Summary

Financial Mathematics describes and analyses financial transactions mathematically. This introductory subject is taught during the first semester of year 2 and it gives 6 ECTS credits.

Financial Mathematics is the first topic related to Finance that students come across in the EDEM Business Degree. This subject is aimed to provide the fundamental knowledge needed to operate in a world of growing financial complexity. General topics include: Simple and compound interest, discount, annuities, amortization, the measurement of the return on investment and the cost of credit. At the same time, a detailed analysis of two of the most usual financial transactions, such as loans and bonds, are explained.

Why Finance matters in an entrepreneur project? As the professors R. Brealey, S. Myers and F. Alllen said the company managers have two broad responsibilities: What investments should the firm make? How should it pay for those investments? The first question implies spending money. The second one involves raising it. So, this subject introduces the concepts and information on which good financial decisions are based.

Course Details

- **Code:** 36268
- **Degree:** Degree in Business Management
- **Mention:** Business Creation and Management - Itinerary Entrepreneurship
- **Character:** Compulsory
- **Year:** 2nd
- **ECTS:** 6

Prior Knowledge

Not required.

Professors

<table>
<thead>
<tr>
<th>Name</th>
<th>Tutorials</th>
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<tbody>
<tr>
<td>Felipe Sánchez Coll</td>
<td>Thursday (10:15 – 11:15) By appointment</td>
</tr>
<tr>
<td><strong>Department</strong></td>
<td></td>
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<tr>
<td>Accounting</td>
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Competences

BASIC COMPETENCES

• GI.1 – Ability to analyze and summarize.
• GI.2 – Ability to organize and plan.
• GI.4 – Ability to use English for business.
• GI.6 – Ability to research and analyze information from a wide range of sources.
• GI.7 – Problem-solving ability.
• GI.8 – Decision-making ability.

SPECIFIC COMPETENCES

• EA.10 - Ability to express oneself in formal, graphic and symbolic languages.
• EA.42 - Know the fundamentals that govern operations and financial markets
• EA.43- Ability to apply a common assessment model to analyze financial operations such as investment and financing.
• EA.44- Ability to estimate the parameters that define productive investment and understand the different methods of valuing investment.
• EA.48 - Know and analyze financial markets, as well as financial operations attached to the business sector.

Learning Outcomes

Upon completion of this course, students will be able to:

• Analyze and describe financial transactions by using a mathematical model and to quantify the financial variables that exist in any particular financial transaction.
• Have basic knowledge of the fundamentals of Financial Mathematics in order to apply them to solve any new transaction that could come out in the financial markets.
• Interpret accurately information about financial transactions in different contexts (asset issuances, financial regulation, financial institutions’ brochures, etc.).

Course Contents

Unit 1: Fundamentals
1.1. Financial transactions, interest, and dated values.
1.2. Simple interest and compound interest.
1.3. Simple discount.
1.4. Equations of equivalence.

Unit 2: Theory of compound interest
2.2. Equivalent compound interest.
2.3. Discounted Value: Formula.
2.4. Determining the rate and the time.
2.5. Compound Interest at changing interest rates.
2.6. Equations of value.

Unit 3: Financial transactions
3.1. Financial transactions.
3.2. Equations of equivalence.
3.3. Outstanding balance.
3.4. Investment return and financing cost measurement: the internal effective rate.
3.5. Additional terms and conditions.

Unit 4: Annuities
4.1. Definitions and notations.
4.2. Accumulated value of an ordinary simple annuity.
4.3. Discounted value of an ordinary simple annuity.
4.4. General annuities.
4.5. Perpetuities.
4.6. Annuities whose payments vary (“rentas variables”).

Unit 5: Loans
5.1. Amortization of a debt.
5.2. Equations of equivalence.
5.3. Outstanding balance.
5.4. Total payments division.
5.5. Types of Loans:
   5.5.1. Bullet. Interest only Loan (“Americano”).
   5.5.2. Equal payments and constant interest rate (“Préstamo francés”).
   5.5.3. Constant principal repayments loan.
   5.5.4. Adjustable-rate loans.

Unit 6: Bonds
6.1. Introduction and terminology.
6.2. Financial analysis.
6.3. Introduction to bond valuation.
6.4. Basic principles of bond valuation.
6.5. Yield to maturity as a rate of return measure.
**Work Load**

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<th>PRESENTIAL ACTIVITIES</th>
<th>HOURS</th>
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<tr>
<td>Lectures</td>
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<tr>
<td>Practical sessions</td>
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<td><strong>Total Presental Activities</strong></td>
<td><strong>60</strong></td>
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<table>
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<th>NON-PRESENTIAL ACTIVITIES</th>
<th>HOURS</th>
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<tr>
<td>Group assignments preparation</td>
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<tr>
<td>Individual assignments preparation</td>
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</tr>
<tr>
<td>Self-preparation and study for evaluation activities</td>
<td>31</td>
</tr>
<tr>
<td>Self-preparation and study for assignments and lectures</td>
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<td>Self-preparation and study for practical sessions</td>
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<td><strong>Total Non-Presential Activities</strong></td>
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<td><strong>Total</strong></td>
<td><strong>150</strong></td>
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**Teaching Methodology**

Financial mathematics will be oriented to combine the capacity of individual work with that of teamwork. In particular, the methodology to be used can be described as follows:

- For the theoretical classes the students will prepare in advance to the class the basic material that serves as the basis for the theoretical explanation, as well as the main doubts that may arise. The teacher will combine his explanations with the active participation of the students. So, doubts will be carried out by the teacher and / or his / her classmates, as well as the resolution of brief questions raised by the teacher and the group discussion of the aspects that have aroused the greatest interest. It is intended that the student develops both his/her autonomous work capacity and his/her oral and written communication skills (raising his doubts in public on the subject and /or solving in writing the questions raised by the teacher before his/ her classmates).

- For the practical classes students will prepare in advance a set of exercises and / or practical cases that will be worked in the classroom. These tasks may lead to deliveries and / or exhibitions, individual or collective, which will be evaluated by the teacher. With these assignments, the student is expected to develop his / her analytical capacity for problem solving, oral and written communication, as well as teamwork.

**Evaluation Criteria**

Student assessment will be conducted through continuous assessment and 2 exams, a midterm one and a final term one.

1. **Continuous assessment: 40%**
   The evaluation of the participation and active involvement of the student in the learning process, together with the activities carried out by the student during the course will allow obtaining up to 4 points of the final grade to be distributed as follows:
   - Participation and involvement of the student in class: 2 points.
   - Elaboration and exposition of exercises: 2 points.

2. **Examinations: 60%**
   **First Call:**
   During the academic year, two written examinations will be carried out, one in the middle of the semester (for subjects 1 to 3) and the other at the end of the semester (for subjects 4 to 6 or for the entire syllabus) with the following cases:
   
   A. Students who pass the first partial exam, that is, obtain a minimum grade of 5 out of 10, will be able to eliminate the subject and present themselves to the final exam by the remaining syllabus (items 4 and 6). In this case, your final grade will be an average between the two exams, provided that in the final exam you have obtained a minimum grade of
Basic bibliography

The required text for the course is:


In addition, several parts of the course will follow the structure of the books below:


Students can also read any book that contains explanations about financial functions. A recommended text is:


COMPLEMENTARY BIBLIOGRAPHY

nes Financieras”. Editorial AC. Madrid.
