F71AB Financial Mathematics

**COURSE DETAILS**

**Course Code:** F71AB  
**Full Course Title:** Financial Mathematics  
**SCQF Level:** 11  
**SCAF Credits:** 15  
**Available as Elective:** No

**DELIVERY LEVEL**

Undergraduate: Yes  
Postgraduate Taught: Yes  
Postgraduate Research: No

**COURSE AIMS**

This module aims to provide postgraduate students with a broad knowledge of basic concepts in financial mathematics including interest rates, arbitrage, stochastic interest rates, inflation and continuous cash flows.

**LEARNING OUTCOMES – SUBJECT MASTERY**

On completion of this module the student should be able to:

- Know how to discount and accumulate cash flows and calculate internal rates of return.
- Know the derivation of formulae for standard cash flows.
- Derive and solve equations of value.
- Understand the principle of equivalence
- Understand the theory and practice of loan repayments.
- Understand measures of investment performance
- Value fixed interest securities subject to tax and determine their yield.
- Understand the concept of arbitrage and the no-arbitrage assumption
- Calculate the forward price and the value of forward contracts using arbitrage free pricing.
- Develop a replicating portfolio for forward contracts
- Understand forward interest rates and the term structure of interest rates.
- Calculate the duration and convexity of a set of cash flows.
- Understand Redington's theory of immunization and apply it in simple situations
- Understand simple stochastic interest rate models.
- Calculate the accumulated profit of projects using deterministic interest rates
- Understand the concept of inflation and calculate inflation adjusted payoffs
- Find the real yield and the monetary yield of inflation linked gilts
- Calculate the break-even rate of inflation

**LEARNING OUTCOMES – PERSONAL ABILITIES**

On completion of this module the student should be able to

- demonstrate knowledge and critical understanding of the basic concepts and models in financial mathematics.
- demonstrate the ability to learn independently
F71AB Financial Mathematics

- manage time, work to deadlines and prioritize workloads
- present results in a way that demonstrates that they have understood the technical and broader issues in financial mathematics

SYLLABUS

- Rates of interests
- Present values, equations of value and yields
- Principle of equivalence
- Annuities
- Loan schedules and mortgages
- Project appraisal and discounted cash flows
- Measures of fund performance
- Fixed interest securities
- Inflation and index-linked securities
- Continuous Compounding, force of interest and continuous cash flows
- Immunisation, duration and convexity
- Arbitrage and forward contracts
- The term structure of interest rates and forward rates
- Stochastic interest rate models

COURSE RELATIONSHIPS

N/A

LOCATION AND ASSESSMENT METHODS

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<th>Edi</th>
<th>SBC</th>
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<td>Assessment</td>
<td>Semester 1</td>
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Examination will be at least 60% and no more than 80%.

| Y       |     |     |     |       |     |      |     |     | Coursework  | 40     | Assessment | Semester 1  |             |                 |

Coursework will be at least 20% and no more than 40%.

| Y       |     |     |     |       |     |      |     |     | Examination  | 100    | 180       | Reassessment | Semester 1  |                 |

Re-assessment in the next academic year.