



SYLLABUS

INTRODUCTION TO PROBABILITY AND STATISTICS

Instructor: Silvia Ferrini

Contact Hrs: 40

Language of Instruction: English

Siena, Italy

COURSE DESCRIPTION

Statistics play an important role in a great number of fields and there is a growing interest in handling data for decision-making. The course introduces the principal of statistics using theory and practice. The basic of descriptive statistics and inference are the core subjects but working with real world applications will enhance students understanding of the role of statistics in problem solving. The process of doing statistics will be taught using practical examples.

COURSE OBJECTIVES

The goal of this course is to comprehend the process of doing descriptive and inferential statistical analysis. The course will provide the basic of descriptive statistics:

- Data summary with tables and graphs
- Data summary statistics with mean, median, variance

The theory of sampling and probability will be mainly introduced with examples and exercises. The introduction to statistical inference will be given by:

- Confidence intervals
- The concept of statistical significance
- Test of hypothesis (mean and proportion)
- Two-sample analysis.

Students who successfully complete this course will understand the process of doing statistics by gathering, summarizing, and drawing conclusions from data. Students will also learn how to use electronic spreadsheets to carry out a statistical analysis. The effectively communication of results will be an integral part of the learning process.

INSTRUCTIONAL METHODOLOGY

The course is split between classroom lectures and laboratory sessions. The classroom lectures introduce the main theoretical foundation of statistics and applications. In the laboratory sessions students will learn to solve statistical problems using the electronic spreadsheet Excel. The course is organized in 7 weeks with a balance between theory and practice in many lessons. Extra support will be offered to students if needed.

METHOD OF EVALUATION (GRADING)

Students will be required to attend the course, complete three assignments and a final written exam.

Course attendance and discussion (10%)

Assignment 1 (20%)

Assignment 2 (20%)

Assignment 3 (20%)

Final exam (written text with multiple choice questions and exercises) (30%)

COURSE OUTLINE

We will attempt to proceed with the following outline:

Subject	Period	Readings	Assignments
Descriptive statistics and sampling	Week 1	Course introduction and data analysis and representation Reading: chapters 1-2	
	Week 2	Introduction of Excel, data representation regression, scatterplot Reading: chapters 4-6	1 st Assign.: hand-in
Probability theory and sampling distributions	Week 3-4	Probability, sampling and experiments Reading: chapters 8-11	1 st Assign.: Review
Inference	Week 4	Recap on probability and sampling distributions, basic of inference and confidence intervals Reading: chapters (10,11) 14	2 nd Assign.: hand-in
	Week 5	Recap on confidence intervals and test of significance, inference in practice Reading: chapters (14)15-16	2 nd Assign.: review 3 rd Assign: hand-in
	Week 6	Population mean (possibly proportion) and two-sample problems Reading: chapters 18-19 (possibly 20)	3 rd Assign: review
Review and Exam	Week 7	Review and final exam	

COURSE READINGS

The Basic Practice of Statistics, 6th Ed. by Moore, only chapters listed. Complementary readings provided during the course.

BIBLIOGRAPHY

Moore et al (2010). *The Basic Practice of Statistics, 6th Ed. by Moore*. Freeman and company. New York.