

Academic Year: ( 2022 / 2023 )

Review date: 13-05-2022

Department assigned to the subject: Statistics Department

Coordinating teacher: GRANE CHAVEZ, AUREA

Type: Electives ECTS Credits : 6.0

Year : Semester :

## OBJECTIVES

The central aim of this subject is to understand the basic principles, tools and applications of Statistics needed for risk analysis in Finances and Actuarial Sciences.

### SPECIFIC KNOWLEDGE COMPETENCES:

After successfully finishing the course, the student will be able:

- To understand and to apply Technical Statistical Analysis to study the stock market
- To understand Warrant's characteristics and behavior.
- To learn the basic actuarial notions
- To run the calculus of a car insurance rate and the value of technical provisions.

### ADDITIONAL COMPETENCES:

Skills:

- Capacity to analyze and synthesize real situations by means of quantitative models
- Logical and relational abilities

Attitudes:

- To offer quantitative solutions to complex problems
- The use of mathematical language and techniques to give a formal description of problems.

## DESCRIPTION OF CONTENTS: PROGRAMME

### PART I: STATISTICAL METHODS FOR FINANCE

1. Technical and graphical stock-market analysis
  - 1.1 Introduction
  - 1.2 Dow Theory
  - 1.3 Graphics
  - 1.4 Trends
  - 1.5 Stock-market chart formations
2. Statistical tools for the technical analysis
  - 2.1 Moving averages
  - 2.2 Technical indicators and oscillators
3. Warrants
  - 3.1 Derivatives
  - 3.2 Warrants: definition
  - 3.3 Warrants: characteristics
  - 3.4 Warrants: the price
  - 3.5 Variables affecting the time value
  - 3.6 Greeks
  - 3.7 Tools for warrant analysis
  - 3.8 Selection of a warrant: the underlying asset
  - 3.9 Selection of a warrant: the expiration date

3.10 Selection of a warrant: the strike

3.11 Delta sensitivity relation

## PART II: STATISTICAL METHODS FOR INSURANCE

4. Insurance preliminary definitions

4.1 Management basics

4.2 Elements of an Insurance contract

4.3 Insurance types

5. Non-life insurance

5.1 Frequency distribution and average cost

5.2 Risk factors

5.3 Parameters and methodology

6. Life Insurance

6.1 Types

6.2 Mortality tables

6.3 Generational mortality tables: projection methods

7. Provisions

7.1 Classification

7.2 Statistical methods for provisions calculation

7.3 Determining technical provisions: Grossing up, Link Ratio and Chain-Ladder

## LEARNING ACTIVITIES AND METHODOLOGY

Tutorial classes are scheduled for 15th week.

## ASSESSMENT SYSTEM

**% end-of-term-examination:** 60

**% of continuous assessment (assignments, laboratory, practicals...):** 40

60% of the final mark will be obtained by means of a final exam that tests the required knowledge. The final exam consists of two parts, theory and practice. A minimum of 4 points is required in each part of the final exam. The remaining 40% will result from the presentation of 5 case studies (20%). Optionally, an examination about these case studies can be done.

100% of the final mark will be obtained by means of the final June exam.

## BASIC BIBLIOGRAPHY

- Andrew M. Chisholm Derivatives Demystified, John Wiley & Sons, 2011

- Barry C. Arnold, N. Balakrishnan, Jose-Maria Sarabia Alegria Advances in Mathematical and Statistical Modeling, Biometrics, 2009

- Dale S. Borowiak, ¿Arnold F. Shapiro Financial and Actuarial Statistics: An Introduction, CRC Press, 2013

- Erik Barker Indicators and Oscillators in Excel, Borsa e Mercati, 2013

- Pavel Cizek, Wolfgang Karl Härdle, Weron Statistical Tools for Finance and Insurance, Springer Science & Business Media B.V. / Books, 2011

## ADDITIONAL BIBLIOGRAPHY

- Gil Fana, J.A., Heras Martínez, A. y Vilar Zanón. Matemática de los seguros de vida., Mapfre, 1999..

- Latorre Llorens, L. Teoría del Riesgo y sus Aplicaciones a la Empresa Aseguradora., Mapfre, 1992..

- Lozano Aragües, R. Análisis práctico de la normativa patrimonial de las entidades aseguradoras., CES (Centro de Estudios del Seguro), 1999..
- Marín, J.M. y Rubio, G. Economía Financiera., Antoni Bosch, 2001..
- Meneu, V., Jorda, M.P. y Barreira, T. Operaciones financieras en el mercado español., Ariel, 1994..
- Nieto de Alba, U. y Vegas Asensio, J. Matemática Actuarial., Mapfre, 1993..
- Peña, D. Fundamentos de Estadística., Alianza Universidad Textos, 2008..