# Quantitative methods for management

**Academic Year: ( 2022 / 2023 )** **Review date: 09-05-2022**

**Department assigned to the subject: Statistics Department**

**Coordinating teacher: VILLAGARCIA CASLA, TERESA**

**Type: Compulsory ECTS Credits : 6.0**

**Year : 1 Semester : 1**

## REQUIREMENTS (SUBJECTS THAT ARE ASSUMED TO BE KNOWN)

Any degree allowing to be accepted in the Master in Management

## OBJECTIVES

The students learn about the basic models used to represent cross-sectional and time series data. The main objective is the interpretation of the models with less emphasis on technical aspects. There is also a focus on the empirical implementation of the models. The students not only learn about the models but also implement them to analyse real data.
The first part of the course deals with the regression model. In particular, the students learn about the Ordinary Least Squares estimation of the parameters and the diagnosis of the asumptions of the model. In the second part of the course, the basic models to represent the evolution of the conditional means of time series are described. The students learn how to fit and forecast using seasonal ARIMA models.

## DESCRIPTION OF CONTENTS: PROGRAMME

Lesson 1. Introduction
1.1 Why Statistics are important for Management
1.2 Types of data
1.3 Alternative models

Lesson 2. Regression model
2.1 Description and interpretation of the simple regression model
2.2 Assumptions, estimation and properties
2.3 Checking the assumptions
2.4 Multiple regression model
2.5 Multicollinerity
2.6 Dicotomous a polytomous variables

Lesson 3. Time series models
3.1 Definition of time series and properties
3.2 Transformations to stationarity
3.3 Univariate ARIMA models
3.4 Using ARIMA models for forecasting
3.5 Seasonal ARIMA Models

## LEARNING ACTIVITIES AND METHODOLOGY

Each class will be divided in two parts. In the first part the teacher will present the main concepts using slides which are available to the students previously to each lecture. The second part of the class will take place in a computer room where the students have to apply the theory using real data sets. They will use Statgraphics an SPSS.

## ASSESSMENT SYSTEM

All the exams will take place in a computer room.
This course will be have two parts. At the end of each part there will be an midterm exam. If this exam is passed the result is valid for the ordinary and extraordinary exams.

The students that pass both midterm exams automatically pass the course.

Students who fail one or both parts shall take the final exam only for the failed parts.

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| **% end-of-term-examination:** | 50 |
| **% of continuous assessment (assigments, laboratory, practicals…):** | 50 |

## BASIC BIBLIOGRAPHY


- Wayne A. Woodward, Henry L. Gray, Alan C Elliott Applied Time Series Analysis, CRC Press.
- Weisberg, S Applied linear regression, Wiley, 1985