### COURSE SPECIFICATION FORM
**for new course proposals and course amendments**

<table>
<thead>
<tr>
<th>Department/School:</th>
<th>Mathematics</th>
<th>Academic Session:</th>
<th>2016-17</th>
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<tbody>
<tr>
<td><strong>Course Title:</strong></td>
<td>Advanced Financial Mathematics</td>
<td><strong>Course Value:</strong> (U/G courses = unit value, PG courses = notional learning hours)</td>
<td>20 credits</td>
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<tr>
<td><strong>Course Code:</strong></td>
<td>MT5448</td>
<td><strong>Course JACS Code:</strong> (Please contact Data Management for advice)</td>
<td>G100</td>
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<tr>
<td><strong>Availability:</strong></td>
<td>Term 2</td>
<td><strong>Status:</strong></td>
<td>Optional Condonable</td>
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<td><strong>Pre-requisites:</strong></td>
<td>An undergraduate course in financial mathematics</td>
<td><strong>Co-requisites:</strong></td>
<td>-</td>
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<tr>
<td><strong>Co-ordinator:</strong></td>
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<td><strong>Course Staff:</strong></td>
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**Aims:**
- To investigate the validity of various linear and non-linear time series occurring in finance;
- To extend the use of stochastic calculus to interest rate movements and credit rating;

**Learning Outcomes:**
1. make use of some of the ARCH (autoregressive conditionally heteroscedastic) family of models in time series;
2. appreciate the ideas behind the use of the BDS test and the bispectral test for time series;
3. understand the partial differential equation for interest rates and the assumptions that lead to it;
4. be able to model forward and spot rates;
5. see how to model the prices for certain exotic options.
6. Demonstrate independent learning skills

**Course Content:**
- Interest rate analysis: Revision of ideas in stochastic calculus. Modelling of interest rates, the bond pricing equation. Bond derivatives. The Heath-Jarrow-Morton model.
- Exotic options: Asian and barrier options.

**Teaching & Learning Methods:**
The total number of notional learning hours associated with this course are 200. 3 hours of lectures per week over 11 weeks. 33 hours total. 167 hours of private study, including work on the miniproject, problem sheets and examination preparation. This may include discussions with the course leader if the student wishes.

**Key Bibliography:**
- Paul Wilmott Introduces Quantitative Finance – P Wilmott (Wiley 2007) Library reference 332.632 WIL

**Formative Assessment & Feedback:**
Formative assignments in the form of 8 problem sheets. The students will receive feedback as written comments on their attempts.

**Summative Assessment:**
- **Exam:** 90% Two hour written exam.
- **Coursework:** 10% Unsupervised mini project

The information contained in this course outline is correct at the time of publication, but may be subject to change as part of the Department’s policy of continuous improvement and development. Every effort will be made to notify you of any such changes.