FINANCIAL MATHEMATICS

COURSE DETAILS

Code	36268
Degree	Degree in Business Management
Mention	Business creation and management
Character	Compulsory
Year	2º
ECTS	6

Professors

Name	Department	Tutorials
Sánchez Coll, Felipe	Accounting	Thursday (10:15 – 11:15) By appointment

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. Allen[1] 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.

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[1] 1 Brealey, R. and Myers, S. and Allen, F. (2013) " Principles of Corporate Finance". McGraw-Hill Ed.

Financial decisions are crucial, given that today investing or borrowing have long term fundamental effects on the business. Therefore, most senior managers have to have solid financial notions in order to be involved in financial decisions.

Besides, this subject is needed to provide the foundations for the discipline which will be developed in coming subjects such as Investment Theory (second semester in year 2) or Financial Theory and Financial Statement Analysis (both in year 3).

PRIOR KNOWLEDGE

Not required.

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

2.1. Compound Interest: Introduction, notation and formula

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

WORKLOAD

ACTIVITIES	HOURS	ATTENDANCE REQUIRED
Lectures	30	Yes
Practical sessions	30	Yes
Group assignments preparation	5	No
Individual assignments preparation	4	No
Self-preparation and study for evaluation activities	31	No
Self-preparation and study for assignments and lectures	30	No
Self-preparation and study for practical sessions	20	No
TOTAL	**150**	

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: 1 point.

- Elaboration and exposition of exercises: 3 points.

2. Examinations: 60%

First Call:

During the academic year, several written examinations or tests will be carried out, 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 5 out of 10:

- Partial examination (units 1 to 3): 3 points.

- Second Partial exam (topics 4 and 6): 3 points

B. Those students who do not pass the partial exam will have to submit to the final exam for the entire syllabus, being in this case their final mark obtained in the final exam:

- Final exam (items 1 to 6): 6 points

C. Those students who, even if they passed the partial exam, wish to take the final exam to improve the grade, will not be considered the grade obtained in the partial exam. Therefore, their final grade will be the one obtained for the entire syllabus in the final exam:

- Final exam (items 1 to 6): 6 points

D. Students who pass the first partial and do not pass the second partial will have to take the second call.

2nd Call:

Those students who do not exceed the 1st call, will have to present themselves to a new examination in 2nd call and their final note will be the one obtained for the whole agenda in this examination:

- Final exam (items 1 to 6): 6 points

The continuous evaluation is not recoverable, therefore, the grade obtained during the continuous evaluation of the subject will be maintained both in the 1st call and in the 2nd call.

The exams are obligatory, so to exceed them (minimum mark of 5 out of 10 in both the final and final exam) is an indispensable condition to combine the grade with continuous assessment and to pass the subject.

RE-REGISTRATION AFTER FAILING IN SECOND EXAMINATION

Students who do not pass the course in 1st / 2nd call and who do not repeat course, will have to register again. They will have the right to 3rd and 4th call. The evaluation will be as follows:

Continuous evaluation: 20% of the final grade, which will consist of a set of exercises related to the topics covered in the subject. Students have to send the teacher the file at the end of the semester and before the exam.

Exam: 80% of the final grade.

CLASS ATTENDANCE

Class attendance is compulsory for the appropriate understanding of the course. Absences above 4 of the total number of sessions will imply that the student will not obtain any grade for the continuous evaluation process.

Therefore, the final grade will be calculated applying 60% over the exam grades.

SPELLING, GRAMMAR AND EXERCISE PRESENTATION

Students must comply with the rules of correct spelling, punctuation and grammar in their works and examinations. These formal aspects will be taken into account in their evaluation.

In addition, exercises asked to be delivered to the teacher **must be typed**, **not handwritten.** Hence, those exercises written in hand will not be accepted.

REFERENCES

BASIC BIBLIOGRAPHY

The required text for the course is:

ZIMA, P. and R.L. BROWN (2011) "Schaum's outline of theory and practice of Mathematics of Finance", 2nd Edition. McGraw-Hill, New York.

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

De Pablo, A. (1998): "Matemáticas de las operaciones financieras", Tomos I y II, Tercera Edición, Editorial UNED. 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.

Navarro Arribas, Eliseo (2019) "Matemáticas de las operaciones Financieras" . Ediciones Pirámide.

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

Timor Ferrando, E. (2009): "Curso práctico de Matemática Financiera con Excel 2007". Infobook's, D.L.

COMPLEMENTARY BIBLIOGRAPHY

Apraiz, A. (2003): "Fundamentos de Matemática Financiera". Editorial Desclée de Brouwer. Bilbao.

Baquero M.J. y Maestro, Mª.L. (2003): "Matemáticas de las Operaciones Financieras. Problemas resueltos". Ed. AC, Madrid.

Cabello, J.M., Gómez, T., Rodríguez, R., Ruíz, F. y Torrico, A. (1999): "Matemáticas financieras aplicadas: 127 problemas resueltos". Editorial AC. Madrid.

Cabello, J.M. (2006): "Valoración Financiera: teoría y práctica con Excel". Delta Publicaciones. Madrid.

García Boza, J. et al. (2002): "Problemas resueltos de matemática de las operaciones financieras". Ediciones Pirámide. Madrid.

Gil Peláez, L. (1987): "Matemáticas de las Operaciones Financieras". Editorial AC. Madrid.

Gómez, J.M. y Bermejo, F. (2004): "Gestión Financiera". Ediciones Pirámide. Madrid.

González Velasco, M.C. (2001): "Análisis de las operaciones financieras: 150 supuestos resueltos". Civitas Ediciones. Madrid.

Miner, J. (2003): "Curso de Matemática Financiera". Editorial McGraw-Hill. Madrid.

Miralles, J.L., Gómez, P. y Miralles, M.P. (2002): "Matemáticas de las operaciones financieras. Problemas resueltos". Universitas Editorial. Badajoz.

Tovar, J. (2006): "Operaciones financieras. Teoría y problemas resueltos", Segunda Edición. Editorial Centro de Estudios Financieros (CEF). Madrid.