

Academic Year: ( 2019 / 2020 )

Review date: 12-06-2019

Department assigned to the subject: Business Administration Department

Coordinating teacher: PENALVA ZUASTI, JOSE SEBASTIAN

Type: Basic Core ECTS Credits : 6.0

Year : 1 Semester : 1

Branch of knowledge: Engineering and Architecture

**OBJECTIVES**

Competences of Knowledge:

- To identify the time value of the money as well as the classic forms of capitalization and discount (simple and compound).
- To learn the typologies of annuities and their application in the valuation of financial products, and in the valuation of investment projects of the company.
- To learn the elements of a loan and to calculate them.
- To apply the financial concepts to new situations and new financial instruments that need to be pricing correctly.

Skills:

- We will develop the capacity of working independently.
- Ability to analyze different situations.

Attitudes:

- To have an enthusiastic attitude and curiosity to solve problems or practices.

**DESCRIPTION OF CONTENTS: PROGRAMME**

1. Introduction to financial mathematics
  - 1.1. The time value of the money
  - 1.2. Financial Operation.
  - 1.3. Present and future value
  - 1.4. Financial law
2. Capitalization
  - 2.1. Simple and Compound Interest
  - 2.2. Financial Factors
  - 2.3. Capitalization and discounting
  - 2.4. Financial Sum
  - 2.5. The frequency of compounding
3. Interest Rates
  - 3.1. Simple and Compound Interest Rate
  - 3.2. Interest Rates and Capitalization Laws
  - 3.3. Nominal and Effective APR
  - 3.4. Forward and Spot Interest Rates
  - 3.5. The Effective APR as a Comparison Tool
4. Financial operations
  - 4.1. Types
  - 4.2. Commercial Characteristics
5. Short term operations
  - 5.1. Simple Commercial Discounting
  - 5.2. Discounting Commercial effects
  - 5.3. T-bills
  - 5.4. Repurchase agreements (REPOs)
6. Annuities and Perpetuities
  - 6.1. Concept of annuity
  - 6.2. Classification
  - 6.3. Constant annuities: immediate, deferred, anticipated
  - 6.4. Varying annuities
  - 6.5. Fractional annuities
7. Valuation of Stocks and Bonds
  - 7.1. Pricing a bond

- 7.2. Valuation of perpetual debt
- 7.2. Pricing common stock
- 8. Loan repayments
  - 8.1. Constant amortization of principal
  - 8.2. American loan
  - 8.3. French loan
  - 8.4. Balance of a financial operation. Mathematical Reserve. Changing Interest Rates
  - 8.5. Operations with grace periods

## LEARNING ACTIVITIES AND METHODOLOGY

The competences of knowledge will be acquired by students through lectures and the resolution of tasks and exercises. While skills will be achieved through individual work by students.

Students receive two types of teaching material during the course: 1) Technical Notes of theory, 2) Work to be done in practical classes.

The tasks and exercises are linked to each of the parts that comprise the agenda as described in the detailed program.. Students will be motivated to likewise perform practical exercises correction prior to class.

## ASSESSMENT SYSTEM

The goal of the final exam (60% of the final calification) is to verify the degree in which the competitions of knowledge have been acquired by the student. The 40% of the final calification that remains will correspond to 3 evaluation exersices. The two best grades in the 3 evaluation sets.

If in the final exam the grade is below 4 (out of 10), the student will fail the course (and receive the grade in the final exam).

In the extraordinary exam, if the grade is below 4 (out of 10), the student will fail the course (and receive the grade in the extraordinary exam). Otherwise, the grade will be the better one between:

- 60% extraordinary exam, 40% continuous evaluation
- 100% extraordinary exam.

No calculators with wireless connection features of any kind are allowed.

<b>% end-of-term-examination:</b>	60
<b>% of continuous assessment (assigments, laboratory, practicals...):</b>	40

## BASIC BIBLIOGRAPHY

- Chris Ruckman Financial Mathematics: A Practical Guide For Actuaries And Other Business, BPP Professional Education; 2nd edition (August 2005).
- James W. Daniel Mathematical Interest Theory, Mathematical Association of America; 2 edition (2008).