INSTITUTO POLITÉCNICO DE BRAGANÇA

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| Course Unit | Financial Mathematics | | | Field of study | Management | | |
| Bachelor in | Accounting | | | School | School of Technology and Management | | |
| Academic Year | 2023/2024 | Year of study | 1 | Level | 1-1 | ECTS credits | 6.0 |
| Type | Semestral | Semester | 2 | Code | 9056-514-1204-00-23 | | |

| Workload (hours) | 162 | Contact hours | T - | TP 60 | PL - | TC - | S - | E - | OT - | O - |
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T - Lectures; TP - Lectures and problem-solving; PL - Problem-solving, project or laboratory; TC - Fieldwork; S - Seminar; E - Placement; OT - Tutorial; O - Other

Name(s) of lecturer(s): Ana Paula Carvalho do Monte, Paula Adriana Ferreri de Gusmao e Silva

## Learning outcomes and competences

At the end of the course unit the learner is expected to be able to:
1. Have knowledge regarding financial operations and the meaning of the variables involved in it - principal, time and interest (rate);
2. Understand the basic rule: to compare cash amounts it is necessary to report them to the same date;
3. Understand the concept of future value and present value in simple interest and compound interest as well the compound factor and discounted factor;
4. Understand the concepts of installments; redemption of principal, interest, deferred period and grace period;
5. Use the knowledge about annuities and equivalence of rates and capital to solve concrete problems in the organization management and personal finance;
6. Create loans/mortgage schedules;
7. Understand the basics of life insurance, particularly the relation to annuities.

## Prerequisites

Before the course unit the learner is expected to be able to:
Use knowledge of mathematics for management.

## Course contents

Basic concepts. Compounding and discounting methods. Equivalence of capital and interest rates. Annuities. Loan amortisation. Short, medium and long-term financial product. The basics of Life and non-life Insurance.

## Course contents (extended version)

1. Basic concepts
   - Time value of money;
   - Interest rate and discount rate;
   - Present value and future value.
2. Compounding and discounting methods
   - Simple interest;
   - Compound interest.
3. Equivalence of capital and interest rates
   - Single capital, average maturity and average rate;
   - Equivalence of interest rate: in simple and compound interest rate method;
   - Effective annual rate and All-in-cost rate.
4. Annuities
   - Definition and classification;
   - Simple annuities with constant terms (ordinary and due);
   - Simple annuities, with deferred constant terms;
   - Simple annuities with variable terms;
   - General annuities;
   - Perpetuities.
5. Loan amortisation
   - Amortisation methods;
   - Classic loan amortisation plans.
6. Short, medium and long-term financial products
   - Discounted bank notes and promissory notes;
   - Factoring;
   - Cash advance loans;
   - Leasing;
   - Bond amortisation schedule.
7. The basics of Life and non-life Insurance

## Recommended reading


1. Matias, F. , Martins, A. , Monteiro, C. , & Correia, T. (2020). Matemática Financeira: Teoria e Prática. Edições Silabo.
2. Matias, R. (2018). Cálculo Financeiro: Teoria e Prática (6. ª Edição). Escolar Editora.
3. Matias, R. (2020). Cálculo Financeiro: Exercícios Resolvidos e Explicados, vol. II (2. ª Edição). Escolar Editora.
4. Quelhas, A. P. , & Correia, F. (2017). Manual de Matemática Financeira (4. ª Edição). Livraria Almedina.
5. Rodrigues, J. A. & Nicolau, I. (2010). Elementos De Cálculo Financeiro (9. ª Edição). Áreas Editores.


## Teaching and learning methods

Theoretical-pratical classes where theory and applied examples are presented as well as concrete situations, case studies and practical exercises, are solved and discussed which allow not only the exchange of experience but also the practice of decision-making group and that help to consolidate the learning outcomes.

## Assessment methods

1. Alternative 1 - distributed assessment (DA) - (Regular, Student Worker) (Final, Supplementary)
   - Case Studies - 10% (1 Case Study solved in teams in the classroom, in the last week of the semester)
   - Intermediate Written Test - 10% (1 online mid-term test (in the 6th week)
     Oral test if the mark is higher than 19.)
   - Intermediate Written Test - 25% (face-to-face test to be held in the 9th week.)
   - Intermediate Written Test - 35% (It is mandatory to reach a minimum score of 5 (in 20) for approval (in normal exam season))
   - Practical Work - 10% (Practical exercises for assessment, randomly and without any announcement)

## Assessment methods

- Portfolio - 10% (weekly homework upload in IPBVirtual; attendance and participation in class and tutoring meet (>70%))
2. Alternative 2 - single exam - (Regular, Student Worker) (Final, Supplementary, Special)
   - Final Written Exam - 100% (It is mandatory to reach a minimum score of 9.5 values (in 20 values) for approval.)
3. Alternative 3_distributed assessment (worker stud) - (Student Worker) (Final, Supplementary)
   - Intermediate Written Test - 40% (face-to-face test to be held in the 9th week.)
   - Intermediate Written Test - 60% (It is mandatory to reach a minimum score of 5 (in 20) for approval (in normal exam season))

## Language of instruction

Portuguese, with additional English support for foreign students.

## Electronic validation

| Ana Paula Carvalho do Monte, Paula Adriana Ferreri de Gusmao e Silva | Joaquim Agostinho Mendes Leite | Jorge Manuel Afonso Alves | José Carlos Rufino Amaro |
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| 05-03-2024 | 05-03-2024 | 07-03-2024 | 09-03-2024 |