

FINANCIAL CALCULUS

Degree in Accounting

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Degree in Taxation

Degree in Taxation

Code: 16207

Main Scientific Area: Finance

Lecturer: Paulo Alexandre da Rocha Armada de Campos Leite

Language of Instruction: Portuguese

Regime: S1

Contact Hours: 60h Total Workload: 108h

ECTS: 6,0

Objectives

Students must understand the fundamental concepts and principles of financial mathematics, namely those related with compounding and discount, interest rates, annuities, and amortization of debt.

Learning Outcomes

In the final of the curricular unit, students should:

Understand the fundamentals of mathematical finance, namely those related with compounding and discount and the equation of value;

Distinguish and calculate: nominal and effective interest rates; illiquid and liquid interest rates; current and real interest rates;

Classify and calculate the value of an annuity;

Understand the main systems of amortization of debt;

Course Contents

Chapter 1: Introduction

1.1. Overview of financial mathematics

1.2. Basic concepts

1.3. Basic principles

Chapter 2: Compounding

2.1. Simple interest

2.2. Compound interest

2.3. Simple interest versus compound interest

2.4. Simple interest and compound interest with variable interest rate

Chapter 3: Interest Rates

3.1. Disparity between the compounding period and the period of the interest rate

3.2. Nominal and effective interest rates

3.3. Illiquid and liquid interest rates

3.4. Current and real interest rates

Chapter 4: Discount

4.1. Definition

4.2. Simple interest

4.3. Compound interest

Chapter 5: Equivalence of Capital

5.1. Equation of value

5.2. Single capital

5.3. Single maturity

Chapter 6: Annuities

6.1. Definition and classification

6.2. Temporary annuities with constant cash-flows

6.3. Perpetuities with constant cash-flows

6.4. Temporary annuities with uneven cash-flows

Chapter 7: Amortization of Debt

7.1. Definition and classification

7.2. Single amortization systems

7.3. Periodic amortization systems

Recommended Bibliography

Barroso, Maria Nazaré; Couto, Eduardo; Crespo, Nuno (2009), Cálculo e Instrumentos Financeiros, 2ª edição, Escolar Editora

Quelhas, Ana Paula; Correia, Fernando (2017), Manual de Matemática Financeira, 4ª edição, Almedina

Learning and Teaching Methods

Chapters 1 to 4 will allow students to understand the fundamentals of mathematical finance, namely those related with compounding and discount, as well as to distinguish and calculate: nominal and effective interest rates; illiquid and liquid interest rates; current and real interest rates.

Chapter 5 will allow students to establish the equation of value using capitals in different moments of time.

Chapter 6 will allow students to identify and classify an annuity, as well as to calculate its value.

Chapter 7 will allow students to understand the main systems of amortization of debt.

Assessment Methods

The continuous evaluation system includes consists in two in-class tests, each one with the weight of 50% in the final classification. The final classification is the weighted average of the grades obtained in both tests.

There is no oral evaluation.

The use of mobile phones, smartphones, smartwatches during tests and exams is not allowed.