



## Information about the subject

**Degree:** Bachelor of Science Degree in Business Administration and Management

**Faculty:** Faculty of Legal, Economic and Social Sciences

**Code:** 300205 **Name:** Business and Financial Mathematics

**Credits:** 6,00 **ECTS Year:** 2 **Semester:** 1

**Module:** Finance

**Subject Matter:** Applied Finance **Type:** Compulsory

**Department:** Accounting, Finance, and Management Control

**Type of learning:** Classroom-based learning / Online

**Languages in which it is taught:** English, Spanish

### Lecturer/-s:

|       |   |                       |
|-------|---|-----------------------|
| 302A  | <u>Sandra Alfonso Sargues</u> (Responsible Lecturer)      | sandra.alfonso@ucv.es |
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## Module organization

### Finance

| Subject Matter       | ECTS  | Subject                                 | ECTS | Year/semester   |
|----------------------|-------|---|------|---|
| Financial Management | 12,00 | Corporate Finance I                     | 6,00 | 3/1   |
|                      |       | Corporate Finance II                    | 6,00 | 4/1   |
| Applied Finance      | 24,00 | Business and Financial Mathematics      | 6,00 | 2/1   |
|                      |       | Financial Planning and Control          | 6,00 | 3, 4/1  |
|                      |       | Negotiation with Financial Institutions | 6,00 | This elective is not offered in the academic year 25/26 |
|                      |       | Stock Markets and Securities Trading    | 6,00 | 4/2   |

## Recommended knowledge

Financial Mathematics is a second-year course. It marks the beginning of the study of finance within the Business Administration degree program.

The Financial Mathematics course provides an economic and financial description and analysis of financing and investment operations available to both businesses and individuals. This course develops the mathematical skills necessary for calculating financial operations, including the cost analysis of financing products and the profitability of investment products.

In principle, no prior knowledge is required to successfully complete the course; however, the study of financial instruments in Accounting courses is highly beneficial.



## Learning outcomes

At the end of the course, the student must be able to prove that he/she has acquired the following learning outcomes:

- R1 Apply their knowledge correctly to their work or vocation in a professional manner and be able to develop and defend arguments and solve problems within their field of study. [RAB2]
- R2 Be able to gather and interpret relevant data (usually within their field of study) to make judgments that include reflections on relevant social, scientific, or ethical issues. [RAB3]
- R3 Respect and implement the ethical principles and action proposals derived from the Sustainable Development Goals, transferring them to all academic and professional activities. [RAT3]
- R4 Be able to make decisions autonomously, responsibly, and based on reason. [RAG2]
- R5 Be able to relate to and collaborate with others in a respectful, empathetic, and assertive manner, recognizing and valuing different disciplines, diversity, and interculturality, and managing conflicts that may arise constructively. [RAG7]
- R6 Be able to act with confidence and self-esteem in their field of study and professional environment, taking on the challenges and responsibilities that arise, and making autonomous and informed decisions. [RAG8]
- R7 Be able to integrate and apply the knowledge from the different disciplines that make up the field of business administration and management (such as economics, accounting, finance, marketing, organization, etc.), to perform a comprehensive and strategic analysis of a company, defining the criteria that characterize and differentiate it from others, and linking the results with the analysis of the environment in which it operates. [RAE3]
- R8 Be able to understand existing technology and new technologies that affect the field of business administration and management, as well as evaluate their impact on the creation, development, and competitiveness of new or future markets. [RAE4]
- R9 Be able to understand the principles of law that regulate the operation and relationships of companies and organizations (such as commercial law, labor law, tax law, administrative law, etc.), and relate them to knowledge related to business management (such as accounting, finance, marketing, organization, etc.). [RAE7]



## Assessment system for the acquisition of competencies and grading system

| Assessed learning outcomes | Granted percentage | Assessment method  |
|----------------------------|--------------------|--|
|                            | 25,00%             | Objective Tests  |
|                            | 15,00%             | Completion of Theoretical-Practical Activities                                     |
|                            | 10,00%             | Class Attendance and Participation   |
|                            | 50,00%             | Final Exam   |
|                            | 5,00%              | Participation in Synchronous Communication Activities                              |
|                            | 25,00%             | Deliverable Activities   |
|                            | 15,00%             | Periodic Evaluations Through Online Questionnaires                                 |
|                            | 5,00%              | Participation in Discussion Forums   |
|                            | 50,00%             | Final evaluation with essay questions and practical scenarios (In-person activity) |

### Observations

In order to measure the acquisition of the subject's competencies through the learning outcomes defined above, the following assessment system has been designed, which is valid for the first exam session.

Four assessment tests will be carried out throughout the course, which will account for 40% of the final mark, on the following dates:

Assessment test 1: Topic 1

Assessment test 2: Topic 2

Assessment test 3: Topic 3

Assessment test 4: Topic 4

In addition, the work submitted and its presentation will be assessed, as well as the reports and practical reports prepared by the students. Attendance and active participation in technical reflections and discussions will also be assessed, as will participation in group dynamics



throughout the semester.

The final assessment will consist of a written test, which will include multiple-choice questions, short-answer questions and essay questions.

The final mark for the course will be calculated by adding together all the components described above, with the corresponding percentage assigned to each.

With regard to the assessment system for the second sitting, students who have not taken or passed the assessment tests and classroom assignments required for the first sitting must take a more comprehensive final exam, in which case the mark obtained will account for 100% of their final mark.

Finally, given that attendance is compulsory and in accordance with the following article of the UCV, students who do not attend 70% of the sessions, with the exception of the case provided for in the following single assessment, will lose their right to take the exam for the entire course, both in the first and second exam sessions.

In this regard, and in accordance with the General Regulations for Assessment and Grading of Official Courses and UCV Degrees, the single assessment is linked to the inability of students enrolled in a degree programme to attend class. It is, therefore, an extraordinary and exceptional assessment system available to students who, for justified and accredited reasons, are unable to undergo continuous assessment and who request it from the professor responsible for the subject, who will expressly decide on the admission of the student's request for a single assessment and will notify them of its acceptance or rejection. In this case, the final exam will account for 100% of the grade.

#### CRITERIA FOR AWARDING HONOURS:

According to Article 14.4 of the General Regulations for Assessment and Grading of Official Courses and UCV Degrees, the distinction of 'Honours' may be awarded to students who have obtained a grade of 9.0 or higher. The number of honours may not exceed five per cent of the students enrolled in a group in the corresponding academic year, unless the number of students enrolled is less than 20, in which case only one 'Honours' may be awarded.

#### MENTION OF DISTINCTION:

The mention of "Honors" may be awarded to students who have obtained a grade equal to or greater than 9.0. Their number may not exceed five percent of the students enrolled in a group in the corresponding academic year, unless the number of students enrolled is lower.

## Learning activities

The following methodologies will be used so that the students can achieve the learning outcomes of the subject:

- |    |  |
|----|--|
| M1 | Lecture of contents by the teacher, analysis of competencies, explanation, and demonstration of abilities, skills, and knowledge in the classroom. |
|----|--|



- M3 Supervised group work sessions led by the teacher. Study of economic-business cases, both real and fictitious. Meaningful construction of knowledge through student interaction and activity. Critical analysis of values and social commitment.
- M4 Supervised monographic sessions with shared participation.
- M5 Application of interdisciplinary knowledge.
- M6 Personalized and small-group attention. Instruction and/or guidance period conducted by a tutor with the aim of reviewing and discussing materials and topics presented in classes, seminars, readings, completion of assignments, etc.
- M7 Set of oral and/or written tests used in the initial, formative, or summative assessment of the student.
- M9 Group preparation of readings, essays, problem-solving, seminars, assignments, reports, etc., to present or submit in theoretical classes, practical classes, and/or small-group tutorials.
- M10 Student study: individual preparation of readings, essays, problem-solving, seminars, assignments, reports, etc., to present or submit in theoretical classes, practical classes, and/or small-group tutorials.
- M11 Presentation of content by the teacher, analysis of competencies, explanation, and demonstration of skills, abilities, and knowledge in the virtual classroom.
- M12 Group work sessions via moderated chat led by the teacher. Study of economic-business cases, both real and fictitious, to construct knowledge through student interaction and activity. Critical analysis of values and social commitment.
- M13 Monographic sessions throughout the course, focused on current aspects and applications of the subject.
- M14 Problem-solving, comments, reports, to be submitted at deadlines throughout the course.
- M15 Individual attention for monitoring and guidance of the learning process, conducted by a tutor with the objective of reviewing and discussing materials, topics, seminars, readings, completion of assignments, etc.
- M16 Participation and contributions to discussion forums related to the subject, moderated by the course instructor.



- M17 Set of tests, written or oral, used in the initial, formative, or summative assessment of the student.
- M19 Group preparation of readings, essays, problem-solving, seminars, assignments, reports, etc., for dissemination or submission.
- M20 Student study: individual preparation of readings, essays, problem-solving, seminars, assignments, reports, etc., for discussion or submission in electronic format.



## IN-CLASS LEARNING

### IN-CLASS LEARNING ACTIVITIES

|  | LEARNING OUTCOMES                     | HOURS        | ECTS        |
|--|---------------------------------------|--------------|-------------|
| On-campus Class<br>M1                    | R1, R2, R3, R4, R5, R6, R7,<br>R8, R9 | 22,50        | 0,90        |
| Practical Class<br>M1, M3, M5, M9        | R1, R2, R3, R4, R5, R6, R7,<br>R8, R9 | 15,00        | 0,60        |
| Seminar<br>M4, M5, M9                    | R1, R2, R4, R6                        | 4,50         | 0,18        |
| Group Project Presentation<br>M3, M7, M9 | R5, R7, R9                            | 6,00         | 0,24        |
| Tutoring<br>M6                           | R4, R6                                | 6,00         | 0,24        |
| Evaluation<br>M7                         | R1, R4, R9                            | 6,00         | 0,24        |
| <b>TOTAL</b>                             |                                       | <b>60,00</b> | <b>2,40</b> |

### LEARNING ACTIVITIES OF AUTONOMOUS WORK

|                              | LEARNING OUTCOMES                 | HOURS        | ECTS        |
|------------------------------|-----------------------------------|--------------|-------------|
| Group Work<br>M3, M5, M6, M7 | R1, R2, R3, R4, R5, R6, R7,<br>R9 | 30,00        | 1,20        |
| Individual Work<br>M5, M10   | R1, R2, R4, R6, R7, R8, R9        | 60,00        | 2,40        |
| <b>TOTAL</b>                 |                                   | <b>90,00</b> | <b>3,60</b> |





## ON-LINE LEARNING

### SYNCHRONOUS LEARNING ACTIVITIES

|  | LEARNING OUTCOMES                     | HOURS        | ECTS        |
|--|---------------------------------------|--------------|-------------|
| Synchronous Virtual Session<br>M11                             | R1, R2, R3, R4, R5, R6, R7,<br>R8, R9 | 4,00         | 0,16        |
| Synchronous Virtual Practical Session<br>M11, M14              | R1, R2, R3, R4, R5, R6, R7,<br>R8, R9 | 4,00         | 0,16        |
| Synchronous Virtual Seminar and<br>Videoconference<br>M13, M19 | R1, R2, R4, R6                        | 4,00         | 0,16        |
| In-person Assessment<br>M17                                    | R1, R4, R9                            | 3,00         | 0,12        |
| Group Work<br>M12, M19   | R5, R7, R9                            | 10,00        | 0,40        |
| Individual Work<br>M14, M15, M20                               | R1, R2, R4, R6, R7, R8, R9            | 60,00        | 2,40        |
| <b>TOTAL</b>   |                                       | <b>85,00</b> | <b>3,40</b> |

### ASYNCHRONOUS LEARNING ACTIVITIES

|  | LEARNING OUTCOMES      | HOURS        | ECTS        |
|--|------------------------|--------------|-------------|
| Individual Tutoring<br>M14, M17, M19         | R1, R2, R4, R7, R9     | 50,00        | 2,00        |
| Discussion Forums<br>M15                     | R4, R6                 | 5,00         | 0,20        |
| Continuous Assessment Activities<br>M12, M16 | R2, R3, R4, R5, R6, R7 | 10,00        | 0,40        |
| <b>TOTAL</b>                                 |                        | <b>65,00</b> | <b>2,60</b> |



## Description of the contents

Description of the necessary contents to acquire the learning outcomes.

Theoretical contents:

| Content block                                   | Contents  |
|---|---|
| BLOCK I. FINANCIAL MATHEMATICS<br>FUNDAMENTALS  | <ul style="list-style-type: none"><li>- Financial Capital.</li><li>- Financial Equivalence.</li><li>- Financial Laws: Capitalisation and Discounting.</li></ul> |
| BLOCK II. FINANCIAL OPERATIONS.                 | <ul style="list-style-type: none"><li>- Concept.</li><li>- Financial reserve.</li><li>- Cost and return.</li></ul>  |
| BLOCK III. INCOME VALUATION.                    | <ul style="list-style-type: none"><li>- Concept.</li><li>- Final valuation, initial valuation.</li><li>- Prepaid and deferred income.</li></ul>                 |
| BLOCK IV. CAPITAL AMORTISATION<br>TRANSACTIONS. | <ul style="list-style-type: none"><li>- Concept and valuation</li></ul>   |
| BLOCK V. CAPITAL FORMATION<br>TRANSACTIONS.     | <ul style="list-style-type: none"><li>- Concept and valuation</li></ul>   |



## Temporary organization of learning:

| Block of content                             | Number of sessions | Hours |
|--|--------------------|-------|
| BLOCK I. FINANCIAL MATHEMATICS FUNDAMENTALS  | 6,00               | 12,00 |
| BLOCK II. FINANCIAL OPERATIONS.              | 7,00               | 14,00 |
| BLOCK III. INCOME VALUATION.                 | 10,00              | 20,00 |
| BLOCK IV. CAPITAL AMORTISATION TRANSACTIONS. | 4,00               | 8,00  |
| BLOCK V. CAPITAL FORMATION TRANSACTIONS.     | 3,00               | 6,00  |

## References

**Basic bibliography** Bonilla, M, Ivars, A. y Moya, I. (2011): *Matemática de las operaciones financieras: teoría y práctica*. Editorial: Thomson

De la Fuente & Pra, I.(2020) *Matemáticas de las operaciones financieras*. Editorial Universitaria Ramón Areces.

De la Fuente & Pra, I..(2020) Ejercicios de *Matemáticas de las operaciones financieras*. Editorial Universitaria Ramón Areces.

Dumrauf, G (2022) *Manual de matemáticas financieras*. Marcombo.

Rambaud, S. C., & García, J. S. (2024). *Curso de matemáticas aplicadas a la empresa* (Vol. 175). Universidad Almería.

### Supplementary bibliography

Alhabeeb, M. J. (2012). *Mathematical Finance*. John Wiley & Sons, New Jersey.

Brown, R.; Zima, P. & Kopp, S. (2011): *Mathematics of Finance*. McGraw-Hill Ryerson, New York.

Luderer, B. (2020) *Classical Financial Mathematics: Basic Ideas, Central Formulas and Terms at a Glance*. Springer, Wiesbaden

Navarro, E. (2019) *Matemáticas de las operaciones financieras (Economía y Empresa)*. Ediciones Piramide

Tovar, J. (2011). *Operaciones financieras. Teoría y problemas resueltos*. Ed. CEF, Madrid.