

## **STATISTICS II**

Degree(s)	: Economics; Management
Type	: Compulsory course unit
Curricular year/semester	: 2nd year / 2nd Semester
ECTS / hours per week	: 6 ECTS / 5.0 Hours
Workload per week	: 2 Theoretical x 1.5 Hours + 1 Practical x 2 Hours
Teacher responsible	: Professor Nicoletta Rosati

### **OBJECTIVES**

The aim of the course is to present some statistical techniques which are widely used in Management, namely the linear regression model.

After completing the course, the students should be able to:

- 1) use methods of inferential statistics to interpret data;
  - 2) formulate simple probability models to interpret economic problems including the estimation and testing of parameters;
  - 3) understand the assumptions underlying the linear regression model; 4) carry-out simple econometric or statistic studies using adequate [SOFTWARE](#).
- To use methods of statistics inference to interpret data.
  - To understand the assumptions underlying the linear regression model for cross-section data.
  - To use basic software to apply the procedures in statistics and econometrics.
  - To access a significant portion of the applied economics literature that uses cross-section econometrics.
  - To carry-out simple and adequate econometric studies using cross-section data.
  - To have the basic knowledge in order to follow the econometrics course.

## **PROGRAM**

### **1. Estimation**

- 1.1 Introduction
- 1.2 Point estimation
- 1.3 Properties of point estimators
- 1.4 Interval estimation

### **2. Hypothesis testing**

- 2.1 Introduction
- 2.2 Most powerful test. Neyman-Pearson Lemma
- 2.3 Testing of simple vs composite hypotheses
- 2.4 P-value
- 2.5 Normal populations - mean and variance testing
- 2.6 Normal populations - Testing equality of two populations
- 2.7 Non-normal populations - Large samples results

### **3. Non-parametric methods**

- 3.1 Introduction
- 3.2 Adjustment test
- 3.3 Independence test

### **4. Linear regression model**

- 4.1 Introduction
- 4.2 Definition of the linear regression model
- 4.3 Basic hypotheses of the model
- 4.4 Coefficient estimation through the least squares method
- 4.5 Properties of the least squares estimator
- 4.6 Unbiased estimation of the error variance
- 4.7 Coefficient of determination
- 4.8 Regression through the origin
- 4.9 The normal linear regression model
- 4.10 Inference in the linear regression model

### **5. Further topics in the linear regression model**

- 5.1 Dummy variables
- 5.2 Specification tests
- 5.3 Prediction
- 5.4 Heteroskedasticity



## **BIBLIOGRAPHY**

### **Recommended Bibliography:**

- Miller & Miller, John E. Freund's Mathematical Statistics with applications, 8th Edition, Pearson Education, [MM], 2013
- P. Newbold, W. Carlson, B. Thorne, Statistics for Business and Economics, 8th Edition, Pearson Education, [N], 2012

### **Optional Bibliography:**

- Hogg, R.V. and Tanis, EA, , Probability and Statistical Inference, 6th Edition, Prentice - Hall, [HT], 2001
- Wooldridge, J. M., Introductory Econometrics, A Modern Approach, 4th Ed., Thomson South-Western , [W], 2009