

**COURSE DATA****DATA SUBJECT**

**Code:** 43786  
**Name:** Non-Life insurance  
**Cycle:** Master's Degree  
**ECTS Credits:** 6  
**Academic year:** 2025-26

**STUDY (S)**

Degree	Center	Acad. year	Period
2171 - Master's Degree in Actuarial and Financial Sciences	Facultat d'Economia	1	Second quarter

**SUBJECT-MATTER**

Degree	Subject-matter	Character
2171 - Master's Degree in Actuarial and Financial Sciences	Non-life insurance	COMPULSORY

**COORDINATION**

SEGURA GISBERT JORGE

**SUMMARY**

The course **Non-Life Insurance** is scheduled for the second semester of the first year and is taken after the study of two previous courses. One of these is dedicated to establishing the technical and methodological foundations that will support much of the subsequent developments, and the other is intended to introduce students to the professional environment in which they will work.

Its placement reflects the formative importance of the subject **Non-Life Insurance** within the curriculum, as it serves to develop the technical and methodological bases that will underpin some of the processes students will encounter in later courses. In this regard, the course is linked to content taught in other subjects, such as III (Finance and Introduction to Insurance), VI (Risk Control and Solvency), and IX (Elective Pathways).

This course is highly valuable professionally, as many of the concepts and skills acquired are directly applicable in professional practice. For example, students will develop skills in non-life insurance for pricing, claims reserving, and simulation. In particular, the course covers topics such as premium calculation principles, credibility theory, reserving, and Bonus-Malus systems.

**PREVIOUS KNOWLEDGE**



## RELATIONSHIP TO OTHER SUBJECTS OF THE SAME DEGREE

There are no specified enrollment restrictions with other subjects of the curriculum.

## OTHER REQUIREMENTS

To successfully learn the content of this course, students should be familiar with the typical statistics topics taught in social science programs, as well as have basic skills in using software.

No enrollment restrictions have been specified with respect to other courses in the curriculum.

## COMPETENCES / LEARNING OUTCOMES

### 2171 - Master's Degree in Actuarial and Financial Sciences

Comprender y ser capaces de desarrollar las técnicas matemáticas y estadísticas que resultan relevantes para el trabajo actuarial: modelos de supervivencia, siniestralidad, tarificación, previsión y solvencia.

Poseer un amplio conocimiento de los procesos estocásticos y ser capaces de utilizarlos en modelos financieros y actuariales.

Saber tomar decisiones relacionadas con los riesgos evaluables económicamente.

Ser capaces de aplicar los criterios y principios de planificación y control actuarial, necesarios para el correcto funcionamiento de las operaciones que, en cada momento, ofrezcan las entidades de seguros, financieras o cualesquiera otras que impliquen transferencia y cobertura de riesgos.

Ser capaces de construir modelos adecuados al entorno económico empresarial a partir de las posibilidades que ofrecen las modernas tecnologías de la información y de la computación.

Students should apply acquired knowledge to solve problems in unfamiliar contexts within their field of study, including multidisciplinary scenarios.

Students should be able to integrate knowledge and address the complexity of making informed judgments based on incomplete or limited information, including reflections on the social and ethical responsibilities associated with the application of their knowledge and judgments.

Students should demonstrate self-directed learning skills for continued academic growth.

## DESCRIPTION OF CONTENTS

### 1. Non-Life Insurance

#### 1.1 Introduction

#### 1.2 The Insurance Business. Properties and characteristics of risk



- 1.3 Essential characteristics of non-life insurance. Differences with life insurance
- 1.4 Risk mitigation in non-life insurance
- 1.5 Random variables and probability distributions
- 1.6 Distribution fitting and maximum likelihood estimation with R

## **2. Generalized Linear Models**

- 2.1 Predictive modeling in non-life insurance
- 2.2 Linear models (with Normal response)
- 2.3 Models with discrete response variables
- 2.4 Models with continuous response variables
- 2.5 Introduction to machine learning in non-life insurance
- 2.6 Practical applications in non-life insurance

## **3. Statistical Bases for Pricing**

- 3.1 Report and Technical Bases
- 3.2 Types of premiums
- 3.3 Principles of premium calculation
- 3.4 Premium structure
- 3.5 The pricing process in non-life insurance
- 3.6 Aspects to consider in non-life insurance pricing
- 3.7 A priori and a posteriori pricing systems
- 3.8 Risk factors. Selection methods
- 3.9 Credibility theory. Bühlmann and Bühlmann-Straub models
- 3.10 Bonus-Malus systems. Definition and objectives
- 3.11 Specific statistical elements to consider in motor insurance

## **4. Technical Provisions for Claims**

- 4.1 Introduction to the loss reserving process
- 4.2 Individual method versus statistical methods
- 4.3 Segmentation by lines of business
- 4.4 Sufficiency, consistency, and quality of data
- 4.5 Claims triangles. Stages in the estimation process for benefit provisions
- 4.6 Non-stochastic methods
- 4.7 Stochastic methods
- 4.8 Validation of the calculation. Comparison with experience
- 4.9 Other technical provisions
- 4.10 The Actuarial Function. Actuary's report

## **5. Simulation**

- 5.1 Introduction
- 5.2 Random number generation
- 5.3 The Monte Carlo method



5.4 Discrete and continuous events

5.5 Practical applications. Underwriting risk for premiums and reserves

**WORKLOAD****PRESENCIAL ACTIVITIES**

Activity	Hours
Theory	30,00
Classroom practices	30,00
<b>Total hours</b>	<b>60,00</b>

**NON PRESENCIAL ACTIVITIES**

Activity	Hours
Attendance at other activities	5,00
Individual or group project	45,00
Independent study and work	0,00
Preparation of lessons	0,00
Preparation for assessment activities	40,00
Resolution of case studies	0,00
<b>Total hours</b>	<b>90,00</b>

**TEACHING METHODOLOGY**

Throughout the course, the program content will be covered by alternating theoretical material with exercises and practical case studies, and various assignments will be proposed for students to submit in the manner and by the deadlines specified during the course.

To achieve the course objectives, all available resources (whiteboard, transparencies, projector, computer, etc.) will be used as needed and as deemed most appropriate.

However, computer skills are essential for working in this course.

In general, there will be no distinction between theoretical and practical parts; in class, the instructor will highlight the key aspects of each topic and guide students' study through the relevant bibliography, which must be consulted to complete and deepen understanding of the subject. Additionally, real-world questions and case studies will be presented for students to solve, including, where appropriate, the necessary modeling and discussion of the solution.

Classes and assignments will be carried out with computer support, so that students can gain up-to-date experience with the software packages and techniques that are essential in this field.

Teaching materials will be available through the virtual classroom at <http://aulavirtual.uv.es>.



## EVALUATION

Grades will be expressed numerically in accordance with the regulations (RD1125/2003 of September 5), which establish the European Credit Transfer System (ECTS) and the grading system for official university degrees valid throughout the national territory.

Both individual and group work completed by students during the course will be assessed, considering the acquisition of specific and generic competencies as well as the knowledge relevant to the module.

Depending on the academic circumstances of the course, the instructor will select one or more of the following assessment tools:

-Written exams: including objective or semi-objective tests, problem-solving, short-answer tests, essays, case studies, or similar options.

-Oral exams: including oral tests, interviews, debates, or oral presentations in class, or similar options.

-Completion of assignments and submission of reports on specific issues that may arise during the course.

-Observation: use of observation scales and recording of students' attitudes during tasks and activities related to competencies.

Whenever possible, the preferred assessment method will be the completion of assignments and submission of reports on real case studies that may arise during the course, which students must submit by the deadlines and in the manner specified during the course.

The specific criteria and processes used for assessment, as well as their exact numerical weighting, will depend on the final number of enrolled students and will be published in the detailed course guide available in the course's virtual classroom.

## REFERENCES

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Boj, Eva; Mercè Claramunt, Josep Fortiana y Ángel Vegas (2005). Bases de datos estadísticas del seguro de automóviles en España: influencia en el cálculo de primas. Estadística Española Vol. 47, nº 160, págs. 539-566.



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