COURSE DATA

DATA SUBJECT

Code: 35943
Name: Financial mathematics
Cycle: Undergraduate Studies
ECTS Credits: 6
Academic year: 2025-26

STUDY (S)

Degree	Center	Acad. year	Period
1315 - Degree in Finance and Accounting	Facultat d'Economia	2	First quarter

SUBJECT-MATTER

Degree	Subject-matter	Character
1315 - Degree in Finance and Accounting	Financial mathematics	COMPULSORY

COORDINATION

GONZALEZ BAIXAULI EUSEBIO CRISTOBAL

SUMMARY

The main objective of this subject is to provide students with a solid and generic framework to analyse complex financial transactions. On completion of this course the student should be able to quantify the financial variables in any particular transaction and take the appropriate decisions based on the measurement of the cost and return on the transaction for the borrower and the lender, respectively.

This generic aim can be expressed through the following particular goals:

- To obtain an overview of the scope of Financial Mathematics.
- To master the fundamental concepts of Financial Mathematics.
- To accurately apply the standard valuation model in financial mathematics for the analysis of the most usual financial transactions.
- To develop skills to be applied in the analysis of new financial transactions that could come out in the financial markets.

This course is part of the FINANCE module. This is a mandatory subject of 6 ECTS (150 hours). The contents will be the basis for the development of the other disciplines that make up this module, such as Fixed Income Markets or Bank Analysis and Management.

PREVIOUS KNOWLEDGE

RELATIONSHIP TO OTHER SUBJECTS OF THE SAME DEGREE

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

OTHER REQUIREMENTS

No prior knowledge is required.

COMPETENCES / LEARNING OUTCOMES

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CM4FYC 1 Conocer los fundamentos básicos que rigen las operaciones y los mercados financieros.

CM4FYC 2 Capacidad para aplicar correctamente un modelo de valoración común para el análisis de las operaciones financieras de inversión y financiación.

DESCRIPTION OF CONTENTS

1. Introduction to Basic Concepts

1.1 Introduction

1.2 Simple Capitalization and Discounting

2. Compound Capitalization

2.1 Compound Capitalization

2.2 Accumulation and Discount Factors

2.3 Effective and Nominal Interest Rates

3. Financial Valuation of a Set of Cash Flows: Annuities

3.1 Financial Value of a Set of Cash Flows

3.2 Annuity. Financial Value of an annuity.

3.3 Valuation of a constant annuity.

3.4 Valuation of Cash Flows that follow a Geometric Progression

4. Complex Annuities

4.1 Valuation annuities payable mthly

4.2 Other complex annuities

5. Financial Transaction: Financial Equivalence and Oustanding Balance

5.1 Definition and Classification

5.2 General Approach

5.3 Outstanding Balance concept, calculation methods, and evolution.

6. Cost and Yield: Effective interest rates

6.1 Effective rate in a Pure Financial Transaction

6.2 Effective rates in a Financial Transaction with additional terms and conditions

6.3 Effective rates used in the market. APR

7. Loans: General Analysis

7.1 Definition

7.2 Financial Equivalence

7.3 Outstanding Balance

7.4 Decomposition of the periodic payment

7.5 Other Variables and Relationships

7.6 Evolution of Variables. Amortization schedule

8. Loans with Predetermined Interest Rates

8.1 Bullet Loan

8.2 Level-payment, fixed-rate Loan

8.3 Loans with constant prepayments

8.4 Other loans: interest installment payments

9. Adjustable-rate Loans

9.1 Adjustable-rate amortization transactions.

9.2 Adjustable-rate loans with fixed duration and unspecified periodic payments.

9.3 Adjustable-rate loans with unspecified duration and known payments.

10. Fixed-income securities

10.1 Bond issues: concept and types.

10.2 Financial analysis of fixed-income securities.

10.3 Market value of a bond.

WORKLOAD

PRESENCIAL ACTIVITIES

Activity	Hours
Theory	30,00
Computer classroom practice	15,00
Classroom practices	15,00
Total hours	**60,00**

NON PRESENCIAL ACTIVITIES

Activity	Hours

Attendance at other activities	0,00
Individual or group project	0,00
Independent study and work	45,00
Preparation of lessons	30,00
Preparation for assessment activities	15,00
Resolution of case studies	0,00
Total hours	**90,00**

TEACHING METHODOLOGY

This subject consists of two hours of theory and two hours of practical classes per week, for a total of four hours of class per week. Students in each theory group will be divided into two practical groups.

The practical classes will consist of exercises, real-life case studies, class presentations, and reading discussions. The materials necessary for the theoretical and practical classes will be made available to students in the Virtual Classroom with sufficient advance notice. Please note that attendance is mandatory for all in-person activities in this course.

Students are expected to actively participate in both practical and theoretical classes. Students are also required to arrive well in advance of the start of class and with their cell phones turned off. Students should also refrain from talking continuously with their classmates during class. Comments and questions regarding the class content can (and should) be made, but should be appointed to the instructor.

Additionally, students are encouraged to take advantage of the teacher's tutoring schedule throughout the course to ask any questions or request clarification.

The methodology used to teach Financial Mathematics is a combination of active methodologies that seek meaningful, constructive, and autonomous learning. Under this methodology, both professor and students are jointly responsible for student learning.

More specifically, the methodology used can be described as follows:

For theoretical classes, students must prepare in advance the basic reading material that serves as the basis for the theoretical explanation, as well as the main questions that arise during the reading of the material. During classes, the professor will combine his explanations with active student participation (posing questions that can be answered by the professor and/or their classmates, answering brief questions posed by the professor, and group discussion of the aspects that have generated the greatest interest). The objective is for the student to develop both their capacity for independent work (work prior to classes) and their ability to work in a team, argue and defend ideas (group debates) and their oral and written communication skills (raising doubts about the topic in public and resolving in writing the questions that have been raised in class).

Practical classes will consist of exercises completed by the instructor and/or the student. For these classes, students will be given a questionnaire of exercises, part of which will be used for individual work. In addition, students will be required to complete exercises, tests, and case studies individually or in groups, which must be submitted to the instructor or presented in class. In practical classes conducted on a

computer in the computer lab, problems will be solved using an Excel spreadsheet.

An important element of learning is the instructor's tutorials. Any questions and issues that may arise throughout the teaching-learning process can be resolved individually or in groups. Therefore, students are encouraged to make use of them regularly. It is recommended to schedule an appointment for the tutorial via email to avoid waiting times.

EVALUATION

The subject of Financial Mathematics will be assessed on the basis of the following aspects: 1) Final exam, which will consist of theoretical and practical questions and will allow obtaining up to 70% of the final mark (7 points out of 10). 2) The remaining 30% will be obtained from the activities carried out by the student during semester, including the assignment of solved problems, the follow-up tests and any other type of continuous assessment.

The continuous assessment is considered to be recoverable. This applies to both the first and second calls. In any case, in order to pass the course, it is considered an essential requirement to pass the final exam (answering at least 50% of the exam correctly), which is compulsory. In case of failing the synthesis exam, the maximum grade that the student can obtain as the sum of all the components will be 4.5 points.

The assessment tests will be subject to the provisions of Article 13 on fraudulent performance of assessment tests of the "Reglament d'avaluació i qualificació de la Universitat de València per a títols de grau i màster, ACGUV 108/2017 de 30 de mayo". Likewise, the rest of the assignments and assignments that can be assessed will be subject to the regulation on plagiarism detailed in Article 15.2 of the aforementioned regulation. Any possible change of date and/or time of the final assessment tests will be governed by the procedure and deadline established in Article 9.2 of the aforementioned Regulations.

In particular, in the event that the dates and times of the final assessment exams of subjects in the same degree course in which the student has enrolled coincide, if the change is to be made for this subject, a written request must be submitted to the head of the department responsible at least one month before the start of the official exam period. You can send your request electronically to: dep.economia.financera@uv.es only from your alumni.uv.es email address. An e-mail sent from a private address will not be accepted. In order to be able to take advantage of the additional call, the student must justify that he/she has taken the coinciding exam.

exam.

REFERENCES

Basic:

- Navarro, E. (2019): Matemáticas de las operaciones financieras. Ediciones Pirámide. Madrid.

Additional:

- Baquero, M.J. y Maestro, M.L. (2003): Problemas Resueltos de Matemática de las Operaciones Financieras. Editorial AC. Madrid.
- Dalton, B. (2008): Financial products: an introduction using mathematics and Excel, Cambridge UniversityPress.
- García Boza, J. (2017): Matemáticas Financieras. Ediciones Pirámide. Madrid.
- Meneu, V., Jordá, M.P. y Barreira, M.T. (1994): Operaciones financieras en el mercado español. Editorial Ariel Economía. Barcelona.
- Navarro, E. y Nave, J.M. (2001): Fundamentos de Matemáticas Financieras. Antoni Bosch Editor. Barcelona.
- Zima, P. and R.L. Brown (1996): Schaums outline of theory and practice of Mathematics of Finance, 2nd Edition. McGraw-Hill, New York.