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>
</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>90</td>
<td>180</td>
<td>Assessment</td>
<td>Semester 1</td>
<td></td>
</tr>
<tr>
<td>Y</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Coursework</td>
<td>10</td>
<td></td>
<td>Assessment</td>
<td>Semester 1</td>
<td></td>
</tr>
<tr>
<td>Y</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Examination</td>
<td>100</td>
<td>180</td>
<td>Reassessment</td>
<td>Semester 3</td>
<td></td>
</tr>
</tbody>
</table>