F78AB Actuarial and Financial Mathematics B

**COURSE DETAILS**

Course Code: F78AB  
Full Course Title: Actuarial and Financial Mathematics B  
SCQF Level: 8  
SCAF Credits: 7.5  
Available as Elective: No

**DELIVERY LEVEL**

Undergraduate: Yes  
Postgraduate Taught: No  
Postgraduate Research: No

Additional Information:

**COURSE AIMS**

To introduce the student to more advanced mathematical models of cashflows accumulated or discounted at interest, and to develop skill in applying these models to real financial contracts and transactions.

**LEARNING OUTCOMES – SUBJECT MASTERY**

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

- Describe and calculate nominal rates of interest.
- Know how to value and accumulate continuously-payable cash flows and how to calculate internal rates of return for transactions with such cash flows.
- Define the duration and convexity of a cash flow sequence and illustrate how these may be used to estimate the sensitivity of the value of the cash flow sequence to changes in the rate of interest.
- Know how duration and convexity are used in the immunisation of a portfolio of liabilities.
- Show an understanding of the term structure of interest rates and of the main factors influencing this structure.
- Calculate the delivery price and the value of a forward contract, using arbitrage-free pricing methods and to explain what is meant by hedging in the case of a forward contract.
- Know how to calculate the value of various types of forward contracts at any time during their duration.
- Use an appropriate computer package to apply the methods introduced in this course.

**LEARNING OUTCOMES – PERSONAL ABILITIES**

- Interpreting problems from commercial practice in terms of relevant mathematical models
- Independently recognizing and applying appropriate mathematical techniques to solve problems
- Interpreting solutions expressed mathematically in terms of the original problem
- Communicating the solutions to complex problems in the financial services sector

**SYLLABUS**

- Nominal rates of interest
- Force of interest and continuous cash flows
- Duration and Redington's theory of immunization
- The term structure of interest rates
- Forward contracts

### COURSE RELATIONSHIPS

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Level</th>
<th>Title</th>
<th>School</th>
<th>Type</th>
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<tbody>
<tr>
<td>F78AA</td>
<td>8</td>
<td>Actuarial and Financial Mathematics A</td>
<td>School of Math and Comp Sci.</td>
<td>Assessed</td>
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### LOCATION AND ASSESSMENT METHODS

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<tr>
<th>Edi</th>
<th>SBC</th>
<th>Ork</th>
<th>Dub</th>
<th>Malay</th>
<th>IDL</th>
<th>COLL</th>
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<td>Examination</td>
<td>70</td>
<td>120</td>
<td>Assessment</td>
<td>Semester 2</td>
<td>F78AA</td>
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The assessments will be as follows:
F78AA (Semester 1): 25% Continuous assessments. No final exam at the end of the semester.
F78AB (Semester 2): 5% Continuous assessments. Final exam for F78AA and F78AB syllabus amounting to 70% of the total grade at the end of semester 2.

| Y   | Y   | Y   |     |       |     |      |     |     | Coursework| 5      |           | Assessment | Semester 2 | F78AA |

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| Y   | Y   | Y   |     |       |     |      |     |     | Examination| 100    | 120       | Reassessment | Semester 3 | F78AA |