



Universitat de Lleida

DEGREE CURRICULUM  
**MATHEMATICS OF FINANCIAL  
OPERATIONS**

Coordination: MIQUEL FERNANDEZ, SILVIA MARIA

Academic year 2023-24

## Subject's general information

<b>Subject name</b>	MATHEMATICS OF FINANCIAL OPERATIONS			
<b>Code</b>	103318			
<b>Semester</b>	1st Q(SEMESTER) CONTINUED EVALUATION			
<b>Typology</b>	<b>Degree</b>	<b>Course</b>	<b>Character</b>	<b>Modality</b>
	Bachelor's Degree in Business Administration and Management	2	COMPULSORY	Attendance-based
	Doble titulació: Grau en Enginyeria en Organització Industrial i Logística i Grau en Administració i Direcció d'Empreses	2	COMPULSORY	Attendance-based
<b>Course number of credits (ECTS)</b>	6			
<b>Type of activity, credits, and groups</b>	<b>Activity type</b>	PRAULA		TEORIA
	<b>Number of credits</b>	3		3
	<b>Number of groups</b>	1		1
<b>Coordination</b>	MIQUEL FERNANDEZ, SILVIA MARIA			
<b>Department</b>	MATHEMATICS			
<b>Important information on data processing</b>	Consult <a href="#">this link</a> for more information.			

Teaching staff	E-mail addresses	Credits taught by teacher	Office and hour of attention
MIQUEL FERNANDEZ, SILVIA MARIA	silvia.miquel@udl.cat	0	
VERDES ENRICH, MONICA	monica.verdes@udl.cat	6	

## Subject's extra information

The course as part of the academic plan

Once the concepts introduced in the Business Mathematics subject have been mastered, the subject Mathematics for Financial Operations focuses on the financial aspects of business. It facilitates the in-depth study of these aspects through the mathematical justification of instruments that students will apply in subjects like Financial Accounting of Basics of Business Finance. It is essential that students should work rigorously in the subject, and this is particularly necessary if they want to aim the optional side of the last year of BAM towards majoring in Accounting and Finance.

## Learning objectives

See competences.

## Competences

### University of Lleida strategic competences

- CT1 Correctness in oral and written language.

#### Goals

- To explain the approach and solution to a problem and the interpretation of the result.
- To use mathematical language properly, in both approaching and solving problems.

- CT3 Master Information and Communication Technologies.

#### Goals

- To use financial functions available in a spreadsheet properly
- To find financial information in internet

### Degree-specific competences

- CE4 Apply instrumental techniques to the analysis and solution of business problems and to the taking of decisions.

## Goals

- To identify the financial system applied to a financial operation depending on the agreements made between the subjects of the operation.
  - To calculate the actual (final) value of any revenue.
  - To calculate the initial amount in discount operations.
  - To calculate equivalent interest payments (discounts).
  - To calculate the price under continuous capitalization
  - To choose the correct magnitude to compare different financial operations.
  - To identify the most favourable financial operation for the active (passive) party in an operation.
  - To distinguish among different types of financial revenues.
  - To deduce the expression of the adjustment factor for any revenue.
  - To value any type of financial revenue.
- CE7 Intervene in operations belonging to financial entities and markets.

## Goals

- To identify different kind of loans.
- To calculate the cost of a loan.
- To represent the evolution of the debt along the time.
- To calculate the value of a loan at any time of its life.
- To analyze a loan operation.
- To choose the more convenient kind of loan for the agents involved.
- To identify different types of debenture operations.
- To analyze debenture operations from the point of view of each agent involved (to calculate cost and profitability of the debenture operation).
- To choose the more convenient debenture operation for the agents involved.

## Degree-transversal competences

- CG3 Ability to criticise and be self-critical.

## Goals

- To justify the mathematical formulation of a problem and the solution method.
  - To justify decision-making in a particular situation/problem based on mathematical concepts.
- CG5 Be able to work and to learn in an autonomous way and simultaneously adequately interact with others, through cooperation and collaboration.

## Goals

- To detect mistakes and correct them
  - To search for information related to the content of the subject.
  - To learn from own mistakes and to search for alternative ways of solving a problem.
  - To consider new problems or questions in the field of economics or finance.
  - To relate the concepts of the subject to those worked on in other subjects.
- CG1 Ability to analyse and synthesise.

## Goals

- To analyze a situation and select the main elements for coming to a decision

- CG6 Act in accordance with rigour, personal compromise and in a quality orientated way.

## Goals

- To use mathematical language properly, in both approaching and solving problems.
- To justify the way of addressing a problem and the given solution.

## Subject contents

### Topic 1: Financial systems

The financial market.

Liquidity preference.

Financial equivalence.

The financial factor.

Capitalisation and simple discount.

Simple interest financial system.

Commercial discount financial system.

Equivalent interest and discount.

Compound capitalisation and discount.

Compound interest financial system.

Compound discount financial system.

Equivalences between interest and discount rates of different frequencies.

Continuous capitalisation.

### Topic 2: Financial revenue

Financial revenue.

Definition and notation.

Classification.

Valuation.

Adjustment factor under compound interest financial system.

Constant revenue.

Geometric revenue.

Arithmetic revenue.

### Topic 3: Loan operation

Mathematical reserve.

Loan operation.

Definition and notation.

Classification.

Analysis of a loan operation.

Repayment term.

Outstanding debt.

Composition of the repayment term.

Repayment table.

Types of loan operation.

French loan.

American loan.

German loan.

Variable repayment loan.

Reversed mortgage

## **Topic 4: Debenture operation**

Debenture operation.

Definition and notation.

Classification.

Analysis of a debenture operation. Securities with equal maturity.

Normal debenture.

Zero coupon debenture.

Periodic repayment debenture.

## Methodology

En aquesta secció considerem la metodologia de l'assignatura i fem una taula que en resumeix la temporització.

El semestre consta de 19 setmanes.

En quatre d'aquestes setmanes es duen a terme activitats programades d'avaluació ([calendari d'exàmens](#)). Es tracta de la setmana 9 i les setmanes 17, 18 i 19. De tota manera, es programen altres activitats d'avaluació durant el curs (veure l'apartat d'Avaluació).

Durant la primera setmana es presenta l'assignatura i es treballa l'anomenat Tema 0 (veure l'apartat de Continguts). Es tracta d'un tema en el que es revisen els conceptes bàsics de matemàtiques que l'estudiant ha de tenir abans d'iniciar l'assignatura i que no seran objecte d'avaluació en aquesta assignatura.

Durant les altres 14 setmanes, els dilluns i els dijous o divendres (dues hores cadascun dels dos dies) s'imparteixen classes presencials ([horari](#)).

Les classes dels dilluns són bàsicament de teoria i, a les classes en grup mitjà (dijous o divendres), es corregeixen els exercicis encomanats i disponibles al campus virtual.

Abans d'assistir a una classe presencial cal consultar l'agenda i els recursos del campus virtual per tal de revisar els materials disponibles i les tasques encomanades.

A continuació es mostra la temporització de l'assignatura.

Temporització

Setmana	Descripció	Hores presencials	Hores de treball autònom
1	Tema 0	4	6
2,3 i 4	Tema 1	12	18
5,6 i 7	Tema 2	12	18
8	Tema 3	4	6
9	Examen Parcial 1 (7 d'abril de 2014)		
10,11,12,13 i 14	Tema 3	20	30
15 i 16	Tema 4	8	12
17 i 18	Examen Final (16 de juny de 2014)		

## Development plan

Development plan

Week	Topic	Number of classroom-hours	Number of homework-hours
1,2,3 i 4	Topic 1	16	24
5,6,7 i 8	Topic 2	16	24
9	Exam Midterm I		



Week	Topic	Number of classroom-hours	Number of homework-hours
10,11,12 i 13	Topic 3	16	24
14 i 15	Topic 4	8	12
16 i 17	Exam Midterm II		
18			
19	Second-chance exam		

## Evaluation

Portfolio of evidence:

1. Periodic activities (Mark A)
2. Midterm exam I (week 9): The exam will take place at the university and it will take two hours (Mark B)
3. Midterm exam II (week 16-17): The exam will take place at the university and it will take two hours (Mark C)

### Estimatio of the final qualification (FQ)

$$FQ = 0,2 A + 0,4 B + 0,4 C$$

In case FQ is lower than 5, the student has second chance exams: B and C.

### Alternative assessment

In the event that a student documentally proves that s/he is unable to attend scheduled activities of the continuous assessment (for paid work, second or subsequent tuition of the subject, family conciliation, etc.), s/he can opt for a single test of validation of competences and knowledge that will be conducted on the day and in the schedule established in the calendar of evaluation of the Degree for the final test of the ordinary evaluation (weeks 16-17). The application for this assessment modality must be carried out before the third week of class with documentary accreditation and, once done, it can not be modified. On the website of the Faculty there is the document that students must complete and deliver to the professor responsible for the subject:

<http://www.fdet.udl.cat/export/sites/Fdet/ca/.galleries/Documents/Secretaria-documents/Sollicitud-davaluacio-alternativa.pdf>

(Deadline: October 30th)

In accordance with art. 3.1 of the UdL evaluation regulations, the student can not use, in any case, during the evaluation tests, means not allowed or fraudulent mechanisms. The student who uses any fraudulent means related to the test and/ or carry electronic devices not allowed, will have to abandon the test or the tests, and will be subject to the consequences provided in these regulations or in any other regulations of internal regime of the UdL.

## Bibliography

Recommended bibliography

### Notes, practical assignments, tests, problems and webgraphy

Available on the virtual campus as the academic year goes on.

## Basic bibliography

- Bonilla,M., Ivars, A. and Moya, I. (2006) Matemáticas de las operaciones financieras: Teoría y práctica. Thomson.
- Fontanals,H. (1992) Matemática financiera. Supuestos. SU Barcelona.
- Rodríguez,A. (1994) Matemática de la financiación. Ediciones S.

## Additional bibliography

- Alegre,P. et al. (1995) Ejercicios resueltos de matemática de las operaciones financieras. AC, Barcelona.
- GilPelález, L. (1987) Matemática de las operaciones financieras. AC, Madrid.
- GilPelález, L. (1987) Matemática de las operaciones financieras. Problemas resueltos. AC, Madrid.
- Miner,J. (2003) Curso de matemática financiera. McGraw Hill.
- Navarro,E. and Nave, J.M. (2001) Fundamentos de matemáticas financieras. Antoni Bosch Editor.
- PabloLópez, A. (2002) Matemática de las operaciones financieras. UNED.
- Pozo,E. and Zúñiga, J. (1994) Análisis y formulación de las operaciones financieras. Esic Editorial.
- Villalobos,J.L. (2001) Matemáticas financieras. Prentice Hall.