

Bachelor Degree in Business Administration and Management and Business Transformation

Course: Financial Mathematics

Subject: Accounting and finance

Credits: 6 ECTS

Program: Bachelor

Modality: On-Site

Year: Second

Semester: Second

Academic Year: 2026-2027

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2. Presentation

The subject of Financial Mathematics offers the mathematical tools available to companies to assess different investment and financing problems, such as income, loans or borrowings. In fact, as recognized by the International Association of Actuaries, graduates in this discipline are professionals with advanced mathematical and financial skills. For this reason, they have sometimes been called Financial Architects or Social Mathematicians, given their particular combination of analytical and business knowledge have been employed to achieve a growing variety of financial and social challenges worldwide.

3. Learning outcome of the degree

- RAT1 - The graduate will be able to recognize the tasks of the different functional areas within a company or organization, taking into account previous theoretical learning about business structures.
- RAT2 - The graduate will identify the moral and ethical principles related to legal and social responsibility, derived from business action through theoretical learning of the regulations that apply to companies.
- RAT3 - The graduate will be able to identify economic, environmental, political, sociological and technological factors at the local, national and international levels and their impact on organizations through research-based learning in business environments.
- RAT4 - The student will describe the techniques of management in the development of business organizations by means of different written tests.
- RAT5 - The graduate will describe the characteristics of the institutions and procedures of the Spanish and European legal system and their impact on the business environment, by means of a written or oral test.
- RAT6 - The graduate will be able to understand the different data analysis techniques used to assess the feasibility of a business project.
- RAT7 - The student, after completing the Degree, will be able to identify the HR principles and practices of organizations through real-world case study learning
- RAT8 - The graduate will be able to provide a detailed description of the principles of occupational risk assessment as well as the action plans required to implement them in a company.
- RAT9 - The student will be able to provide clear and precise explanations of any knowledge/information, both orally and in writing, in Catalan, Spanish and a third language, particularly English.
- RAT10 - The student will be able to apply digital technologies (at the right time) in his/her field of expertise.
- RAT11 - After completing the Degree, the student will be able to apply the teamwork techniques in an autonomous way.
- RAT12 - The graduate will be able to develop both traditional and digital marketing and promotional projects in a business environment.
- RAT13 - The graduate will be able to analyze the economic operations of companies, which have been carried out in the financial markets.

- RAT14 - The graduate will be able to apply in an effective way the principles of quality management and continuous improvement of organizations by means of a simulation of the implementation of a quality system in a company.
- RAT15 - The graduate will be able to analyze the possible solutions to a legal problem in the business environment.
- RAT16 - The graduate will be able to understand the economic-financial information of business entities and institutions in relation to their environment.
- RAT17 - After completing the degree, the graduate will be able to apply techniques to analyze and solve problems in changing business environments through the implementation of challenges and problem-solving methods.
- RAT18 - The student will be able to provide innovative, creative and entrepreneurial solutions in professional situations.
- RAT19 - The student will be able to evaluate the sustainability and social impact of the proposals presented, with ethical, environmental and professional responsibility.
- RAT20 - The student will be able to apply the gender perspective in the professional tasks.
- RAT21 - The graduate will be able to verify the economic-financial information of business organizations and institutions with regard to their environment, by analyzing the companies' profit and loss accounts.

4. Learning outcomes of the subject

- RAM2 - The student will be able to accurately generate the financial planning of a company to evaluate its viability through simulations of real cases.
- RAM7 - The student will be able to propose in a clear way the necessary requirements for the search of financing for the digital transformation of the company, through the learning based on problems.
- RAM8 - The student will be able to correctly create a detailed study on the viability of a company by applying the theoretical knowledge learned.

5. Contents

The subject of Financial Mathematics offers the mathematical tools available to companies to assess different investment and financing problems, such as income, loans or borrowings. In particular:

1. Introduction to financial mathematics
2. Simple financial regimes
 - 2.1. Simple interest (post-paid)
 - 2.2. Pre-paid simple interest
 - 2.3. Commercial discount
 - 2.4. Rational discount
 - 2.5. Equivalence between interest and discount simple rates
3. Applications of practical financial regimes
4. Compound financial regimes
 - 4.1. Nominal interest rate vs. Effective interest rate
 - 4.2. Equivalence between effective interest rates
 - 4.3. Compound interest
 - 4.4. Nominal discount rate vs. Effective discount rate
 - 4.5. Equivalence between effective discount rates 36
 - 4.6. Compound discount
 - 4.7. Equivalence between interest rates and discount rates
 - 4.8. Continuous compounding
 - 4.9. Common maturity & average maturity
 - 4.10. Calculating tae (ear) according to banco de españa regulation
5. Annuities & perpetuities
 - 5.1. Annuities: concept & elements
 - 5.2. Classification
 - 5.3. Constant annuities/perpetuities
 - 5.4. Geometric annuities /perpetuities
 - 5.5. Arithmetic annuities/perpetuities
 - 5.6. Instalments
6. Loans
 - 6.1. Concept
 - 6.2. Types of loans
 - 6.3. Single repayment loan
 - 6.4. Constant payment loans
 - 6.5. Variable payment loans
 - 6.6. Financial leasing
 - 6.7. Loans with exclusion period
 - 6.8. Early termination
 - 6.9. Cost, return & ear
7. Corporate bonds issue

6. Methodology

Learning outcomes developed	Teaching methodology	Training activities
Knowledge	Master class	Teacher's presentations
	Instructional sessions	Student's presentations
	Tutoring	Meetings for the resolution of doubts
	Learning based on readings	Reading and analysis of documents
Skill	Learning based on projects	Problem solving
	Learning based on audio-visual	Audiovisual analysis
	Case-based learning	Search and processing of information. Problem solving
Competence	Project-based work	Reporting Submissions of reports or papers

7. Evaluation

Evaluation system	Weight
Continuous evaluation: exercises, problems, reporting, papers, case studies	40 %
Mid-term exam	20 %
Final exam	40 %

The regulations include the obligation of 75% attendance.

- Absences are divided into two categories: justified and unexcused. Excused absences are those that can be demonstrated with a proof. All other absences are considered unjustified absences.
- The supporting documents must be delivered within a maximum period of 7 days to the teaching staff and clearly include the student's personal data as well as the date and time in which the student did not attend to a class.

Continuous assessment

The final grade for the subject is calculated based on the weighted average of three evaluation blocks:

- a) Midterm exam, 20%
- b) Activities (participation, class tests, seminar cases and/or group projects), 40%
- c) Final exam, 40%

These three blocks will only be weighted if the final exam grade is equal to or greater than 4.0.

When the final exam grade is less than 4.0, blocks a) and b) will not be weighted and the final exam grade becomes the final grade for the subject.

If the student does not take the final exam, the final grade for the course is "No show."

In the event that the course final grade is a fail, but the final exam grade is less than 5.0, the student can recover the final exam with an additional test. With the result obtained, the final grade for the subject will be calculated according to the previous criteria.

Single Evaluation

The single evaluation consists of a single exam that is equivalent to 100% of the course grade. The exam, and therefore the subject, is passed with a grade of 5 out of 10 in this final test. In case of obtaining a grade lower than 5.0, the student has the right to a make-up exam.

To benefit from the single evaluation, it is necessary to send a written request to the coordination during the first 15 business days of the course.

The regulations establish a mandatory attendance requirement of 75%.

Regular attendance at in-person teaching activities is a fundamental academic requirement for the proper acquisition of the course competencies and learning outcomes. Accordingly, students must attend at least **75% of all scheduled sessions**.

Failure to meet this minimum attendance requirement will result in the loss of the right to sit the final examination for the course. Consequently, the student will receive a failing grade, with no possibility of accessing reassessment procedures or second-chance examinations, in accordance with the University's current academic regulations.

1. Absences are divided into two categories: **excused** and **unexcused**. Excused absences are those that can be supported by appropriate documentation. All other absences will be considered unexcused.
2. Supporting documentation for excused absences must be submitted to the teaching staff within a maximum of **7 days** and must clearly include the student's personal details, as well as the date and time period during which attendance in class was prevented.

8. Bibliography

8.1 Basic bibliography

- Gutiérrez, Marco T. Méndez. *Matemáticas financieras: Rentas a interés compuesto 2a Edición. Problemario*. Ediciones de la U, 2021.

8.2 Complementary bibliography

- E. Navarro & J.M. Nave. Fundamentos de Matemática Financiera. Antoni Bosch, editor
- M. Bonilla, A. Ivars & I. Moya. Matemática de las operaciones financieras. Teoría y práctica. Ed. Thomson
- M.C. González. Análisis de las operaciones financieras. Ed. Thomson – Civitas
- E. Levi. Curso de matemática financiera y actuarial (Volumen I). Bosch, Casa Editorial
- P. Alegre, C. Badia, M. Borrell, T. Sancho. Ejercicios de Matemática financiera. Ed. AC
- V. Nieto de Alba. Matemática de las operaciones financieras. Ed. ICAI

- Rodríguez. Matemática de la financiación. Ed. Ediciones de la Universidad de Barcelona
- ROSS, Stephen, et al. Fundamentals of Corporate Finance. New York: Irwin- McGraw, 2010. ISBN: 0073530689.
- BREALEY, Richard, et al. Fundamentals of Corporate Finance. New York: Irwin- McGraw, 2011. ISBN: 0078034647
- KEOWN, Foundations of Finance, Global Edition, 10th edition, 2020.