Universidad Pablo de Olavide

COURSE SYLLABUS

Academic year 2009/2010

BASIC COURSE INFORMATION

COURSE: **FINANCIAL MATHEMATICS** **(Matemática Financiera – English group)**	DEGREE IN: **FINANCE AND ACCOUNTING** DOUBLE DEGREE IN: **FINANCE AND ACCOUNTING, AND LAW**

CODE: **502056**	STUDY PLAN: **2009**	
TYPE: **OBLIGATORY**	ECTS CREDITS: **6**	ORGANIZATIONAL MODEL: **C1**
DURATION: **SEMI-ANNUAL**	YEAR: **1st**	TERM: **2nd**

1. TEACHING TEAM INFORMATION

COURSE COORDINATORS:

NAME: **FLOR MARÍA GUERRERO CASAS**

DEPARTMENT: ECONOMICS, QUANTITATIVE METHODS AND ECONOMIC HISTORY

ACADEMIC AREA: QUANTITATIVE METHODS

CATEGORY: *CATEDRÁTICA DE UNIVERSIDAD*

OFFICE No: 3.2.5	E-mail: fquecas@upo.es	Tel.: (+34) 954977985

WEBPAGE:

NAME: **MÓNICA DOMÍNGUEZ SERRANO**

DEPARTMENT: ECONOMICS, QUANTITATIVE METHODS AND ECONOMIC HISTORY

ACADEMIC AREA: QUANTITATIVE METHODS

CATEGORY: *PROFESORA AYUDANTE DOCTORA*

OFFICE No: 3.2.2	E-mail: mdomser@upo.es	Tel.: (+34) 954349279

WEBPAGE:

OTHER TEACHERS:

NAME: **PATRICIA HERRANZ PEINADO**

DEPARTMENT: ECONOMICS, QUANTITATIVE METHODS AND ECONOMIC HISTORY

ACADEMIC AREA: QUANTITATIVE METHODS

CATEGORY: *PROFESORA COLABORADORA*

OFFICE No: 3.2.21	E-mail: pherpei@upo.es	Tel.: (+34) 954349740

WEBPAGE:

SPECIFIC COURSE INFORMATION

2. COURSE DESCRIPTION AND OBJECTIVES

The objective of this subject is to provide students with the knowledge and skills necessary to succeed in the world of banking and finance. This also involves using the most appropriated IT programmes for problem-solving.

The essential objective is to study the main financial operations like capitalization, bank discount, instalment credit, repayment of loans and the mathematical equations which are involved. Using the financial models studied, students will solve equations and suggest additional ways of solving them which could be useful in the financial market.

As well as the general course objectives, there are several additional aims for each thematic unit.

3. ACADEMIC CONTEXT

3.1. PREREQUISITES:

Basic mathematical knowledge is necessary in order to take part in this course.

3.2. CONTEXT WITHIN THE DEGREE:

This subject is worth 6 credits and is part of the module "Analysis of Financial Operations". It is studied in the second semester of the first year of the Degree in Finance and Accounting.

It is a compulsory course for the modules of accounting, finance and quantitative methods.

As well as the knowledge and skills which will be obtained through completion of the course, the main and most important aspect is to gain a logical and critical way of thinking which can later be applied to many fields.

3.3. RECOMMENDATIONS:

Within this subject there is a unit called "Evaluation of Capital", which is extremely important for any future professional specialised in finance but also for those who wish to take exams in order to enter Public Administration or financial bodies. In these cases the unit is usually compulsory.

3.4. LEARNING TARGETS:

3.4.1. GENERAL SKILLS:

- To know and understand the social consequences of financial and economic action.
- To acquire the relevant IT skills that can be adapted to a range of different financial operations.

3.4.2. SPECIFIC SKILLS:

Instrumental:

- Reading and interpretation of financial texts.
- Analysis and synthesis skills.
- Organization and planning skills.
- Oral and written skills in Spanish.
- Oral and written skills in a foreign language (for the Degree taught in English).
- Ability to search for and analyse information from a diverse range of sources.
- Problem-solving skills.
- IT skills (Excel).
- Decision-making skills.

Personal:

- Critical thinking.
- Interest in quality and financial ethics.
- Business-minded.

Knowledge:

- To understand financial operations which take place in business environments, as well as the design and analysis of investment and financing strategies.
- To correctly interpret ideas, concepts and methods which are used in the analysis and valuation of different types of financial operations.
- To acquire accounting knowledge in order to manage finance effectively.
- To understand the way in which national and international financial markets work.
- To know the main operations in the field of corporate finance.

4. DISTRIBUTION OF IN-CLASS LEARNING

No. OF STUDENTS: -

GROUP TYPE	STUDENTS PER GROUP	No. OF GROUPS
GENERAL TEACHING (GT)	-	1
PRACTICAL TEACHING (PT)	-	1
SEMINARS (SEM)	0	0

5. STUDENT LEARNING

TOTAL No. OF HOURS: 150 (6 ECTS CREDITS)

GROUP TYPE	HOURS PER STUDENT	CREDITS PER STUDENT
GENERAL TEACHING (GT)	22.50	0.90
PRACTICAL TEACHING (PT)	22.50	0.90
SEMINARS (SEM)	-	-
SELF-STUDY AND TUTORIALS	90.00	3.60
ASSESSMENT AND GRADING	15.00	0.60
TOTAL	150.00	6.00

6. ASSESSMENT AND GRADING

The assessment for this subject will be based on a series of ongoing activities throughout the term. These will be differently weighted according to the difficulty, effort and dedication needed.

General Teaching (GT) and Practical Teaching (PT) will be taught in the following way:

1. GT will be assessed in the form of an exam at the end of the semester. This exam will consist of theoretical questions, practical issues, and problems related to the subject. Students must show what they have learnt throughout the subject. This will make up 50% of the final grade.

2. PT will be assessed continuously throughout the subject in the form of individual tasks and group work. This will make up 30% of the final grade and cannot be retaken. There will also be three IT sessions in which students will apply their financial knowledge to a spreadsheet using Excel. The IT sessions will have an exam which will make up the remaining 20% of the final grade. This exam, as well as the exam from lectures, can be retaken.

Requirements to pass the subject:

1) The following minimum grades are required:
   - GT: 1.5 points.
   - IT sessions: 1 point.

2) When these have been completed the sum of both exams from GT and PT must be higher than or equal to 5 points out of ten.

Resit exam (July):

Students who do not pass the subject will have a chance to retake it in July. The exam will consist of an assessment of GT (50%) and IT sessions (20%) for those who did not pass in the first or second session. The same minimum grades as previously mentioned are required in order to pass.

The final grade will include the continuous assessment of PT (30%) which cannot be retaken.

Student mobility:

Those UPO students who are not able to attend seminars due to being abroad under official mobility programs (Socrates-Erasmus, Séneca, Atlanticus...) will have an additional exam, or work that will be clearly defined, in order to obtain the 50% of the grade corresponding to the continuous evaluation. Students in this situation must inform the responsible lecturers at the beginning of the academic year, before the 15th of March, 2010.

7. CONTENTS

UNIT 1: **SIMPLE INTEREST AND SIMPLE DISCOUNT FOR FINANCIAL TRANSACTIONS**

1.1. Concepts of financial capital, interest and discount rates

1.2. Future value: total amount and yield to maturity

1.3. Present value: comparing simple interest and simple discount

1.4. Calculations with different types of time

1.5. Discharging several payments with a single equivalent payment: equivalent time and the average due date

1.6. Bill of exchange discount

1.7. Treasury bills

1.8. Business notes

1.9. Current account settlement

1.10. Bank accounts: current accounts, savings accounts, line of credit

UNIT 2: COMPOUND INTEREST AND COMPOUND DISCOUNT FOR FINANCIAL TRANSACTIONS

2.1. Future value: total amount and yield to maturity

2.2. Calculations with different types of time

2.3. Present value: compound interest and compound discount

2.4. Nominal rates: relation between the nominal and annual effective rate

2.5. Effective rates of interest

UNIT 3: ORDINARY ANNUITIES

3.1. Concept and classification

3.2. Present and future value of fixed annuities with simple laws

3.3. Present and future value of some annuities with compound laws: ordinary annuity, annuity due, deferred annuity, forborne annuity and perpetuity:

a) Fixed annuities

b) Variable annuities

3.4. Present and future value of some fixed values with different type of time

UNIT 4: AMORTIZATION METHODS OF LOANS REPAYMENT

4.1. Full amortization

4.2. Partial amortization

4.3. Interest only amortization

4.4. Different amortization systems:

a) Fixed annuities

b) Fixed amortization quota

c) American System

4.5. Effective rates of interest

4.6. Full and Partial cancellation

4.5. Financial value, usufruct and remainder estate of a loan

UNIT 5: AMORTIZATION METHODS OF LOANS

5.1. Main concepts

5.2. Normal or Pure Loans: classification and main operations

5.3. Commercial characteristics: Loan Standardization

5.4. Effective rates of interest

8. BIBLIOGRAPHY

8.1. GENERAL READING:

- BONILLA M., IVARS A., MOYA I. (2006): Matemática de las operaciones financiera: teoría y práctica. Thomson. Madrid.
- BRECHNER, R. (2009): Contemporary Mathematics for Business and Consumers. Thomson South-Western.
- BROVERMAN, S.A. (2004): Mathematics of investment and credit. ACTEX Publications.
- CAIN, J.; CARMAN, R.A. (1992): Mathematics for Business Careers. Pearson Prentice Hall.
- CLEAVES, C.; HOBBS, M. (2008): Business Math, Brief and Study Guide Package. Pearson Prentice Hall.
- GONZÁLEZ-CATALÁ (1991): Enfoque práctico de las operaciones de la matemática financiera. Ed. Ciencias Sociales. Madrid.
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- HINOJOSA RAMOS y otros (1997): Problemas de Matemáticas Financieras. Pirámide.
- PRAKASH, A.J.; KARELS, G.V.; FERNANDEZ, R. (1987): Financial, Commercial, and Mortgage Mathematics and Their Applications. Praeger Publisher.
- SLATER, J. (1997): Practical Business Math Procedures. Irwin/McGraw-Hill.
- VÁZQUEZ CUETO (1993): Curso de matemáticas Financieras. Pirámide.
- ZIMA, P.; BROWN, R.L. (1983): Mathematics of finance. McGraw-Hill.

8.2. FURTHER READING:

- ÁLVAREZ HERREZUELO, A. (2000). Matemáticas Financieras. Paraninfo. Madrid.
- ANTHONY, M y BIGGS, N. (2001). Matemáticas para la economía y las finanzas: una introducción. Cambridge University Press. Madrid.
- APRAIZ LARRAGÁN, A. (2003). Fundamentos de Matemática Financiera. Desclée de Brouwer. Bilbao.
- BONILLA M., IVARS A. (1994): *Manual de las operaciones financieras*. A.C. Madrid.
- CASANOVA M. (1997): *Operaciones financieras*. Pirámide.
- GARCÍA BOZA, J. (2002). Problemas resueltos de matemática de las Operaciones Financieras. Pirámide, Madrid.
- GIL PELÁEZ (1993): *Matemáticas de las operaciones financieras. Problemas resueltos*. A.C. Madrid.
- GONZÁLEZ VELASCO, MC. (2001). Análisis de las Operaciones Financieras (150 supuestos resueltos). Civitas. Madrid.
- LEVENFELD y otros (1997): Matemática de las operaciones financieras y de la inversión. McGraw-Hill.
- LEVI, F. (1973): Curso de Matemática Financiera y Actuarial. Ed. Bosch. Barcelona. (2 tomos)
- MAO, J. (1974): Análisis Financiero. Ed. El Ateneo. Buenos Aires.
- MINER ARANZÁBAL, J. (2003). Curso de Matemática Financiera. McGraw-Hill. Madrid.
- NAVARRO, E. y NAVE, J. (2001). Fundamentos de Matemáticas Financieras. Antoni Bosch, D.L. Barcelona.
- PABLO LÓPEZ, A. De:
  - (1995) *Valoración Financiera y Operaciones de Financiación*. Ed. Centro de Estudios Ramón Areces. Madrid.
  - (1993) *Matemática de las Operaciones Financieras*. Ed. UNED. Madrid.

9. TEACHING ORGANIZATION: WEEKLY COURSE SCHEDULE

WEEK	No. HOURS GT	No. HOURS PT	No. HOURS SEM	No. HOURS SELF-STUDY	No. HOURS ASSESSMENT	UNITS
1	1.5	1.5		5		Unit 1
2	1.5	1.5		6		Unit 1
3	1.5	1.5		6		Units 1 & 2
4	1.5	1.5		6		Unit 2
5	1.5	1.5		7		Units 2 & 3
6	1.5	1.5		6		Unit 3
7	1.5	1.5		6		Unit 3
8	1.5	1.5		6		Unit 3
9	1.5	1.5		6		Unit 3
10	1.5	1.5		6		Unit 4
11	1.5	1.5		6		Unit 4
12	1.5	1.5		6		Unit 4
13	1.5	1.5		6		Unit 4
14	1.5	1.5		7		Units 4 & 5
15	1.5	1.5		5		Unit 5
					6	
FINAL EXAM					4.5	Units 1 to 5
RESIT EXAM					4.5	Units 1 to 5
TOTAL	22.5	22.5	0	90	15	