UNICUSANO
ROME

Code: MAT/06 **Credits: 6**
Matter: Probability and Statistics
Main language of instruction: Italian
Other language of instruction: English

Teaching Staff

Head instructor
Prof. Carlo Drago - carlo.drago@unicusano.it

Introduction

1. *Objective of the course :*

The programme is divided into two main parts: a general part and a special part. The general part covers institutional topics of a course of Probability and Statistics for Engineering where the special part deepens more advanced topics such as seminars (with relevant applications to Engineering). Lessons will be based both on the theory of Probability and Statistics and on computational techniques for use of statistics in professional fields. In particular, students will study programming languages in depth applied to Statistics as R and Octave. A characteristic element of the course and of learning is the need to the student to write an application work on real or simulated data and a report document professional describing the objectives of the work applied, the data used, the methodologies and finally the results obtained. The emphasis, in this case, is on the application of the concepts learned during the course in a context immediately reusable in professional engineering contexts. It is necessary from the beginning to agree on with the teacher, the theme of the application work to be carried out (through the individual e-activities) and then further define one or more objectives that will then become the basis of the work for the remaining part of the session

Objectives

2. *Course Structure:*

The course is organized in these parts:

1) The role of the Statistics in Engineering

2) Descriptive Statistics and Exploratory Data Analysis

3) Probability

4) Random Variables

5) Random Variables and Probability Models

6) Distributions of Sampling Statistics

7) Parameter Estimation

8) Hypothesis testing

9) Regression

To influence the rigor of learning the course contains a practical part consisting of the application of the concept learned over the course by the writing a short dissertation based on a theme and data agreed with the instructor. The applied work will be discussed in class **which requires a previous work by the students**.

Competencies:

- Knowledge and understanding skills in Statistics and Probability.
- Ability to apply statistical knowledge and understanding to real cases and real problems
- Ability to draw conclusions
- Communication skills
- Ability to learn

3. Programme of the course:

Subject 1. The role of Statistics in Engineering
Subject 2. Descriptive Statistics
Subject 3. Probability
Subject 4. Random Variables
Subject 5. Probability Models
Subject 6. Sampling Distributions
Subject 7. Parameter Estimation
Subject 8. Hypothesis Testing
Subject 9. Regression

Evaluation system and criteria

The assessments of course is based on the following criteria:

I) **Final exam** (**100%** of grade):

This exam will have two parts:

1) A theoretical part based on Probability and Statistics

2) An applied part with question\questions on the short dissertation which need to be sent to the instructor before the final examination.

Bibliography and resources

4. *Materials to consult:*

Lecture Notes and academic educational material of the course, books, other materials useful to learning agreed with the instructor.

5. *Recommended bibliography:*

Ross, S. M. (2014). Introduction to probability and statistics for engineers and scientists. Academic Press.