COURSE DATA

DATA SUBJECT

Code: 43785
Name: Accident models
Cycle: Master's Degree
ECTS Credits: 3
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

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SUMMARY

The subject of Accident models is located in the second semester of the first year and is taken after the study of two previous subjects. One of them is dedicated to laying the technical and methodological foundations on which much of the subsequent developments will be based, and the other is intended to place the student in the context in which their professional activity will take place.

Its placement responds to the educational importance of the Non-Life Insurance subject area, within which this subject is located, in the curriculum as it serves to develop the technical and methodological foundations that will support part of the subsequent processes that the student will acquire in other subjects. In this regard, the subject is linked to part of the content taught in some of the subjects of areas III (Finances and Introduction to Insurance), VI (Risk Control and Solvency), and IX (Optional modules).

The subject is professionally useful since part of the content and skills acquired are directly applicable during professional practice. For example, skills will be acquired in non-life insurance for modeling the number of claims, claim amounts, and total claims. In particular, the content taught includes deductibles, reinsurance, and extreme value theory.

PREVIOUS KNOWLEDGE

RELATIONSHIP TO OTHER SUBJECTS OF THE SAME DEGREE

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

OTHER REQUIREMENTS

Para realizar un adecuado aprendizaje de los contenidos de esta asignatura el estudiante deberá conocer los contenidos típicos de Estadística que se suelen impartir en los estudios de ciencias sociales, así como tener una destreza básica en la utilización de software.
No se han especificado restricciones de matrícula con otras asignaturas del plan de estudios.

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. Modeling the Number of Accidents

1.1. Introduction

1.2. Discrete Distributions

1.2.1 Binomial Distribution

1.2.2 Poisson Distribution

1.2.3 Negative Binomial Distribution

1.2.4 Hypergeometric Distribution

1.3. The (a, b, 0) Class of Distributions

1.4. The (a, b, 1) Class of Distributions

1.5. Mixtures

2. Modeling the Amount of a Claim

2.1 Introduction

2.2 Continuous Distributions

2.2.1 Uniform Distribution

2.2.2 Normal Distribution

2.2.3 LogNormal Distribution

2.2.4 Exponential Distribution

2.2.5 Gamma Distribution

2.2.6 Beta Distribution

2.2.7 Pareto Distribution

2.2.8 Weibull Distribution

3. Composite Models of Total Losses

3.1 Introduction

3.2 The Aggregate Loss Model

3.3 The Recursive Method

3.4 Impact of the Models The Individual Risk Model

4. Introduction to Deductibles

4.1 Introduction

4.2 Proportional or Self-Participating Deductible

4.3 Absolute Deductible

4.4 Limited Proportional Deductible

4.5 Other Deductibles

5. Reinsurance

5.1 Introduction

5.2 Objectives and Consequences

5.3 Facultative and Compulsory Reinsurance

5.4 Proportional Reinsurance

5.4.1 Quota Share

5.4.2 Excess Amounts

5.5 Non-Proportional Reinsurance

WORKLOAD

PRESENCIAL ACTIVITIES

Activity	Hours
Theory	15,00
Classroom practices	15,00
Total hours	**30,00**

NON PRESENCIAL ACTIVITIES

Activity	Hours
Attendance at other activities	0,00
Individual or group project	0,00
Independent study and work	15,00
Preparation of lessons	15,00
Preparation for assessment activities	15,00
Resolution of case studies	0,00
Total hours	**45,00**

TEACHING METHODOLOGY

During the course, the program's contents will be worked on, combining theoretical content with practical exercises and assumptions. Various assignments will be proposed, which the student must submit in the manner and on the date specified throughout the course. To this end, all available resources (whiteboard, transparencies, projector, computer, etc.) deemed most appropriate to successfully achieve the proposed objectives will be used, as needed.

In general, there will be no distinction between theoretical and practical aspects. In classes, the faculty will highlight the fundamental aspects of each topic and guide the study through the relevant bibliography, which must be consulted to complete and deepen the subject matter. Furthermore, real-life questions and assumptions will be posed during classes, which the student must resolve, proceeding, where appropriate, to the relevant modeling and discussion of the solution. The classes and assignments will be conducted using computer support, so that students can have an up-to-date understanding of the use of essential software packages and techniques for the subject.

The available teaching materials can be accessed from the virtual classroom, http://aulavirtual.uv.es.

EVALUATION

It will be expressed through a numerical grade in accordance with the regulations (RD 1125/2003 of September 5) establishing the European credit system and the grading system for official university degrees valid throughout the country.

The teaching staff, depending on the academic circumstances of the subject, will select one or more of the following assessment tools:

- Written exams: including objective or semi-objective tests, problem-solving, short-answer tests, case

studies, or other similar options.

- Completion of tasks and presentation of reports on specific issues throughout the course.

- Observation: application of observation scales and recording of students' attitudes in the development of tasks and activities related to the competencies.

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

REFERENCES

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