

TEACHING GUIDE

FINANCIAL MATHEMATICS

GRADO EN ECONOMÍA (INGLÉS)

ACADEMIC YEAR 2026-27

Publication date: 05-07-2026



I.-Subject Identification

Type	OBLIGATORIA
Teaching period	3 course, 1Q semester
Nº of credits	6
Language in wich the subject is taught	English

II.-Presentation

The main objective of the Financial Mathematics course is to provide students with the conceptual and operational tools necessary to understand and apply the principles that govern the evolution of the value of money over time, which is central to numerous economic and financial decisions. This is a basic subject within Economics and Business studies, which introduces the theoretical foundations of financial operations and develops skills for their analysis and resolution through the use of mathematical language. Throughout the course, students will study the main capitalisation and discount models, the valuation of financial annuities, investment evaluation criteria and the functioning of different loan repayment systems. The content covered is accessible but essential, as it forms the basis for other subjects in the curriculum related to financial economics, accounting, investment valuation and banking management. This subject therefore plays a key role in the progressive training of students. Its approach is eminently applied: based on theoretical concepts, students will work on problem solving, which is the central focus of the subject and will account for the largest percentage of work in the classroom. By the end of the course, students are expected to be able to pose and solve various financial situations with mathematical rigour, correctly interpret the results obtained, and use that knowledge as a basis for making informed economic decisions. Prior knowledge of basic mathematics is necessary to make effective use of the course.

III.-Learning outcomes

CT01. Ability to analyse and synthesise
 CT05. Knowledge of information systems relating to the field of study
 CT07. Ability to solve problems
 CT08. Ability to make decisions
 CT15. Ability to learn independently
 CB02 . That students are able to apply their knowledge to their work or vocation in a professional manner and have the skills that are typically demonstrated through the preparation and defense of arguments and problem solving within their field of study.
 CB03 . That students have the ability to gather and interpret relevant data (usually within their field of study) to express judgments that include a reflection on relevant topics related to social, scientific or ethical areas.
 CB04 . That students are able to transmit information, ideas, problems and solutions to both specialized and non-specialized audience.
 CB05 . That students have developed the learning skills needed to undertake further studies with a considerable degree of autonomy.
 CE01. Ability to put knowledge of economics into practice
 CE12. Understanding and evaluating financial investment
 CE14. Ability to convert an empirical problem into an area of research and reach conclusions

- Key for degrees not adapted to RD 822/21: **CB** - basic competences, **CG** - generic competences, **CE** - specific competences, **CT** - transversal competences.
- Key for degrees adapted to RD 822/21: **CON** - knowledge, **COM** - competences, **HAB** - skills.



IV.-Contents

IV.A.-Syllabus

Contents	Units	Sections
I.- "Basic Topics. Simple Financial Operations."	Unit 1. " Fundamentals of Financial Mathematics "	1.1. Introduction to Financial Calculus 1.2. The Time Value of Money 1.3. Financial Capital 1.4. Financial Operation 1.5. Classification of Operations 1.6. Theoretical Concepts
	Unit 2. "Financial Laws"	2.1. Concepts and Properties of Financial Laws 2.2. Financial Laws Classification 2.3. Magnitudes related to Financial Laws
	Unit 3. "Capitalization Operations: Simple and Compound Interest Regime"	3.1. Simple Interest. Characteristics and Properties 3.2. Compound Interest. Characteristics and Properties 2.3. Commercial Characteristics of Capitalization Operations
	Unit 4. "Discount Operations: Simple and Compound Discount Regime"	4.1. Simple Discount. Characteristics and Properties 4.2. Compound Discount. Characteristics and Properties 4.3. Commercial Characteristics of Discount Interest
II.- "Annuities"	Unit 5. "Annuities Valuation"	5.1. Annuity Concept. 5.2. Financial Value of an Annuity 5.3. Financial Annuities Classification 5.4. Ordinary Annuity and Annuity Due
	Unit 6. "Compound Financial Operations"	6.1. Compound Financial Operation Concept. 6.2. Financial Equivalence 6.3. Compound Financial Operations Classifications 6.4. Methods of Calculation of Mathematical Reserves: Retrospective, Recurrent and Prospective 6.5. Decision Criteria. NPV and IRR.
III.- "Paid off Systems. Loans"	Unit 7. "Loans "	7.1. Loan Definition. 7.2. Loan Magnitudes 7.3. Loan Tables and Paid off Systems 7.4. Loan Dynamic Scheme



	Unit 8. "Loan Repayment and Settlement Systems"	8.1. Classification of Loan Repayment and Settlement Systems 8.2. French Loan 8.3. American Loan 8.4. Constant Principal Repayments (Italian Loan) 8.5. Geometric Loans 8.6. Other Repayment and Settlement Systems
	Unit 9. "Spanish Public Debt Market"	9.1. Spanish Public Treasury 9.2. Treasury Bills and Bonds

IV.B.-Training activities	
Type	Title
Theoretical sessions	Problem Solving: Contents I, II, and III
Practical sessions	Possibility of case study workshops using the virtual classroom tools.
Lectures	Financial information can be found in the financial press or on websites.
Theoretical sessions	Lessons on the theoretical content of the course
Academic tutorials	Tutorials throughout the course

V.-Student workload	
Theoretical sessions	15
Resolution of exercises, problems, case studies, etc.	40
Practical sessions in experimental, technological and clinical laboratories, fieldwork, etc.	0
Tests and/or exams	5
Academic tutorials	48
Related activities: conferences, seminars, etc.	0
Preparation of theoretical sessions and self-study	12
Preparation of practical tasks, exercises, case studies, projects, etc.	40
Preparation for tests and/or exams	20
Total student workload	180

VI.-Methodology and academic programme		
Type	Period	Content
Theoretical sessions	Week 1 to Week 11	The development of the theory of the different topics
Resolution of exercises, problems, case studies	Week 2 to Week 15	The course will have an eminently practical content, including the inclusion of many and varied financial problems to be developed throughout the course on a regular basis.
Tests and/or exams	Week 9 to Week 16	Assessment tests of the subject in person
Other activities	Week 1 to Week 1	Presentation of the course, the teaching guide, and the course syllabus.
Academic tutorials	Week 1 to Week 15	Academic tutorials available throughout the duration of the course.
Other activities	Week 1 to Week 13	Depending on the number of students enrolled, workshops can be held via the virtual classroom.



VII.-Assessment methods

The general assessment method is continuous as established in the *Regulation for the Assessment of Learning Outcomes* of Rey Juan Carlos University.

All the assessment systems established in the degree report must be employed, except for those that have a minimum weight of 0%, which can be used by professors in the academic years they consider relevant. Each assessment system may be applied through one or more assessment activities, consistent with the system. No assessment activity can exceed individually 60% of the overall grade for the subject.

The sum of non re-evaluable activities cannot exceed 40% of the overall grade for the subject and, in general, should not have an established minimum grade (except for practical activities in which, strictly speaking, the conditions of the ordinary call cannot be reproduced in the extraordinary call).

Those students who do not manage to pass the subject in the ordinary call, or do not attend this first call, may attend the extraordinary call only for failed re-evaluable assessment activities.

The distribution and characteristics of the assessment activities are described below.

VII.A.-Description and weight of the assessment activities



Assessment system	Exam Weighting	Resit exam in the extraordinary session	Minimum grade to pass	Contents	Date
S.E.-1 Written examination with a weighting of 100% of the final grade according to RUCT, divided into two parts/tests."	40%	Yes	5/10	Blocks I and II	Within the academic term (date to be communicated in advance by the lecturer)
	60%	Yes	5/10	Blocks II (the rest) and III	Official date indicated by the university

The details and characteristics of the assessment tests will be communicated by the lecturer in the first weeks of the academic year.

Extraordinary Examination Session

Students will be required to sit the extraordinary examination session if they have not passed the course during the ordinary session. In this case, they will only be assessed on the parts of the course they have not yet passed.

Early Examination Session

Students wishing to take the early assessment session must meet the requirements established in the **Regulations for the Assessment of Learning Outcomes** of the URJC. In the specific case of this course, students will be evaluated through a comprehensive exam covering the entire syllabus.

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IMPORTANT NOTES

The dates of the ordinary and extraordinary exams are **official** and published well in advance. Once these dates are made final and published on the official website, they **cannot be modified or rescheduled** for individual students. The same policy applies



to exam review sessions.

During the first days of the course, the **lecturer** will provide detailed information about the teaching methodology, office hours, and specific aspects of the assessment system. Office hours will only be held during the regular academic period of the course. To ensure proper classroom management, the **lecturer** will establish specific rules regarding punctuality, participation, and any other relevant aspects. Student attendance in the classroom is conditional upon compliance with these rules, as well as the academic conduct regulations published on the URJC website:

https://www.urjc.es/images/Universidad/Presentacion/normativa/Normativa_conducta_academica_URJC.pdf

Should the **lecturer** determine that the minimum conditions for the normal development of a class are not met, the teaching activity will be suspended, and the corresponding university authorities will be informed.

Exam Review Procedures:

Exam reviews will take place on a date set between the day of the exam and the official deadline for grade submission established by the University for each academic year. The review session will be held on a **single day**, which will be announced in advance together with the provisional marks, and students will be notified **at least 48 hours prior**. No individual or private reviews will be held outside the established dates.

For the purposes of review, **no personal, family, or academic circumstances will justify passing the course** if the marks obtained do not support it. If any student believes the **lecturer** should take into account a particular circumstance that may affect their performance in the course, they must inform the **lecturer** during the academic term and, in any case, **before the end of classes**.

VII.B. Assessment of students with academic exemption from class attendance

Having Academic Exemption from Class Attendance (DAAC) does not imply that students are automatically exempt from participating in the continuous assessment activities or in the training activities of compulsory attendance as established in the teaching guide. Once the exemption has been granted, students must contact the subject's teaching staff, who will propose the adaptations he/she may consider relevant, as long as they guarantee the acquisition and adequate assessment of the learning goals established. Students must maintain adequate communication with the teaching staff so that they may provide information on the dates for training and assessment activities, if these are not established in the programme and available for students at the time of achieving the exemption.

Subject with possibility of academic exemption: Yes.

VII.C. Review of assessment activities

In accordance with the Regulation for the Assessment of Learning Outcomes of Rey Juan Carlos University.

VII.D.-Students with a disability or special educational needs

In order to guarantee equal opportunities, non-discrimination, universal accessibility and academic success, students with disabilities or especial education needs may request curricular adaptations to follow their studies. These adaptations will be provided by the Unit of Attention to People with Disabilities of Rey Juan Carlos University, in accordance with the regulation which regulates the service for the Attention of People with Disabilities at the University. This Unit will issue a report for curricular adaptations, so that students with disabilities or special education needs must contact the service (at e-mail discapacidad.programa@urjc.es) in order to provide relevant information for different educational alternatives.

VII.E.-Academic behaviour, academic integrity and honesty

Rey Juan Carlos University is fully committed to the highest standards of academic integrity and honesty, so studying at the URJC means assuming and subscribing to the values of integrity and academic honesty set out in the University's Ethical Code. To support this process, the University has Rey Juan Carlos University's Academic Conduct Regulation as well as different tools (anti-plagiarism, supervision...) that offer a collective guarantee for the full development of these essential values.



VIII.-Teaching resources and materials

Basic bibliography

Ethics, Professional Standards and Quantitative Methods; CFA Institute

Principles of Finance with Excel; Simon Benninga (2006); Oxford University Press Inc (2006)

Cálculo Financiero. Teoría y Ejercicios; Aparicio, A., et al. (2017); Thompson-Paraninfo, (3th Edition)

Consultation bibliography

Matemática de las Operaciones Financieras; Bonilla, María; Ivars, Antonia y Moya, Ismael (2006); Thomson-Paraninfo

Curso de Matemática Financiera; Miner, Javier (2008); Mc Graw Hill

Websites of interest:

www.tesoro.es

www.bde.es

www.excelavanzado.com

Financial newspapers:

www.eleconomista.es

www.expansion.es

www.cinco dias.es

IX.-Professors

Name and surname	MARÍA ELISA GARCÍA ABAJO
E-mail address	mariaelisa.garcia@urjc.es
Department	Economía Financiera y Contabilidad
Campus	Madrid - Quintana
Category	Titular de Universidad interino
Academic degree	Doctor
Person responsible for the subject	Yes
Tutorial timetable	Para consultar las tutorías póngase en contacto con el/la profesor/a a través de correo electrónico
Number of quinquennia	4
Number of sexennia	0
No. of positive evaluations by Docencia	4

