

## **QUANTITATIVE FINANCE**

Degree(s)	: Economics; Management
Type	: Compulsory course unit
Curricular year/semester	: 1st year - 1st / 2nd Semester
ECTS / hours per week	: 6 ECTS / 4.0 Hours
Workload per week	: 1 Theoretical x 1 Hour + 2 Practical x 1.5 Hours
Teacher responsible	: Professor Inês Maria Galvão Teles Ferreira da Fonseca Pinto

### **OBJECTIVES**

- To develop the student's understanding of basic concepts and terminology of financial mathematics;
- To enhance the students ability to solve practical problems; and
- To understand the financial mathematical concepts necessary for other courses dealing with finance, insurance and investments.

### **PROGRAM**

Topics covered in the Quantitative Finance Course include:

#### **1. Simple interest**

- 1.1 Types of time and interest
- 1.2 Future value at simple interest
- 1.3 Present value at simple interest
- 1.4 Simple interest debt instruments
- 1.5 Equation of value
- 1.6 Equivalent time

#### **2. Discount interest**

- 2.1 Comparing simple and discount interest
- 2.2 Discount applications – Treasury Bills

### **3. Compound Interest**

- 3.1 Compound interest – Future Value Formula
- 3.2 Nominal rates and effective interest
- 3.3 Finding the Compound rate
- 3.4 Finding the time for an investment to grow
- 3.5 Equations of Value to Find the unknown
- 3.6 Continuous compounding

### **4. Ordinary Annuities**

- 4.1 The future value of an ordinary annuity
- 4.2 The Present Value of an Ordinary Annuity
- 4.3 The Periodic Payment or Rent for an Ordinary Annuity

### **5. Other Annuities Certain**

- 5.1 Deferred Annuities
- 5.2 Perpetuities;

### **6. Variable Payment Annuities**

- 6.1 Arithmetic
- 6.2 Geometric

### **7. Amortisation of Debts and Amortisation Schedules**

### **8. Investing in bonds**

### **9. Leasing**

## **BIBLIOGRAPHY**

### **Recommended Bibliography:**

- Gary. G. & Larry D. (2009), Mathematics of Interest Rates and Finance, Pearson, London;
- Barroso, M. N.; Couto E. & Crespo, N. (2009) Cálculo e Instrumentos Financeiros, Escolar Editora, Lisboa.