

TEACHING GUIDE

FINANCIAL MATHEMATICS

GRADO EN ADMINISTRACIÓN Y DIRECCIÓN DE EMPRESAS (INGLÉS)

ACADEMIC YEAR 2026-27

Publication date: 29-06-2026



I.-Subject Identification

Type	OBLIGATORIA
Teaching period	1 course, 2Q semester
Nº of credits	6
Language in which 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

CPR01. Practical application of knowledge.

CI01. Ability to analyse and synthesise: analysis, synthesis, evaluation and decision-making based on relevant information records on the company's position and potential growth.

CI05. Knowledge of information systems relating to studies: normal use of information and communications technology in all professional work

CI06. Ability to analyse, search for and interpret information from different sources: ability to identify sources of relevant economic data, obtain and select information that non-professionals are not capable of recognising

CI07. Ability to solve problems

CI08. Ability to make decisions

CS01. Ability to study independently.

CP21 . Ability to apply language and mathematical / statistical logic in the approach of an economic - business problem

CE10. Knowledge support necessary for the proper realization of learning and prior knowledge, especially Math

CP01. Domain of IT tools applied with specific character to the different matters

CP02. Ability of application of the theoretical, methodological knowledge and of the technologies acquired in the process of formation

CP04. Ability to use tools of quantitative nature in the capture of managerial decisions

CP03. Ability to model managerial situations

CP12 . Understanding the financial operations taking place in business

CP13 . Ability to solve problems both financial valuation of funding decisions as business investment

CP14 . Mastery of computer tools applied to financial and accounting management

CP16 . Ability to evaluate the market and the environment integrated into the marketing information system

CP17 . Ability to understand the international implications of business management



- 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

THEMATIC	LESSONS	SECTIONS
I.- "Basic Topics. Simple Financial Operations."	Lesson 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. Operations Classification
		1.6. Theoretical Concepts
	Lesson 2. "Financial Laws"	2.1. Concepts and Properties of Financial Laws
		2.2. Financial Laws Classification
		2.3. Magnitudes related to the Financial Laws
	Lesson 3. "Capitalization Operations: Simple and Compound Interest Regimen"	3.1. Simple Interest. Characteristics and Properties
		3.2. Compound Interest. Characteristics and Properties
		3.3. Commercial Characteristics of Capitalization Operations
	Lesson 4. "Discount Operations: Simple and Compound Discount Regimen"	4.1. Simple Discount. Characteristics and Properties
		4.2. Compound Discount. Characteristics and Properties
		4.3. Commercial Characteristics of Discount Interest
II.- "Annuities"	Lesson 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
	Lesson 6. "Compound Financial Operations "	6.1. Compound Financial Operation Concept.
		6.2. Financial Equivalence
		6.3. Compound Financials Operations Classifications
		6.4. Methods of Calculation of the Mathematical Reserve: Retrospective, Recurrent and Prospective
		6.5. Decision Criteria. NPV and IRR.
III.- "Paid off Systems. Loans"	Lesson 7. "Loans "	7.1. Loan Definition.



		7.2. Loan Magnitudes
		7.3. Loan Tables and Paid off Systems
		7.4. Loan Dynamic Scheme
	Lesson 8. "Paid off Systems"	8.1. Paid off Systems. Classification
		8.2 French Loan
		8.3 American Loan
		8.4 Italian Loan
		8.5. Geometric Loan
		8.6 Other Paid off Systems

IV.B.-Training activities

Type	Title
Theoretical sessions	Problem-solving sessions covering Units I, II and III.
Lectures	Reading of recommended materials and consultation of financial information through the financial press and specialised websites.
Practical sessions	Practical workshops may be organised using the resources available through the Virtual Classroom.
Academic tutorials	Office hours will be announced by the lecturer during the first class session.
Other activities	Attendance at face-to-face seminars, workshops, training courses and conferences.
Other activities	Optional: Subject to the lecturer's approval, students may use artificial intelligence (AI) tools as a learning support resource for consultation, comparison of results and critical reflection in activities related to Financial Mathematics. The use of such tools must always comply with the lecturer's instructions and the assessment requirements of 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	20
Related activities: conferences, seminars, etc.	28
Preparation of theoretical sessions and self-study	15
Preparation of practical tasks, exercises, case studies, projects, etc.	45
Preparation for tests and/or exams	12
Total student workload	180

VI.-Methodology and academic programme

Type	Period	Content
Theoretical sessions	Week 1 to Week 14	Lectures covering the theoretical content of the course. During the first week, the course structure, Teaching Guide, syllabus, assessment methods and course timetable will be presented.
Seminars	Week 1 to Week 14	Attendance, either in person or online, at seminars related to the course content offered by the University (optional).
Practical sessions	Week 2 to Week 15	Guided solution of practical exercises and financial mathematics problems.
Academic tutorials	Week 1 to Week 15	Individual academic support sessions. The lecturer will provide further information on the schedule and arrangements.
Tests and/or exams	Week 9 to Week 14	On-campus written examinations covering the course content.



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

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

Students are entitled to two assessment periods each academic year: the **Ordinary Assessment Period** and the **Extraordinary Assessment Period**.

Ordinary Assessment Period

The ordinary assessment consists of two reassessable written examinations.

The date of the first examination will be determined by the lecturer during the first weeks of the semester and communicated to students through the usual communication channels. This examination may only be taken during the teaching period. The second examination will take place on the official examination date established by the University.

Students must obtain a minimum mark of **5 out of 10** in each examination to pass it independently. Any examination not passed during the ordinary assessment period may be retaken in the extraordinary assessment period.

Extraordinary Assessment Period

Students who do not successfully complete the course during the ordinary assessment period may take the extraordinary assessment. They will only be required to retake the examination(s) that they have not passed.

The examinations in the extraordinary assessment period will be equivalent in format, content and level of difficulty to those of the ordinary assessment period.

Early Assessment

Students wishing to take the early assessment must meet the requirements established in the **URJC Regulations on the Assessment of Learning Outcomes**.

For this course, the early assessment will consist of a comprehensive written examination covering the entire course syllabus.

Assessment system	Assessment activity	Exam Weighting	Reassessable	Minimum Passing Mark	Contents	Date
S.E.3- In-person theoretical-practical exams (mandatory attendance and exempting if passed)"	1 problem-solving examination (it may consist of multiple-choice questions or short-answer questions)	40%	Yes ((during the Extraordinary Assessment Period)	5/10	Units I and II	Within the academic term (date to be communicated in advance by the lecturer)
S . E . 4 - Assessment of problem-solving and practical (in-person and exempting if passed)"	1 theoretical-practical written examination (it may consist of multiple-choice questions or short-answer questions)	60%	Yes (during the Extraordinary Assessment Period)	5/10	Remaining contents of Unit II and Unit III	Official date indicated by the university

Final Grade Calculation

The final course grade will be based on two written examinations undertaken during the **Ordinary Assessment Period**, weighted **40%** and **60%**, respectively.

To successfully complete the course, students must obtain a minimum mark of **5 out of 10** in **each** examination.

Students who achieve a mark of **5 or higher** in both examinations will receive a final grade calculated as the weighted average of the two marks.

Students who fail one examination (i.e., obtain a mark below **5 out of 10**) will be required to retake only that examination during the **Extraordinary Assessment Period**. Students who fail both examinations must retake both.

If the weighted average of the two examination marks is **5 or higher**, but one of the examinations has not reached the minimum passing mark of **5 out of 10**, the course will **not** be considered successfully completed. In such cases, a final grade of **4.0** will be recorded. If the weighted average is below **5.0**, the final recorded grade will correspond to that weighted average.

Students who sit only one of the two examinations will receive a mark of **0** for the examination not taken for the purpose of calculating the final grade. As a result, the missed examination will be considered failed and must be retaken during the extraordinary assessment period. Since all compulsory assessment requirements will not have been fulfilled, the maximum final grade that may be awarded in the ordinary assessment period will be **4.0**.

The grade **"Absent"** will be awarded only to students who do not attend either of the two examinations.

Extraordinary Assessment Period

Students who do not successfully complete the course during the ordinary assessment period may take the extraordinary assessment by retaking only the examination(s) that they have failed or not attended.

A minimum mark of **5 out of 10** must be obtained in each outstanding examination in order to pass the course.

The examinations in the extraordinary assessment period will be equivalent in content, format and level of difficulty to those of the ordinary assessment period. The same assessment weighting (**40%** and **60%**) will apply when calculating the final course grade.

All examinations will be conducted **exclusively in person**. Under no circumstances will examinations be administered through the Virtual Classroom or any other online platform.

Important Information

The dates of both the ordinary and extraordinary examinations are **official** and are published well in advance. Once confirmed and published by the University, these dates cannot be modified or rescheduled for individual students. The same policy applies to examination review sessions, in accordance with the **URJC Regulations on the Assessment of Learning Outcomes**.

During the first weeks of the semester, the lecturer will provide detailed information on the teaching methodology, office hours and all course-specific assessment procedures. Office hours will be available only during the regular teaching period.

The lecturer will establish the classroom regulations concerning punctuality, attendance, participation and any other aspects considered necessary for the proper running of the course. Students are expected to comply with these regulations, as well as with the University's Academic Code of Conduct.

If the lecturer considers that the minimum conditions required for the normal delivery of a class are not met, the teaching activity may be suspended and the matter reported to the appropriate University authorities.

Examination Review

Examination review sessions will take place between the examination date and the official deadline for the submission of final grades established by the University for the corresponding academic year.

The review session will be held on a single date, which will be announced together with the provisional marks. Students will be notified at least **48 hours** in advance.

Individual review sessions outside the scheduled date will not be arranged. Students are expected to attend the review session during the allocated time slot. Requests for alternative review sessions based on personal, professional or organisational reasons will not be accepted.

Review sessions must be conducted in a respectful academic environment. Personal, family or academic circumstances cannot justify the awarding of a passing grade when the assessment evidence demonstrates otherwise.

Students who consider that any personal circumstance may affect their academic performance should inform the lecturer during the semester and, in any case, before the end of the teaching period.

Virtual Classroom

The Virtual Classroom is intended as a supplementary resource to support face-to-face teaching and should not be regarded as a substitute for classroom attendance. The publication of teaching materials on the platform is at the discretion of the lecturer.

Students with Academic Exemption

Students granted academic exemption remain responsible for following the course and for obtaining information regarding the explanations, activities, guidance and materials provided during the face-to-face sessions they do not attend.

Academic exemption does not, by itself, entail an individual adaptation of the course, nor does it require the lecturer to reproduce face-to-face teaching by alternative means. Students retain the right to access any teaching materials and communication channels that the lecturer makes available.



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

Title: Principles of Finance with Excel; Author: Simon Benninga; Publisher: Oxford University Press Inc (2006)

Title: Ethics, Professional Standards and Quantitative Methods; Author: CFA Institute; Publisher: CFA Institute (2004)

Title: Cálculo Financiero. Teoría y Ejercicios; Author: Aparicio et al.; Publisher: Thompson-Paraninfo, (2th Edition)(2002)

Consultation bibliography

Title: Matemática de las Operaciones Financieras; Authors: Bonilla, María; Ivars, Antonia y Moya, Ismael; Publisher: Thomson (2006)

Title: Curso de Matemática Financiera; Author: Miner, Javier; Publisher: Mc Graw Hill (2008)

Title: Matemática de las Operaciones Financieras. Ejercicios Resueltos; Author: Gil Peláez, L; Publisher: AC

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 - Vicálvaro
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

