

STATS 250 – APPLIED STATISTICS (4 credits)

Prerequisites

MATH 134 (Calculus for Management and Social Sciences) or MATH 130 (Finite Mathematics).

Course Description

Application of statistical analysis to real-world business and economic problems. Topics include data presentation and descriptive statistics including measures of location and dispersion, an introduction to probability, discrete and continuous random variables, probability distributions including binomial and normal distributions, sampling and sampling distributions, statistical inference including estimation and hypothesis testing, simple and multiple regression analyses.

Course Format

Each topic will be explained in the classroom, with examples and illustrations. Students are expected to pay attention in class and to participate in classroom activities, such as solving problems in group or presenting them on the board to the other students. After new material has been discussed in class, homework exercises corresponding to this material should be done individually and presented in the next class. Homework corrections are done on the chalkboard by the professor or students, either by volunteering or by request by the teacher. Students will make an extensive use of spreadsheets to work with large amounts of data.

The level of difficulty and type of exercises that you are asked to solve in exams are the same that you find in the homework from the textbook. Therefore, it is important that you study it and familiarize yourself with it. To encourage daily study of the material, short quizzes covering the homework assignments will be given at the beginning of most classes.

For students having difficulties with the material or falling behind the rhythm of the class, it is crucial to use office hours to recuperate. The teacher is always available for consultation, do not hesitate to approach with a difficulty, small as it may seem.

Course Objectives

1. To familiarize students with summaries of collected data.
2. To understand the concept of probability, its implications and use.
3. To learn how to determine probabilities of events.
4. To apply statistical models in business, economics and the social and physical sciences.
5. To incorporate the knowledge of Statistics in one's life so that one can better understand and interpret numerical information, such as that presented in the media.
6. To introduce earlier methods for decision making in the face of uncertainty.

Course Evaluation-Grade breakup

There will be a continuous evaluation based on your participation, homework presented, exercises and examinations. See the semester schedule for more information. The following percentages indicate how the final grade is given:

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|---|-------------------|
| <i>Tests 1,2,3 & 4</i> | <i>12% (each)</i> |
| <i>Final Exam</i> | <i>25%</i> |
| <i>Homework and class participation</i> | <i>12%</i> |
| <i>Project</i> | <i>15%</i> |

Each exam covers approximately one fourth of the course material. The final exam covers all course material and its questions are similar to questions in previous exams. In order to earn homework and class participation grade you must come prepared to class by having done the homework and engage during the class, for instance, solving problems on the board and participating actively in the proposed activities. There will be a short quiz daily with questions similar to homework problems for the day.

Homework and Participation

All students are expected to come to every scheduled class. Not coming to a class generally implies not understanding the material presented that day. This is very difficult to recuperate and affects the understanding of the next class. Regular attendance is required. Two unjustified absences will be allowed. Further unjustified absences will lower the grade half a point for each subsequent absence. Coming late to a class will be counted as an absence.

The homework must be presented in the classroom the day it is due in order to earn credit for it. There will not be make-up exams. Missing an exam will always affect negatively your grade.

Required Textbook and Supplies

Paul Newbold, Statistics for Business and Economics. Prentice Hall International, 6th Ed.

A scientific calculator is required. The book and calculator must be brought to every class meeting.

Course Outline

1. INTRODUCTION.

What is Statistics? Making sense of numerical information. Dealing with uncertainty. Populations and samples. Sampling.

2. MEASURES OF CENTRAL TENDENCY, DISPERSION AND POSITION.

Summation Notation. Measures of Central Tendency: Mean, Median, and Mode. Measures of Dispersion: Range, Variance, and Standard Deviation. Standard Units and Chebyshev's Theorem. Measures of Position: Quartiles. Interquartile Range.

3. FREQUENCY DISTRIBUTIONS.

Grouped Data. Percentage and Cumulative Frequency Distributions. Histograms and Stem-and-leaf Plots. Numerical Summaries of Grouped Data.

4. PROBABILITY THEORY.

Theoretical Probability and Empirical Probability. Law of Large Numbers. Sample Spaces and Probability of an Event. Rules of Probability.

5. DISCRETE PROBABILITY DISTRIBUTIONS.

Discrete Random Variables and Probability Distributions. Mean or Expected Value of a Probability Distribution. Decision Making and Expected Value. Variance of a Probability Distribution. The Binomial Distribution.

6. THE NORMAL DISTRIBUTION.

Continuous Distributions. The Normal Distribution. Areas under Normal Curves. Applications of the Normal Distribution. The Normal Approximation to the Binomial Distribution.

7. LINEAR AND MULTIPLE REGRESSION.

Bivariate data: Input and output variables. Linear correlation and its coefficient r . Linear regression: The method of least squares. The multiple regression model. Estimation of coefficients.

8. SAMPLING AND SAMPLING DISTRIBUTIONS

Sampling from a Population. Sampling Distribution of the Sample Mean. The Central Limit Theorem and Standard Error.

9. INTERVAL ESTIMATION

Confidence Intervals. Confidence Intervals for the Mean of a Normal Population: Population Standard Deviation Known. The student's t Distribution. Confidence Intervals for the Mean of a Normal Population: Population Standard Deviation unknown.

10. HYPOTHESIS TESTING

Concepts of Hypothesis Testing. Tests of the Mean of a Normal Population: Population Standard Deviation known. Tests of the Mean of a Normal Population: Population Standard Deviation unknown.