# F71AB Financial Mathematics

## COURSE DETAILS

<table>
<thead>
<tr>
<th>Course Code</th>
<th>F71AB</th>
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<tbody>
<tr>
<td>Full Course Title</td>
<td>Financial Mathematics</td>
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<tr>
<td>SCQF Level</td>
<td>11</td>
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<tr>
<td>SCAF Credits</td>
<td>15</td>
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<tr>
<td>Available as Elective</td>
<td>No</td>
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## DELIVERY LEVEL

<table>
<thead>
<tr>
<th>Undergraduate</th>
<th>Yes</th>
<th>Postgraduate Taught</th>
<th>Yes</th>
<th>Postgraduate Research</th>
<th>No</th>
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## 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
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

<table>
<thead>
<tr>
<th>Edi</th>
<th>SBC</th>
<th>Ork</th>
<th>Dub</th>
<th>Malay</th>
<th>IDL</th>
<th>COLL</th>
<th>ALP</th>
<th>OTH</th>
<th>Method</th>
<th>Weight</th>
<th>Exam Mins</th>
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<td></td>
<td>Examination</td>
<td>60</td>
<td>180</td>
<td>Assessment</td>
<td>Semester 1</td>
<td></td>
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Examination will be at least 60% and no more than 80%.

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

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

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

Re-assessment in the next academic year.