, and summarizing data. Probability includes basic probability and probability distribution. Statistical inferences emphasizes on estimation and hypothesis testing of large and small samples. Under forecasting techniques concept of simple linear regression and correlation are covered. In addition, students are introduced to the SPSS software where they learn how to present the data collected, and perform hypothesis testing, regression, and correlation analysis.

**LEARNING OBJECTIVES:**

The aims of this course are to enable students to:

1. Present and analyze data using descriptive statistics, index numbers and SPSS software.
2. Solve problems involving uncertainty using the basic laws of probability.
3. Identify the properties of a normal distribution.
4. Apply concepts of statistical inferences, linear regression and correlation between two variables.

**LEARNING OUTCOMES:**

Successful students will be able to:

1. Present a data set using appropriate graphical approaches and use them for estimations.
2. Calculate and interpret the measures of location, dispersion, hypothesis testings, simple linear regression and correlation using SPSS software.
3. Solve problems using the laws of probability and problems involving normal probability distribution.
4. Calculate point and interval estimates of population means and population proportion and interpret the confidence intervals.
5. Calculate and interpret unweighted and weighted index numbers.

**COURSE FORMAT:**

Instructional/Lecture: 3 hr per week, Tutorial: 1 hr per week, Laboratory Work: 2 hr per week.

[For short semester, Instructional/Lecture: 6 hr per week, Tutorial: 2 hr per week, Laboratory Work: 4 hr per week.]

| <b>Total Student Learning Time (SLT) (L = Lecture; T = Tutorial; P = Practical; O = Others):</b> |    |    |    |   |   |
|--|----|----|----|---|---|
| <b>Face to Face</b>  |    |    |    | <b>Guided &amp; Independent Learning (hr)</b> | <b>Total Student Learning Time (hr)</b> |
| L  | T  | P  | O  |   |   |
| 36   | 14 | 20 | 12 | 83  | 165                                     |

**STUDENT EVALUATION:**

Test 1: 15%, Test 2: 15%, Assignments/Quizzes/Student-centered Assessment: 20%, Laboratory Work: 10%.

Final Examination: 40%.

**FINAL EXAMINATION FORMAT:**

Duration: 2 hours

Answer any FOUR out of FIVE structured-type questions.

**GRADING SCALE:**

A+ (90-100), A (80-89), A- (75-79), B+ (70-74), B (65-69), B- (60-64), C+ (55-59), C (50-54), C- (45-49), D (40-44), F (0-39).

**BASIC TEXT:**

Mann, PS. Introductory Statistics. 8<sup>th</sup> ed., Wiley, 2013.

**REFERENCES:**

1. Lind, DA, Marchal, WG & Wathen, SA. Statistical Techniques in Business and Economics. 15<sup>th</sup> ed., McGraw Hill, 2012.

2. Bowerman, BL, O'Connell, RT, Murphree, ES & Orris, JB. Essentials of Business Statistics. 4<sup>th</sup> ed., McGraw Hill, 2012.
3. McClave JT & Sincich, T. First Course in Statistics. 11<sup>th</sup> ed., Pearson, 2013.
4. Triola, MF. Elementary Statistics. 12<sup>th</sup> ed., Addison-Wesley, 2014.
5. Keller, G. Managerial Statistics. 9<sup>th</sup> ed., Cengage, 2012.

**CLASS SYLLABUS:****Sessions(s)      Topics**

|         |  |
|---------|--|
| 1 & 2   | <b>Introduction</b><br>What is statistics. Types of statistics. Basic terms. Types of variables.<br><b>Organizing and Graphing Data</b><br>Raw data. Organizing and graphing quantitative data. Shapes of histograms. Cumulative frequency distributions.  |
| 3 – 8   | <b>Numerical Descriptive Measures</b><br>Measures of central tendency for ungrouped data. Measures of dispersion for ungrouped data. Mean, variance, and standard deviation for grouped data.  |
| 9 – 12  | <b>Probability</b><br>Experiment, outcomes, and sample space. Calculating probability. Counting rule. Marginal and conditional probabilities. Mutually exclusive events. Independent versus dependent events. Complementary events. Intersection of events and the multiplication rule. Union of events and the addition rule.<br>Test 1   |
| 13 & 14 | <b>Continuous Random Variables and the Normal Distribution</b><br>Continuous probability distribution. The Normal distribution. The standard normal distribution. Standardizing a normal distribution. Applications of the normal distribution. Determining the $z$ and $x$ values when an area under the normal distribution curve is known.  |
| 15 & 16 | <b>Sampling Distributions</b><br>Population and sampling distributions. Sampling and nonsampling errors. Mean and standard deviation of $\bar{x}$ . Shape of the sampling distribution of $\bar{x}$ . Applications of the sampling distribution of $\bar{x}$ . Population and sample proportions. Mean, standard deviation, and shape of the sampling distribution of $\hat{p}$ . Applications of the sampling distribution of $\hat{p}$ . |
| 17 & 18 | <b>Estimation of the Mean and Proportion</b><br>Estimation: an introduction. Point and interval estimates. Estimation of a population mean: $\sigma$ known. Estimation of a population mean: $\sigma$ not known. Estimation of a population proportion: large samples.   |
| 19 – 22 | <b>Hypothesis Tests about the Mean and Proportion</b><br>Hypothesis tests: an introduction. Hypothesis tests about $\mu$ : $\sigma$ known. Hypothesis tests about $\mu$ : $\sigma$ not known. Hypothesis tests about a population proportion: large samples.<br>Test 2   |
| 23 & 24 | <b>Chi-Square Tests</b><br>The chi-square distribution. A goodness-of-fit test. Contingency tables. A test of independence or homogeneity.   |
| 25 & 26 | <b>Simple Linear Regression</b><br>Simple linear regression model. Simple linear regression analysis. Coefficient of determination. Linear correlation.  |
| 27 & 28 | <b>Index Numbers</b><br>Construction of index numbers. Unweighted indexes. Weighted indexes. Special-purpose indexes. Shifting the base.   |

**Final Examination****LABORATORY WORK:**

1. Data Entry, Select Cases, Frequency Table, Cross Tabulations
2. Descriptives, Compute, Histogram
3. Recode, Pie Chart, Bar Charts, Sort Cases
4. Confidence Interval For The Mean
5. Test of Hypothesis
6. Chi-Square Test I
7. Chi-Square Test II
8. Linear Regression And Correlation Analysis
- 9/10. SPSS Project