



**Italian code: SECS-S/01**

**Credits: 9**

**Course: Surveys, opinion polling, and data analysis**

**Main language of instruction: Italian**

**Other language of instruction: English**

### Head instructor

**Professor Luca Rossi - [luca.rossi@unicusano.it](mailto:luca.rossi@unicusano.it)**

### Objectives

This course focuses on providing theoretical and methodological tools related to statistical analysis and econometrics, applied to a variety of contexts. Students will learn statistical techniques for data analysis, modeling, and inference, with applications including transportation, logistics, and decision-making frameworks.

### Course structure

- Introduction to Statistics
- Probability Statistical Distributions
- Regression Analysis
- Statistical Distributions

### Competencies

A. Knowledge and understanding:

Fundamental concepts of statistical analysis.

Techniques of linear regression and random utility discrete choice models.

B. Applying knowledge and understanding:

Using statistical and econometric methods to analyze real-world data. Applying techniques for sustainable decision-making.

C. Communication skills:

Developing skills to effectively communicate statistical results to professionals and policymakers.

D. Learning skills:

Preparing students for further professional development and advanced statistical applications.

## Syllabus

### **Subject 1: Introduction to Statistics**

- Foundations of Statistics
- Role of statistics in data analysis and decision-making.
- Overview of descriptive and inferential statistics.
- Data Types and Data Collection
- Understanding different types of data (quantitative vs. qualitative).
- Sampling methods and data collection techniques.

### **Subject 2: Regression Analysis**

- Linear Regression Models
- Simple linear regression: concepts, interpretation, and assumptions.
- Estimation of parameters using the least squares method.
- Multiple Linear Regression
- Expanding linear regression for multiple predictors.
- Diagnostics and goodness-of-fit measures.

### **Subject 3: Probability**

- Basic Probability Concepts
- Probability rules and their applications.
- Random variables and expectations.

### **Subject 4: Statistical Distributions**

- Distributions
- Binomial distribution
- Poisson distribution
- Normal distribution
- Applications of probability distributions in real-world contexts.

## Evaluation system and criteria

The examination consists of a written test. This includes:

- 5 numerical exercises



## **Bibliography and resources**

### *1. Materials to consult*

Notes written by the instructor are available in Italian (part of the notes are also available in English).