**Italian code: SECS-S/01 Credits: 6**

**Course: Statistics**

**Main language of instruction:** Italian

**Other language of instruction:** English

**Head instructor**

**Professor Luca Rossi - 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 and Statistical Distributions
* Statistical Inference
* Regression Analysis

**Competencies**

1. Knowledge and understanding:

Fundamental concepts of statistical analysis.

Techniques of linear regression and random utility discrete choice models.

1. Applying knowledge and understanding:

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

1. Communication skills:

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

1. 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: Probability and**

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

**Subject 3: Statistical Distributions**

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

**Subject 4: 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.

**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).

1. *Recommended bibliography*