

Academic Year: (2024 / 2025)

Review date: 14-03-2025

Department assigned to the subject: Statistics Department

Coordinating teacher: GRANE CHAVEZ, AUREA

Type: Electives ECTS Credits : 6.0

Year : 4 Semester :

LEARNING OUTCOMES

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2.To be able, by means of arguments or procedures developed and supported by themselves, to apply their knowledge, understanding and problem-solving skills in complex or professional and specialised fields of work that require the use of creative and innovative ideas.

3.Have the ability to collect and interpret data and information on which to base their conclusions, including, when necessary and relevant, reflection on social, scientific or ethical issues in their field of study

BASIC COMPETENCES

1.Students have demonstrated possession and understanding of knowledge in an area of study that builds on the foundation of general secondary education, and is usually at a level that, while relying on advanced textbooks, also includes some aspects that involve knowledge from the cutting edge of their field of study

3.Students have the ability to gather and interpret relevant data (usually within their field of study) in order to make judgements which include reflection on relevant social, scientific or ethical issues.

GENERAL COMPETENCES

4.Identify or create the appropriate model for the specific problem that arises in each business activity (finance, marketing, production planning and control, etc.). Computationally and analytically manipulate the models established, taking advantage of the power of statistical and optimisation methods, etc., and analyse the results obtained.

5.Communicate the results, the conclusions of the models and the proposed solutions in a way that is intelligible to the rest of the company, so that they are accepted and implemented by decision-makers.

SPECIFIC COMPETENCES

3.Mathematically model and solve problems using stochastic models and Operations Research techniques.

6.Knowing the basic structure, characteristics and functions of a financial system and understanding the role of the main financial intermediaries and existing markets as well as the functioning of international financial capital markets¹

10 Interpret the results of a quantitative analysis and draw practical conclusions on the real problem for which the statistical models have been built. Write reports and communicate conclusions with the help of advanced graphical representation techniques.

14. Identify and use finance tools to solve problems such as risk estimation, calculation of the cost of capital, valuation of assets and/or derivatives or estimation of the movement of interest rates and/or exchange rates.

TRANSVERSAL COMPETENCES

1.Knowing and being able to handle interpersonal skills on initiative and responsibility, negotiation, emotional intelligence, etc. as well as calculation tools that allow the consolidation of the basic technical skills required in any professional field.

3. Being able to organise and plan their work, making the right decisions based on the information available, gathering and interpreting relevant data to make judgements and critical thinking within

their area of study.

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.

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.

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..