

Academic Year: ( 2020 / 2021 )

Review date: 04-07-2020

Department assigned to the subject: Department of Statistics

Coordinating teacher: MOLINA FERRAGUT, ELISENDA

Type: Electives ECTS Credits : 6.0

Year : Semester :

**LEARNING RESULTS AND COMPETENCES AND SKILLS THAT WILL BE ACQUIRED.**

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

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.

<b>% end-of-term-examination:</b>	60
<b>% of continuous assessment (assignments, laboratory, practicals...):</b>	40

#### 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..