Course Outline

ST216 Statistics for Social Science 1

Semester 2/2024 (January 20 - May 14, 2025)

Lecture Time: Section 046401 Tuesday 09.00-12.00 hours

Section 046402 Thursday 09.00-12.00 hours

Lecture Venue: Section 046401 and Section 046402 Room 202, Faculty of Economics

Teaching Materials Platform: MS Teams

Instructor: Section 046401 and Section 046402

Name: Assoc. Prof. Dr. Supranee Lisawadi

Office Hours: by appointment only

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Number of Credit: 3 Credits (3-0-6)

Prerequisite: -

Course Description:

Introduction to descriptive statistics; index numbers; unconditional and conditional probability; random variables and probability distribution; unconditional and conditional expectations; elementary sampling and sampling distribution; estimation and hypotheses testing for one population; statistical package results interpretation.

Course Objectives:

This course covers the standard methods of descriptive statistics and some statistical inference needed for economics. The purpose of the course is to provide students in the economic sciences with enough understanding of statistical ideas and methodology to

communicate knowledgeably and effectively with specialists in these technical areas. Upon successful completion of this course, students will be able to complete the following tasks:

1. Explain basic concepts of social statistics (e.g., population, sample, sampling distribution).
2. Summarize numeric data by computing descriptive statistics (e.g., mean, variance) and by creating tables and graphs. For each procedure, students will learn a hand calculation method (using calculators) and a computer method (using software called SPSS-computer outputs interpretation).
3. Compute various inferential statistics (e.g., z, t and chi-square statistics) using both hand calculation and computer method (computer outputs interpretation)
4. Parameter estimations and test hypotheses applying probability theory.
5. Explain the differences among various statistical techniques and identify an appropriate technique for a given set of variables and research questions.

The widespread availability of computer software packages is revolutionizing statistics education. Each year, more and more students enter statistics course with a good experience in computer technology and an expectation of using computer packages to solve problems in statistics. Because of this trend, this course will also focus on reading and interpreting the computer outputs. The computer software used in the course is SPSS for windows.

Main Text:

Camm, Jeffrey D., Cochran, James J., Fry, Michael J., Ohlmann, Jeffrey W., Anderson, David R., Sweeney, Dennis J., and Williams, Thomas A. ***Statistics for Business and Economics.*** fifteenth Edition. Cengage Learning, 2024.

Recommended Texts & Materials

1. Berenson, Mark L., Levine, David M., and Krehbielm Timothy C. ***Basic Business Statistics***. Eleventh Edition. Pearson/Prentice Hall, 2009.
2. Lind, Douglas A., Marchal, William G., and Wathen, Samuel A. ***Basic Statistics for Business and Economics.*** Seventh Edition. McGraw-Hill Irwin, 2011.
3. McClave, James T., Benson, P. George, and Sincich, Terry. ***Statistics for Business and Economics***. Eleventh Edition. Student Edition. Prentice Hall, 2011.

Grading Criteria:

The course grades will be based on two exams (individual performance) and homework or quizzes (individual performance). Grading scheme is as follows.

1. Midterm Examination 45%

   (**Thursday, March 13, 2025; 12.00 – 14.00 hrs.)**
2. Final Examination 55%

   (**Tuesday, May 27, 2025; 09.00 – 12.00 hrs.)**

Tentative Class Schedule:

Week	Topics
1-2	1. Data and Statistics
	1.1 What is Statistics?
	1.2 Types of Statistics
	1.2.1 Descriptive Statistics
	1.2.2 Statistical Inference
	1.3 Statistical Data
	1.3.1 Data, Element, Variable
	1.3.2 Types of Data
	1.4 Scales of Measurement
	1.4.1 Nominal Scale
	1.4.2 Ordinal Scale
	1.4.3 Interval Scale
	1.4.4 Ratio Scale
	2. Describing Data: Frequency Tables, Frequency Distributions and Graphic Presentation
	2.1 Summarizing Qualitative Data (Categorical Data)
	2.1.1 Frequency Distribution
	2.1.2 Relative Frequency Distribution
	2.1.3 Bar Charts and Pie Charts
	2.2 Summarizing Quantitative Data (Numerical Data)
	2.2.1 Frequency Distribution
	2.2.2 Relative Frequency Distribution
	2.2.3 Histogram and Frequency Polygon
	2.2.4 Cumulative Frequency Distributions
	2.2.5 Stem-and-Leaf Displays
	3. Measures of Location
	3.1 Mean
	3.1.1 Population Mean
	3.1.2 Sample Mean
	3.2 Weighted Mean
	3.3 Median
	3.4 Mode
	3.5 Percentiles, Deciles and Quartiles
	4. 4.1 Measures of Dispersion (Measures of Variability)
	4.1.1 Range
	4.1.2 Interquartile Range
	4.1.3 Mean Deviation
	4.1.4 Variance and Standard Deviation
	4.1.5 Coefficient of Variation
	4.2 Exploratory Data Analysis: Box-Plot
3-5	5. Introduction to Probability
	5.1 Random Experiment and Sample Space
	5.2 Approaches to Probability

	5.2.1 Classical Probability
	5.2.2 Relative Frequency Probability
	5.2.3 Subjective Probability
	5.3 Properties of Probabilities
	5.4 Rules of Addition
	5.5 Conditional Probability
	5.6 Rules of Multiplication
	5.7 The Bayes' Theorem
	5.8 The Multiplication Formula
	5.10 The Permutation Formula
	5.11 The Combination Formula
6-7	6. Discrete Probability Distributions
	6.1 Random Variables
	6.1.1 Discrete Random Variables
	6.1.2 Continuous Random Variables
	6.2 Expected Values and Variances of Random Variables
	6.3 The Binomial Probability Distribution
	6.4 The Poisson Probability Distribution
Midterm Exam Date: Thursday, March 13, 2025; 12.00 – 14.00 hrs.	
8-9	7. Continuous Probability Distributions
	7.1 General Probability Distributions for Continuous Random Variables
	7.2 Normal Probability Distribution
	7.3 Areas under the Normal Curve
	7.4 Normal Approximation to the Binomial Probability Distribution
10	8. 8.1 Bivariate Distributions
	8.2 Conditional Probability Function
	8.3 Conditional Expectation
11	9. Sampling and Sampling Distributions
	9.1 Methods of Probability Sampling
	9.2 Sampling Distribution of the Mean, Proportion
	9.3 Standard deviation of Sample Mean
	9.4 Central Limit Theorem
12-13	10. Estimation
	10.1 Point Estimation
	10.2 Interval Estimation
	10.2.1 Interval Estimation of a Population Mean:
	Known Population Standard Deviation
	10.2.2 Interval Estimation of a Population Mean:
	Unknown Population Standard Deviation
	10.2.3 Interval Estimation of a Population Proportion
	10.2.4 Determining the Sample Size
14-15	11. Hypothesis Testing
	11.1 Developing Null and Alternative Hypotheses

	11.2 Steps of Hypothesis Testing
	11.3 Type I and Type II Errors
	11.4 One-Tailed and Two-Tailed Tests of Significance
	11.5 Hypothesis Tests about a Population Mean
	11.5.1 Known Population Variance
	11.5.2 Unknown PopulationVariance
	11.6 Hypothesis Tests about a Population Proportion
	11.7 Hypothesis Tests about a Population Variance
	12. Index Numbers
	12.1 The Meaning of Index Numbers
	12.2 Types of Index Numbers
	12.2.1 Price Indexes
	12.2.2 Quantity Indexes
	12.2.3 Value Indexes
Final Exam Date: Tuesday, May 27, 2025; 09.00 – 12.00 hrs.	