

# Quantitative Finance

Degree on Economics, Finance and Management - 1st year, 2017/18



## Lecturers:

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## Aims:

- To develop the students 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.

## 1 Programme

### 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
  - 5.1 Perpetuities
- 6. Variable Payment Annuities
  - 6.1 Arithmetic
  - 6.2 Geometric
- 7. Amortisation of Debts and Amortisation Schedules
- 8. Investing in bonds
- 9. Leasing
- 10. Shares valuation

## References

- Guthrie, Gary C. and Lemon, Larry D. (2014). *Mathematics of Interest Rates and Finance*, Pearson, London.
- Broverman, S.A. (2008). *Mathematics of Investment and Credit*, ACTEX Academic Series, ACTEX Publications Inc., Winsted, Connecticut, USA.
- Barroso, M. N.; Couto E. & Crespo, N. (2009). *Clculo e Instrumentos Financeiros*, Escolar Editora, Lisboa.

## 2 Assessment

Options: Either **2 Intermediate Tests** (50% each) or **Final Exam** (100%).

Intermediate tests are optional:

- 1st test at the midterm week;
- 2nd test at the same date and time of the Final Exam.

**Final Exam:** For everyone, except those who decide to sit the 2nd intermediate test.

**Resit or Repeat Exam:** For those who fail either the Intermediate Tests or the Final Exam. Also for those who wish to increase their mark.

**Formula Sheet:** All tests/exams are written and are carried out without consultation. Students are allowed to use a Formula Sheet provided by the Lecturer. The students should print them and take to the tests/exams. Absolutely no extra writing is allowed.

Graphical calculators or calculators with memory are not allowed during the exam or test.