



COURSE DATA

DATA SUBJECT

Code: 43793
Name: Solvency
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	2	First quarter

SUBJECT-MATTER

Degree	Subject-matter	Character
2171 - Master's Degree in Actuarial and Financial Sciences	Risk control and solvency	COMPULSORY

COORDINATION

MUÑOZ MURGUI FRANCISCO

SUMMARY

Stability and Solvency of insurance entities:

- Short-term fluctuations in claims experience
- Reinsurance
- Public solvency supervision
- The Economic Balance Sheet under Solvency II
- Calculation of the SCR under Solvency II
- Presentation of an SFCR report

PREVIOUS KNOWLEDGE

RELATIONSHIP TO OTHER SUBJECTS OF THE SAME DEGREE

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

OTHER REQUIREMENTS



COMPETENCES / LEARNING OUTCOMES

2171 - Master's Degree in Actuarial and Financial Sciences

Saber realizar una gestión integral del riesgo y alcanzar los conocimientos suficientes para dar respuesta a los riesgos actuales y a los que puedan surgir resultado del cambiante entorno económico, financiero y social, con vistas a dirigir y gestionar todo tipo de entidades financieras y aseguradoras.

Ser capaces de comprender, desarrollar y aplicar los modelos de valoración de riesgos (estándar y avanzados) relativos a los requerimientos de capital exigidos a las entidades financieras y aseguradoras (Basilea II y Solvencia II).

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.

Ser capaces de gestionar el riesgo como un proceso continuo y en constante desarrollo llevado a término de manera integrada y condicionado a los objetivos estratégicos de la empresa, de forma que se maximice el valor sostenible a largo plazo de cada una de sus actividades y se conjuguen los intereses de todas las partes implicadas.

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 communicate conclusions and underlying knowledge clearly and unambiguously to both specialized and non-specialized audiences.

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

DESCRIPTION OF CONTENTS

1. Risk theory and short-term fluctuations in claims experience

1. Introduction to risk theory
2. Portfolio with constant claim amount and with variable claim amount
3. Mean and variance of X
4. The basic model
5. Capital at risk assessment
6. Spreadsheet exercises

2. Reinsurance



1. General and technical aspects
2. Types of reinsurance
3. Proportional reinsurance: characteristics and types of contracts
4. Non-proportional reinsurance: characteristics and types of contracts
5. Modification of the claim amount distribution due to reinsurance
6. Dependence on the level of business and level of reinsurance
7. Maximum retention rules
8. Spreadsheet exercises

3. Fundamentals of Solvency II

1. A global framework for the capital requirements of an insurance entity
2. The three pillars approach
3. Risk categories
4. Capital requirements: the economic balance sheet
5. Quantitative valuation: risk measures
6. Practical applications:
 - Economic balancesheet valuation: life technical provisions
 - Economic balancesheet valuation: non-life technical provisions
 - Economic balancesheet valuation: counterparty default adjustment (CDA), risk margin (RM), and other items

4. Solvency II: The Standard Formula

1. General structure of the SCR (Solvency Capital Requirement)
2. Operational risk
3. Underwriting risk: general characteristics and LoBs (Lines of Business)
4. SCR Life Underwriting Risk
5. SCR Non-Life Underwriting Risk
6. Underlying assumptions in the modeling of the standard formula for NLpr
7. Market risk
8. Counterparty or credit risk
9. Practical applications:
 - General structure of the SCR: risk aggregation and diversification effect
 - Calculation of SCR Life Underwriting Risk
 - Calculation of SCR Non-Life Underwriting Risk
 - Presentation by each student of a Solvency and Financial Condition Report (SFCR)

WORKLOAD

**PRESENCIAL ACTIVITIES**

Activity	Hours
Theory	30,00
Classroom practices	30,00
Total hours	60,00

NON PRESENCIAL ACTIVITIES

Activity	Hours
Attendance at other activities	4,00
Individual or group project	33,00
Independent study and work	38,00
Preparation of lessons	0,00
Preparation for assessment activities	15,00
Resolution of case studies	0,00
Total hours	90,00

TEACHING METHODOLOGY

Throughout the course, the program content will be covered by combining theoretical concepts with exercises and practical case studies. Various assignments will be proposed, which students must submit in the manner and by the deadlines specified during the course. To this end, all available resources (blackboard, slides, projector, computer, etc.) will be used as needed, depending on the situation, and selected based on their suitability to achieve the proposed learning objectives.

In general, the theoretical classes will be delivered using the lecture method, in which the professor will highlight the key aspects of each topic and guide students' study through the recommended bibliography, which must be consulted in order to complete and deepen understanding of the subject.

The practical classes will consist of presenting questions and exercises with an applied focus on the economic, financial, and actuarial fields, which students will be required to solve, including, where appropriate, the relevant modeling and discussion of the solution.

Practical sessions will be supported by computer tools, allowing students to gain an up-to-date understanding of the software packages and techniques that are increasingly used across all the aforementioned areas.

During these sessions, problems and questions previously introduced in the theoretical classes will be addressed, except in certain cases where, due to the practical nature of the topic, those will be delivered exclusively during the practical session.

EVALUATION

The course will be assessed based on the following:



- A written exam, which may include both theoretical questions and problems and/or real case studies.
- Activities carried out by the student throughout the course period, such as the preparation of assignments, solving exercises or problems, completion of tests, submission of reports, oral presentations, etc. These continuous assessment activities are non-recoverable.

The written exam will account for 60% of the final grade, and continuous assessment will make up the remaining 40%.

REFERENCES

- **Fundación MAPFRE (2013):** *An Introduction to Reinsurance*.
<https://documentacion.fundacionmapfre.org/documentacion/publico/es/bib/143251.do>
- **Hossack, Pollard y Zehnwirth (2001):** *Introducción a la estadística con aplicaciones a los seguros generales*. MAPFRE.
- **International Actuarial Association (2004):** *A Global Framework for Insurer Solvency Assessment*. A Report by the Insurer Solvency Assessment Working Party.
- **Normativa Solvencia II:**
 - o *Directiva 2009/138/CE del Parlamento Europeo y del Consejo, de 25 de noviembre de 2009, Solvencia II*
<https://www.boe.es/doue/2009/335/L00001-00155.pdf>
 - o *Reglamento Delegado (UE) 2015/35 de la Comisión, de 10 de octubre de 2014 por el que se completa la Directiva 2009/138/CE*
<https://www.boe.es/doue/2015/012/L00001-00797.pdf>
 - o *Technical Specification for the Preparatory Phase (Part I)* de EIOPA.
- **Sandström, A. (2010):** *Handbook of Solvency for Actuaries and Risk Managers: Theory and Practice*. Chapman and Hall.
- **UNESPA (2015):** *Solvencia II. De un vistazo*. Departamento de Análisis y Estudios.
<https://www.unespa.es/main-files/uploads/2017/07/Solvencia-II.-De-un-vistazo.-FINAL.pdf>
- **Webpage references:**
 - o www.actuaries.org



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