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

<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>
<th>Type</th>
<th>Diet</th>
<th>Synoptic Course</th>
<th>Course</th>
</tr>
</thead>
<tbody>
<tr>
<td>Y</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Examination</td>
<td>60</td>
<td>180</td>
<td>Assessment</td>
<td>Semester 1</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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.