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2 WELCOME MESSAGE

Welcome from Programme Director

I am delighted to welcome you all to the 2016/2017 MSc in Risk Management and Financial Engineering. You are embarking on an exciting and enjoyable year where you will immerse yourselves in finance and risk management and get to grips with both the theory and the practice. The faculty will be working hard to stimulate you and help you to understand the concepts of financial, economic and statistical theory and to show how theory and practice interact; to obtain maximum benefit you too will need to work hard. The pay-off will be a thorough grounding and competence in financial risk management that will stand you in good stead throughout your career.

The Hub is the Business School’s on-line learning platform. Each programme will have an online Hub, which contains all the module resources as well as provides a space for all module communication (so students will just need to check the Hub rather than receive numerous emails). This approach to communication also facilitates the use of rich media, for example, videos from the Programme Director rather than a piece of text. Students are also encouraged to comment on these with any questions they might have.

I am extremely fortunate in having a very experienced programme team to ensure the smooth running of your programme; they are available to deal with any queries that arise. As programme director, I am happy to meet you to discuss any issues you would like to raise; I can always be contacted by email (l.cathcart@imperial.ac.uk).

I hope you all have a fruitful year at Imperial.

With best wishes

Lara Cathcart
Programme Director
MSc Risk Management & Financial Engineering and MSc Finance
3 PROGRAMME OVERVIEW

3.1 Aims, Objectives, Learning Outcome and Skills Mapping

MSc Risk Management and Financial Engineering: AIMS AND OBJECTIVES

We aim to give our students a rigorous understanding of the theoretical basis of risk management and financial engineering at the same time making the theories relevant to market practice and behaviour. The programme is different from MSc Finance in that it provides a more focused training in asset pricing and risk management whereas MSc Finance covers a broader set of topics in finance, ranging from investments, corporate finance and derivatives. The programme aims to provide skills that enable students to embark on a career oriented towards quantitative analysis in the financial services sector or to pursue further academic study (doctoral research). Students who successfully complete the programme will be able to:

- Demonstrate a detailed knowledge of fundamental finance theories and models including their derivation and their use and context in the measurement and management of risk;
- Apply mathematical tools to complex financial problems relating to risk measurement, risk management and risk pricing;
- Use a range of programming tools to develop live implementations of financial models and use these implementations in practice;
- Analyse and evaluate investment decisions and data — students should be able to apply econometric theory and software to draw valid conclusions about data.

The MSc offers a range of careers-related activities which form an integral part of the programme. Please consult the Careers section in the Key Information area of the Hub for further information.

Skills Mapping

Here at Imperial College Business School you have the opportunity to develop a wide range of professional skills through a variety of different mediums. These skills will not only aid your personal development but also make you more competitive within the marketplace. Importantly, this involves more than just workshops. It involves a blend of learning through both curricular and non-curricular activities. In order to rationalise the approach to developing these skills we have created a matrix outlining the different categories and the methods in which you will learn them.

Categories

We split professional skills into three main categories. This provides you with the chance to identify the structure of skills learning and how useful they can be in the workplace.

<table>
<thead>
<tr>
<th>Category</th>
<th>Description</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Personal Development</td>
<td>Personal effectiveness on an operational level. This includes the dynamics of working individually or as a member of a team.</td>
<td>Working in teams or time management.</td>
</tr>
<tr>
<td>Communication</td>
<td>Verbal, non-verbal and written skills.</td>
<td>CV writing or presentation skills.</td>
</tr>
<tr>
<td>Technical &amp; Analytical</td>
<td>Essential workplace tools and techniques beyond curriculum teaching.</td>
<td>VBA, C++, Matlab.</td>
</tr>
<tr>
<td>Professional Skills Type</td>
<td>Foundation Modules</td>
<td>Core Modules</td>
</tr>
<tr>
<td>-------------------------</td>
<td>--------------------</td>
<td>--------------</td>
</tr>
<tr>
<td>Personal Development</td>
<td>An important emphasis is placed on this in the September term. You will start thinking about your approach to learning as an individual, team and cohort member and as an international student.</td>
<td>You will quickly realise, once the core modules start, that you need to sharpen up your personal management skills whilst working effectively on team coursework.</td>
</tr>
<tr>
<td>Communication</td>
<td>You will spend time developing an understanding of communication and how to come across effectively.</td>
<td>Throughout the core modules you will be required to communicate with fellow students, complete coursework and negotiate your way around work priorities. You will also be introduced to financial terminology.</td>
</tr>
<tr>
<td>Technical and Analytical</td>
<td>You will be introduced to the Hub and Matlab that you will use regularly throughout the year.</td>
<td>In addition to the actual subject matter taught, there will be many technical and analytical skills to develop. This will involve learning skills from analysing case studies to effective use of Matlab, VBA and spreadsheets.</td>
</tr>
</tbody>
</table>
### Personal Skills Development for Individual Modules – MSc RMFE

<table>
<thead>
<tr>
<th>September Modules</th>
<th>Written</th>
<th>Presentations</th>
<th>Spreadsheets/ Numerical Software</th>
<th>Analytical &amp; Critical Reasoning</th>
<th>Verbal</th>
<th>Teamwork</th>
<th>Personal Skills</th>
</tr>
</thead>
<tbody>
<tr>
<td>Application of Matlab to Finance</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Data Structures &amp; Algorithms with Python</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Markets and Securities</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Financial Modelling</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Finance Industry</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>

### Core Module
- Financial Statistics | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
- Risk Management & Valuation | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
- Investments and Portfolio Management | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
- Stochastic Calculus for Finance | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
- Empirical Finance: Methods & Applications | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
- Financial Engineering | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |

### Electives
- Advanced Financial Statistics | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
- Asset Allocation & Investment Strategies | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
- Advanced Options Theory | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
- Banks, Regulation & Monetary Policy | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
- Big Data in Finance | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
- Credit Risk | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
- Enterprise Risk Management | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
- Financial Crises and Regulation | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
- Fixed Income Securities | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
- Insurance | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
- International Finance | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
- Int. Elective: Macro. & Finance for Practitioners | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
- Introduction to Algorithmic Trading | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
- Private Equity & Venture Capital | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
- Quantitative Methods in Asset Management | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
- Structured Credit and Equity Products | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
- Topics in Corporate Finance | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
- Topics in Fintech Innovation | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
- Wealth Management & Alternative Investments | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |

### Research Project / Applied Project
- ✓ | ✓ | Depends on topic | ✓ | ✓ | ✓ | ✓ |
3.2 Programme Structure

The programme consists of four compulsory (and one optional) online modules, five foundation modules, six core modules, one key elective, two or three further electives (depending on the project you do), a VBA module and a project.

<table>
<thead>
<tr>
<th>Term</th>
<th>Element</th>
<th>Core/ Elective</th>
<th>Coursework</th>
<th>Module Code</th>
<th>Exam Schedule</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Online Modules</strong></td>
<td>Accounting Primer (pre-study – Aug 2016)</td>
<td>Core</td>
<td></td>
<td>BS1090</td>
<td>Online test Week 3 - 7 October 2016</td>
</tr>
<tr>
<td></td>
<td>Introduction to Finance (pre-study – Aug 2016)</td>
<td>Core</td>
<td></td>
<td>BS1092</td>
<td>Complete by 30 September 2016</td>
</tr>
<tr>
<td></td>
<td>Introduction to Mathematics (optional pre-study – Aug 2016)</td>
<td>Optional</td>
<td></td>
<td>BS1091</td>
<td>N/A</td>
</tr>
<tr>
<td></td>
<td>Plagiarism Awareness Module</td>
<td>Core</td>
<td></td>
<td>BS1317</td>
<td>By 30 Sept 2016</td>
</tr>
<tr>
<td></td>
<td>Ethics and Professional Standards in Finance</td>
<td>Core</td>
<td></td>
<td>BS1305</td>
<td>Summer term</td>
</tr>
<tr>
<td><strong>Foundation (Sept 2016)</strong></td>
<td>Application of Matlab to Finance</td>
<td>Core</td>
<td>100%</td>
<td>BS1032</td>
<td>N/A</td>
</tr>
<tr>
<td></td>
<td>Markets and Securities</td>
<td>Core</td>
<td>0%</td>
<td>BS1023</td>
<td>During Week 3 - 7 October 2016</td>
</tr>
<tr>
<td></td>
<td>Financial Modelling</td>
<td>Core</td>
<td>0%</td>
<td>BS1025</td>
<td>During Week 3 - 7 October 2016</td>
</tr>
<tr>
<td></td>
<td>Data Structures &amp; Algorithms with Python</td>
<td>Core</td>
<td>100%</td>
<td>BS1034</td>
<td>N/A</td>
</tr>
<tr>
<td><strong>Autumn (Oct – Dec 2016)</strong></td>
<td>The Finance Industry</td>
<td>Core</td>
<td>100%</td>
<td>BS1026</td>
<td>N/A</td>
</tr>
<tr>
<td></td>
<td>Financial Statistics</td>
<td>Core</td>
<td>15%</td>
<td>BS1002</td>
<td>12 - 16 December 2016 (exact dates TBC)</td>
</tr>
<tr>
<td></td>
<td>Investments &amp; Portfolio Mgt</td>
<td>Core</td>
<td>20%</td>
<td>BS1016</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Risk Management and Valuation</td>
<td>Core</td>
<td>20%</td>
<td>BS1030</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Stochastic Calculus for Finance</td>
<td>Core</td>
<td>20%</td>
<td>BS1022</td>
<td></td>
</tr>
</tbody>
</table>

**Complete a TOTAL of three or four electives, depending on the project chosen;**

**You must choose a minimum of one ‘Key’ elective;**

**You may only select a maximum of two electives in Spring Term**

<table>
<thead>
<tr>
<th>Term</th>
<th>Element</th>
<th>Core/ Elective</th>
<th>Coursework</th>
<th>Module Code</th>
<th>Exam Schedule</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Spring (Apr – Jun 2017)</strong></td>
<td>Empirical Finance: Methods &amp; Applications</td>
<td>Core</td>
<td>15%</td>
<td>BS1033</td>
<td>13 – 24 March 2017 (exact dates TBC)</td>
</tr>
<tr>
<td></td>
<td>Financial Engineering</td>
<td>Core</td>
<td>20%</td>
<td>BS1031</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Compulsory: VBA</td>
<td>Core</td>
<td>30%</td>
<td>BS1014</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Asset Allocations &amp; Investment Strategies</td>
<td>Key</td>
<td>40%</td>
<td>BS0340</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Advanced Financial Statistics</td>
<td>Elective</td>
<td>15%</td>
<td>BS1021</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Big Data in Finance</td>
<td>Elective</td>
<td>40%</td>
<td>BS0352</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Insurance</td>
<td>Key</td>
<td>50%</td>
<td>BS1130</td>
<td></td>
</tr>
<tr>
<td></td>
<td>International Finance</td>
<td>Elective</td>
<td>15%</td>
<td>BS0309</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Private Equity &amp; Venture Capital</td>
<td>Elective</td>
<td>40%</td>
<td>BS0324</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Quantitative Methods in Asset Management</td>
<td>Elective</td>
<td>50%</td>
<td>BS0345</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Topics in Corporate Finance</td>
<td>Elective</td>
<td>40%</td>
<td>BS2101</td>
<td></td>
</tr>
<tr>
<td><strong>Summer (Apr – Jun 2017)</strong></td>
<td>Advanced Options Theory</td>
<td>Key</td>
<td>20%</td>
<td>BS0302</td>
<td>19 June – 30 June 2017 (exact dates TBC)</td>
</tr>
<tr>
<td></td>
<td>Banks, Regulation &amp; Monetary Policy</td>
<td>Elective</td>
<td>40%</td>
<td>BS0355</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Credit Risk</td>
<td>Key</td>
<td>25%</td>
<td>BS0318</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Enterprise Risk Management</td>
<td>Elective</td>
<td>30%</td>
<td>BS1105</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Financial Crises &amp; Regulation</td>
<td>Elective</td>
<td>25%</td>
<td>BS0343</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Fixed Income Securities</td>
<td>Key</td>
<td>20%</td>
<td>BS0308</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Int.Elective: Macroeconomics and Finance for Practitioners</td>
<td>Elective</td>
<td>45%</td>
<td>BS0344</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Intro. to Algorithmic Trading</td>
<td>Elective</td>
<td>40%</td>
<td>BS0353</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Structured Credit &amp; Equity Products</td>
<td>Elective</td>
<td>15%</td>
<td>BS1011</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Topics in Fintech Innovation</td>
<td>Elective</td>
<td>40%</td>
<td>BS0354</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Wealth Management &amp; Alternative Investments</td>
<td>Elective</td>
<td>30%</td>
<td>BS0347</td>
<td></td>
</tr>
<tr>
<td>Term</td>
<td>Element</td>
<td>Core/Elective</td>
<td>Coursework</td>
<td>Module Code</td>
<td>Deadlines</td>
</tr>
<tr>
<td>--------------------</td>
<td>----------------------------------------------</td>
<td>---------------</td>
<td>------------</td>
<td>-------------</td>
<td>----------------------</td>
</tr>
<tr>
<td>July-August 2017</td>
<td>Research Project or Applied Project (desk-based) or Applied Project (work-based)</td>
<td>Core</td>
<td>100%</td>
<td>BS1000</td>
<td>15 August 2017</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>BS1020</td>
<td>15 August 2017</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>BS1020W</td>
<td>31 August 2017</td>
</tr>
<tr>
<td>Resit Period</td>
<td>All exams</td>
<td></td>
<td></td>
<td></td>
<td>4 – 25 Sept 2017</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(Exact dates TBC)</td>
</tr>
</tbody>
</table>

*Electives run subject to student interest. Imperial College Business School reserves the right not to run electives that do not have sufficient student interest. Imperial College Business School reserves the right to change electives offered.

In addition to the electives, students may also take the following optional module:

- C++ for Finance (Spring term)

Further information is available in the Electives section of this handbook.
3.3 Marking Criteria for Foundation Modules

<table>
<thead>
<tr>
<th>Module</th>
<th>Assessment</th>
<th>Weighting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Application of Matlab to Finance</td>
<td>To be assessed by 50% coursework and 50% final test</td>
<td>25%</td>
</tr>
<tr>
<td>Finance Industry</td>
<td>To be assessed by a 100% attainment of criteria as outlined in Section 3.9.6</td>
<td>N/A</td>
</tr>
<tr>
<td>Financial Modelling</td>
<td>To be assessed by 100% MCQ Exam</td>
<td>25%</td>
</tr>
<tr>
<td>Markets and Securities</td>
<td>To be assessed by 100% MCQ Exam</td>
<td>25%</td>
</tr>
<tr>
<td>Mathematical Finance</td>
<td>To be assessed by 50% coursework and 50% final exam</td>
<td>25%</td>
</tr>
</tbody>
</table>

A pass in the September foundation modules is a requirement for the award.

To gain a pass, students will be required to achieve an average of 50% or above across the four modules (excluding the Finance Industry module), with a minimum mark of 40% in each module. Students must also obtain a pass mark in the Finance Industry module.

If students do not achieve a pass or get less than 40% in any individual assessment they will have the opportunity to resit any coursework element they have failed no later than September 2017 and to resit the exams no later than the first week of October 2017.

- Individual Foundation modules will appear in the official transcript as Pass or Fail.
3.4 Marking Criteria for Core Modules, Electives and Project

At Imperial College Business School, all postgraduate work is marked to the following scheme:

<table>
<thead>
<tr>
<th>Marks</th>
<th>Interpretation</th>
</tr>
</thead>
<tbody>
<tr>
<td>85+</td>
<td>Marks represent an exceptional distinction performance</td>
</tr>
<tr>
<td>70 – 84%</td>
<td>Marks represent a distinction performance</td>
</tr>
<tr>
<td>60 – 69%</td>
<td>Marks represent a merit performance demonstrating a clear grasp of the relevant concepts and facts</td>
</tr>
<tr>
<td>50 – 59%</td>
<td>Marks represent a pass performance demonstrating an adequate grasp of most of the relevant concepts and facts</td>
</tr>
<tr>
<td>40 – 49%</td>
<td>Marks represent a fail performance but failure is considered condoned. Students who receive marks within this boundary in any exams are not required to resit provided they achieve an average of 50% overall for the element.</td>
</tr>
<tr>
<td>30 – 39%</td>
<td>Marks represent a fail performance (with significant shortcomings). Students are automatically required to resit any exams for which they receive a mark in this boundary regardless of the overall grade they achieve for the module.</td>
</tr>
<tr>
<td>0 – 29%</td>
<td>Marks represent a fail performance (with major shortcomings). Students are automatically required to resit any exams for which they receive a mark in this boundary regardless of the overall grade they achieve for the module.</td>
</tr>
</tbody>
</table>

In addition, the following guidance is provided to Faculty in relation to projects:

70% +       | A mark of this level corresponds to a distinction                             |
            | The Report indicates exceptional success in tackling the Project. All the Project's objectives have been met as fully as could reasonably be expected. The student has shown initiative and been rigorous in the collection and use of data. Where appropriate, relevant literature has been critically evaluated. The standard of the Report presentation is very high. A mark of this level should be reserved for Reports of exceptional merit which has something extra and which surprises. The supervisor will be required to justify why a distinction has been awarded in the section provided. |

60 - 69%    | The student has tackled the problem conscientiously and logically and has produced sound conclusions. Presentation is of good standard. A mark of this level corresponds to a merit. |

50 – 59%    | The student’s work has been no more than moderate overall or would have deserved a higher grade but for areas of significant weakness. |

< 50%       | The student’s work has failed to reach a satisfactory standard. A mark below 50% should be used to indicate a “fail” in the Project. |
3.5 Marking Schemes, Exam Papers and External Examiners

3.5.1 Marking Schemes for MSc RMFE

Weighting

All modules are equally weighted with the exception of the Research Project which carries a double weight. The Applied Project is single weighted and must be taken together with an additional elective.

Core modules + Electives: 81%     OR     Core modules + Electives: 90%
Research Project:               19%                    Applied Project: 10%

Pass

- An average of 50% or above in each of the 2 elements
  1. Core modules (not including September foundation and online modules)
  2. Electives & Research Project/Applied Project
- At least 40% in each examination;
- At least 50% in the Research Project or Applied Project;
- A pass mark for each of the Accounting Primer, Ethics, Introduction to Finance and VBA modules;
- A pass mark in the September foundation modules (including a Pass in the Finance Industry module and an average of 50% or above across the remaining four modules with a minimum mark of 40% in each individual module).

Merit

- An average of 60% or above in each of the 2 elements:
  1. Core modules (not including September foundation and online modules)
  2. Electives & Research Project/Applied Project
- At least 40% in each examination;
- At least 60% in the Research Project or Applied Project;
- A pass mark for each of the Accounting Primer, Ethics, Introduction to Finance and VBA modules;
- A pass mark in the September foundation modules (including a Pass in the Finance Industry module and an average of 50% or above across the remaining four modules with a minimum mark of 40% in each individual module).

Distinction

- An average of 70% or above in each of the 2 elements:
  1. Core modules (not including September foundation and online modules)
  2. Electives & Research Project/Applied Project
- At least 50% in all modules;
- At least 40% in each examination;
- At least 70% in the Research Project or Applied Project;
- A pass mark for each of the Accounting Primer, Ethics, Introduction to Finance and VBA modules;
- A pass mark in the September foundation modules (including a Pass in the Finance Industry module and an average of 50% or above across the remaining four modules with a minimum mark of 40% in each individual module).

NB: Please refer to the Resits information in the Academic Regulations & Policies document on the Hub, if applicable.
3.5.2 Marking and Exam Papers

All examination scripts will be marked in detail by the Module Leader with a second marker undertaking check marking to ensure that the mark awarded by the Module Leader is appropriate. A sample of scripts is then sent to an External Examiner from another institution to ensure that the standard of marking at Imperial College Business School is commensurate with elsewhere in the UK. External Examiners also approve draft examination questions prior to the examination being set.

Past examination papers or specimen questions are provided to guide students on content only. The format is subject to change and the Module Leader will provide full information during the module.

3.5.3 External Examiners

Professor Taufiq Choudhry   University of Southampton
Professor John Cotter*   University College Dublin
Dr Susanne Espenlaub   University of Manchester
Professor Vasso Ioannidou*   Lancaster University
Dr Max Jensen   University of Sussex
Professor Bart Taub*   Glasgow University
Professor Andrew Wood*   University of Essex

Please note: Details provided will be for information only. It is not appropriate for students to contact the externals directly regarding their studies. Any issues that you have in relation to your assessment should be raised internally with your Programme Team in the first instance or with the College Registry, if necessary.

* Pending College approval
3.6 Prizes

Each year, outstanding MSc Risk Management & Financial Engineering students are awarded a prize in various areas of finance in recognition of their academic achievements.

Below is the list of prizes* currently available to students:

**MSc Risk Management & Financial Engineering Outstanding Student Prize - £500**
Awarded annually to the student with the best all round performance in examinations, electives and project work taken together.

**MSc Risk Management & Financial Engineering Best Applied Project Prize - £250**
Awarded annually to the MSc Risk Management & Financial Engineering student with the highest mark in his/her Applied Project.

**MSc Risk Management & Financial Engineering Financial Statistics Prize - £200**
Awarded annually to the MSc RM&FE student with the highest average in Financial Statistics and Advanced Financial Statistics combined.

**MSc Risk Management & Financial Engineering Stochastic Calculus Prize - £200**
Awarded annually to the MSc Risk Management & Financial Engineering student with the highest average in Stochastic Calculus and Fixed Income Securities combined.

**Best Research Project Prize (shared across the Finance Suite) - £250**
Awarded annually to the student on the Finance Suite of MSc programmes with the highest mark in his/her Research Project.

**Andreas Kyriakides Memorial Prize for Investment and Portfolio Management (shared with MSc Finance programme) - £200**
Awarded annually to the MSc Finance/MSc Risk Management & Financial Engineering student with the highest average in Investment & Portfolio Management and Asset Allocation & Investment Strategies combined.

*All prizes are subject to change and to College approval*
3.7 Association with Professional Body

The MSc RMFE programme at the Imperial College Business School is reputed for its academic excellence, and as such is associated with Professional Risk Managers’ International Association (PRMIA).

3.7.1 Professional Risk Managers’ International Association (PRMIA)

MSc RMFE is accredited by PRMIA (Professional Risk Managers’ International Association) in order to qualify for the PRM Exam I & II exemptions, students are required to complete the following courses (please note the courses marked * fall under elective courses) with at least a B grade:

- Markets and Securities
- Financial Modelling
- Data Structures & Algorithms with Python
- The Finance Industry
- Risk Management & Valuation
- Financial Statistics
- Investments & Portfolio Management
- Stochastic Calculus for Finance
- Empirical Finance: Methods and Applications
- Financial Engineering
- International Finance*
- 1 RMFE-specific elective*

You can find out more about the PRM exam exemptions at [http://www.prmia.org/prm-exam/exemptions-university](http://www.prmia.org/prm-exam/exemptions-university).

We acquire PRMIA student membership for all RMFE students for the duration of your MSc.

The benefits of being a PRMIA Student Member include:

- Discount on select PRMIA Publications
- Discount on PRM and Associate PRM products
- Discount on all PRMIA eLearning Courses
- Discounts on Training Courses and Select PRMIA Partner Publications
- Discount on Events
- Invitations to exclusive networking receptions and access to speaker presentations
  Free Access to Thought Leadership Webinars
- Free Access to PRMIA blogs and Opportunities to post research and white papers on PRMIA’s website

If you want to opt out of this membership and do not want us to share your Imperial email details with PRMIA then you need to inform us by midday on Monday 5 September 2016 (email tracy.andrew@imperial.ac.uk).

We hope that you find this membership useful – for more information about PRMIA look here [http://www.prmia.org](http://www.prmia.org)
3.8 Pre-study Online Modules

Students are required to complete the following online modules:

Before your arrival at the School:

1. Accounting Primer (compulsory)
2. Introduction to Finance (compulsory)
3. Introduction to Mathematics (optional)

Experience tells us that students without a basic knowledge of these subjects will struggle on parts of the programme. If you have not yet completed these modules, you should do so before the autumn term starts in October.

September:

4. Plagiarism Awareness module (compulsory)

Summer term:

5. Ethics and Professional Standards in Finance (compulsory)

Although the marks for the test and quizzes for modules 1 - 3 & 5 above will not count towards your final grade, it is a programme requirement that you pass them.

It is a Business School requirement that you complete module 4 above.
3.8.1 Accounting Primer (compulsory)

Module Aims:

This module is at an introductory level and includes several self-help exercises. You must then pass a one-hour computer-based accounting test, which will take place in the week of 3rd – 7th October 2016. If you fail the test, you will be able to retake it. We expect all students to gain some basic knowledge of accounting as part of their MSc studies.

Module Contents:

This module introduces the basic financial statements, namely the balance sheet, the income statement and the cash flow statement. It is a legal requirement for companies and large organisations to report their financial status through these statements.

The basic pro-forma of these statements, how they are prepared, and the limitations of the statements are explained. It is imperative for business people to be able to interpret and analyse this information to support good decision-making.

Topics covered:

- The balance sheet
- Profit and loss account
- The cash flow statement

Assessment:

The Accounting Primer module is assessed by a multiple choice test which will take place during week 3rd – 7th October 2016. If you do not pass the test at the first attempt, you will have the opportunity to resit it later in the term.
3.8.2 Introduction to Finance (compulsory)

Module Aims:

This online learning module introduces you to basic concepts in Finance and Financial Valuation models.

When you have completed the module and the quizzes on the Hub, you will be able to:

- Use the time value of money to value assets
- Understand how risky cash flows are valued
- Calculate spot and forward rates
- Understand how a yield curve is obtained
- Understand how portfolio selection problem is solved
- Implement the CAPM equation to estimate the rate of return on risky assets
- Understand how forward and option contracts are priced

Topics covered:

- Bonds
- Valuing risky cash flows
- Bond yields
- Forward rates
- Term structure theory
- Portfolio selection
- CAPM
- Derivatives and markets
- Derivatives and pricing

Assessment:

You are required to complete the Module Review Quiz questions at the end of each section of this module by Friday 30 September 2016.
3.8.3 Introduction to Maths (optional)

Module Aims:

This module reviews mathematical techniques that you will generally have encountered in your earlier studies. The material is presented in a self-contained way. This module is highly recommended to those who have not studied this subject for a while and need to refresh their maths knowledge.

When you have completed the online module, you will be able to:

- Take derivatives and integrate simple commonly encountered functions
- Employ product and chain rules and integrate by parts
- Understand and manipulate simple equations involving vectors and matrices
- Be familiar with commonly encountered matrix functions such as determinants and eigenvectors
- Understand simple properties of linear ordinary differential equations

Topics covered:

- Differentiation
- Integration
- Taylor expansion
- Linear algebra
- Differential equations
3.8.4 Plagiarism Awareness Module (compulsory)

Module Aims:

How would you define plagiarism? Do you know what plagiarism is? Do you know there are different types of plagiarism? We’ve asked lots of students what they think plagiarism is, and most of them say plagiarism is when you ‘cut and paste’ or copy other people's work. This is only one half of a definition of plagiarism. You need to have a full understanding of what plagiarism is, and why it is an academic offence.

After working through this module, you should:

• be able to explain what plagiarism is, and identify six different types of plagiarism
• be familiar with the concept of academic integrity
• be able to explain how to avoid plagiarism
• know what your department and the College policy is on plagiarism
• be able to explain the difference between paraphrasing and using a quotation in your work

Assessment:

You are required to complete and pass the online plagiarism awareness test by Friday 30 September 2016.
3.8.5 Ethics and Professional Standards in Finance (compulsory)

Module Aims:

This module aims to introduce students to corporate responsibility and professional standards for financial analysts. This online module will be available in the summer term and, at the end of it, students are required to take a compulsory test, which must be passed before they can be awarded the MSc.

Module Outline:

In this short module, we will take students through a review of the key factors and responsibilities for ethical practice in finance.

There are eight sections in total for students to complete. Each section will include video commentary, a web-based lecture, suggested readings, practical examples and discussion questions to test the key concepts learned in that section.

Assessment:

You are required to complete and pass the online Ethics and Professional Standards in Finance module during the summer term.
### 3.9 Welcome Day, Welcome Reception and Foundation Modules

#### 3.9.1 Welcome Day and Welcome Reception Schedule: 1 & 2 September 2016

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>09:30 - 10:00</td>
<td>Registration 1 (A - M)</td>
</tr>
<tr>
<td>10:00 - 10:30</td>
<td>Registration 2 (N - Z)</td>
</tr>
<tr>
<td>10:30 - 11:15</td>
<td>Welcome&lt;br&gt;Dean of Imperial College Business School and Programme Director</td>
</tr>
<tr>
<td>11:15 - 11:45</td>
<td>Welcome by Programme team&lt;br&gt;(Lisa Umenyiora, Assistant Director of Finance Programmes)</td>
</tr>
<tr>
<td>11:45 - 12:00</td>
<td>Break</td>
</tr>
<tr>
<td>12:00 - 12:30</td>
<td>Getting Started on Your Programme:&lt;br&gt;September Term&lt;br&gt;(Tracy Andrew, Senior Programme Coordinator)</td>
</tr>
<tr>
<td>12:30 - 12:45</td>
<td>Student Leadership Opportunities&lt;br&gt;(Catherine Batley, Student Experience Manager)</td>
</tr>
<tr>
<td>12:45 - 13:15</td>
<td>International Students:&lt;br&gt;BRP/Visa Distribution</td>
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<tr>
<td>13:15 - 13:45</td>
<td>Lunch</td>
</tr>
<tr>
<td>13:45 - 14:15</td>
<td>Introduction to Library Services&lt;br&gt;(Rosemary Russell/ Kay Griffiths)</td>
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<tr>
<td>14:15 - 15:30</td>
<td>Speed Networking</td>
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<tr>
<td>15:30 - 16:30</td>
<td>Campus Treasure Hunt</td>
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<table>
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<tr>
<th>Time</th>
<th>Event</th>
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<tbody>
<tr>
<td>17:30 - 18:30</td>
<td>Drinks reception&lt;br&gt;(Senior Common Room)</td>
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</table>
Foundation Modules

You will study five modules in September that introduce you to the tools of modern finance and enhance your career development skills.

1. Application of Matlab to Finance
   - Hands-on introduction to Matlab programming
   - Development of good practice and knowledge to tackle complex problems

2. Markets and Securities
   - Introduction into securities trading, pricing and investment
   - Review of probability theory and optimisation

3. Financial Modelling
   - Elements of probability theory
   - Review of matrix algebra and statistics

4. Data Structures and Algorithms with Python
   - Introduction to the basics of algorithms and data structures for developing computational approaches to problem solving
   - Introduction to the Python programming language

5. The Finance Industry
   - An exploration of the financial sector, with special focus on investment banking
   - Practical careers sessions
3.9.2 BS1032 Application of MATLAB to Finance

Module Instructor:
Name: Jialu Shen
Email: j.shen13@imperial.ac.uk

Module Aims:
This module is designed for students with no programming experience and provides the foundations of programming in MATLAB. Variables, arrays, conditional statements, loops, functions, and plots are explained. Furthermore, the module will focus on modelling, leveraging the skills of MATLAB that apply to modern financial markets, from simple linear regression and estimation to volatility modelling, asset pricing and other relevant topics in finance.

Module Outline:
Lecture 1: Variables, Matrices, Indexing and Operations
Lecture 2: Flow Control, Logical Operators, User Defined Functions, Data Reading/Writing
Lectures 3 & 4: Portfolio Optimization, Trading Strategy, Graphics with MATLAB
Lecture 5: Simulation and Option Pricing
Lecture 6: Regression Analysis
Lecture 7: Revision and In-class Test

Key Texts:

Assessment:
- Coursework (50%)
- Final Test (50%)

This breakdown ensures that students balance their time between learning new material and learning how to apply it in practice.
Module Instructor:

Name: Lara Cathcart  
Room: 53 Prince’s Gate - Room 5.09  
Telephone: 020 7594 9126  
Email: l.cathcart@imperial.ac.uk

Module Aims:

This module firstly provides a broad overview of key financial markets; Stocks, Bonds and Derivatives. Secondly it introduces the concepts of risk and return and how diversification influences risk and return.

Module Outline:

- Bonds  
- Equity  
- Portfolio Analysis  
- Derivatives

Key Texts:


Assessment:

- Multiple Choice Questions Exam (100%) during week 3rd – 7th October 2016
3.9.4 BS1025 Financial Modelling

Module Instructor:
Name: Paolo Zaffaroni
Room: 53 Prince's Gate - Room 4.02
Telephone: 020 7594 9186
Email: p.zaffaroni@imperial.ac.uk

Module Aims:
This module intends to provide students with the essential background in probability and statistics for the core and elective modules of the programme.

Module Outline:
1. Motivation: some empirical finance questions
2. Random variables and probability distributions
3. Moments of a random variable
4. Probability distributions
5. Joint, marginal and conditional distributions
6. Functions and transformation of a random variable
7. Hypothesis testing
8. Univariate regression
9. Matrix Algebra

Key text:

Supplementary reading:
For plenty of exercises, the Schaum's Outline series has:

Assessment:
- Multiple Choice Questions Exam (100%) during week 3rd – 7th October 2016
Module Aims:

This module introduces the students to the basics of algorithms and data structures for developing computational approaches to problem solving. The design of efficient computational methods for analysing large data sets lies in the core of modern technological innovation ranging from search engines and social networks to healthcare, energy and finance. The module will familiarize the students with key algorithm design paradigms (such as divide-and-conquer and greedy algorithms) and data structure design, as well as central concepts of computational complexity and running-time analysis. Students will develop a working knowledge of basic algorithms (such as searching, sorting, and shortest paths) and data structures along with the necessary programming constructs.

The module will also serve as an introduction to the Python programming language, aimed at developing a facility in organizing and writing medium-sized programs for practical problem-solving. The module will be hands-on assisted by teaching assistants and will also teach the students debugging and good programming practices.

Module Outline:

Knowledge Objectives

- Basic algorithms (such as searching, sorting, and shortest paths) broader algorithm design paradigms and their applications
- Concepts of computational complexity and running-time analysis
- Basic data structures (such as arrays, lists, and graphs), as well as key concepts in designing data structures
- Core programming constructs, including loops, program flow, objects and classes

Skill Objectives

- Upon the completion of this module, students should be able to:
- Implement and apply basic algorithms and analyse their efficiency
- Implement and apply basic data structures
- Read, organize and write programs in Python in order to solve practical computational problems

Key Texts:

Textbook (selected chapters):


Lecture notes and other material will be distributed during the module.

Assessment:

- Coursework (100%)
Module Instructors:

Name: Career and Professional Development Service
Room: Central Library Building, Level 2
Telephone: 020 7594 1510/6432
Email: icbs.careers@imperial.ac.uk

Module Aims:

An exploration of careers in financial services.

The aims of the module are to give students:

1) An understanding of the finance industry in more depth, to answer the following questions: What opportunities are there for graduates? What do organisations actually do? What does the day to day role look like? What skills and competencies are required in these roles?

2) An understanding of how to market skills, experience and interests effectively to appropriate potential employers.

Module Outline:

This unique module will be delivered by a combination of the Career & Professional Development Service, external consultants and professionals working in the sector. There will be many opportunities to meet potential employers, gain an insight into their organisations.

The module will begin with an introduction to the Career & Professional Development Service, an overview of the UK financial services industry and the recruitment market. Thereafter, attention will be devoted to sessions looking at the day to day working life of professionals working in specific divisions of investment banks or in other types of financial services organisations. In addition, there will be a careers fair to give students a chance to meet a wide variety of other employers from across banking, asset management, consulting, professional services and multinational corporates.

A variety of sessions covering the full spectrum of the job search process from CVs to interviews and assessment centres will help students maximise their chances of success. Professional development workshops will develop presentation and networking skills.

Companies taking part in the module (subject to change) include Morgan Stanley, Citi, BNP Paribas, Nomura, Macquarie, Lazard, Schroders, M&G, GIC, Houlihan Lokey, Commerzbank, Lombard Odier, Moodys and UBS.

Assessment:

Pass/fail based on 100% attainment of all the elements below:

- Attendance at all compulsory workshops
- Team Presentation
- VMock approved uploaded onto on Symplicity by 12pm on Friday 30 September
3.10 Core Modules

The six core modules are:

- Financial Statistics
- Investments and Portfolio Management
- Risk Management and Valuation
- Stochastic Calculus for Finance
- Financial Engineering
- Empirical Finance: Methods & Applications

Four core modules are taught in the autumn term and two in the spring term.

For each module there is a 3-hour lecture and a 1-hour class per week.

We endeavour to film the lectures and have them available to view via the Hub. However, this is not a substitute for class attendance. The system occasionally does not work due to technical errors so this should not be relied upon as an alternative to attending in person.

You are expected to attend all lectures, classes and workshops.

- You will receive key text books for autumn term modules only.

Compulsory VBA Module

For VBA, there is a two-hour workshop per week throughout the spring term.

The following sections will provide information about the Autumn and Spring term core modules.
Autumn Term Modules

3.10.1 BS1002 Financial Statistics (Autumn Term)

Module Instructor:
Name: Paolo Zaffaroni
Room: 53 Prince’s Gate - Room 4.02
Telephone: 020 7594 9186
Email: p.zaffaroni@imperial.ac.uk

Teaching Assistants:
Name: Adelina Barbalu
Email: a.barbalau@imperial.ac.uk

Module aim:
This module is intended to provide students with the essential tools of linear time series and
econometrics with applications to asset pricing and risk management.

Module outline:

1. Least squares estimation theory I
   a) Matrix formulation of the \( k \)-variable model.
   b) Inference in the \( k \)-variable equation.
   c) Testing linear hypothesis.
   d) Large sample properties of OLS.


3. Least squares estimation theory II
   a) Prediction.
   b) Generalized least squares.
   c) Nonlinear least squares.
   d) Instrumental variable estimators.

4. Application: least squares estimation of models for interest rates
   a) Splines.
   b) McCulloch (1975) model.
   c) Nelson-Siegel-Svensson model.

5. Maximum likelihood and method of moments estimation
   a) ML estimation of linear model.
   b) Generalized method of moments.

6. Application: ML estimation of single-factor models for the term structure
   a) Vasicek model.
7. Hypothesis testing
   a) Likelihood ratio (LR) test.
   b) Wald (W) test.
   c) Lagrange multiplier (LM) test.
   d) Testing non-nested hypotheses.


9. Linear Time Series
   a) Stationarity and lag operator.
   b) Linear processes: ARMA.
   c) Model Selection, Estimation and Diagnostic of ARMA($p$; $q$).
   d) Few remarks on stochastic non-stationarity.
   e) Regression-based tests of non-stationarity.
   f) Prediction of ARMA.

10. Kalman filter (we use a different book namely Hamilton (1994), Chapter 13)
    a) State-space representation of dynamic system.
    b) Main blocks of Kalman filter.
    c) Forecasting.
    d) ML estimation.

Key text:

The textbook for this module is:


Assessment:

- Coursework (15%)
- Exam (85%)
3.10.2 BS1016 Investments and Portfolio Management (Autumn Term)

Module Instructor:
Name: Robert Kosowski  
Room: 53 Prince’s Gate – Room 5.01C  
Telephone: 020 7594 3294  
Email: r.kosowski@imperial.ac.uk

Teaching Assistant:
Name: Chao Zhang  
Email: chao.zhang113@imperial.ac.uk

Module aims:
This module provides students with a critical understanding of important investment and portfolio management techniques used for portfolio management by fund managers, risk managers, banks’ trading desks, structured product groups, hedge funds, pension funds and other financial institutions. One of the strengths of the module is that it is accompanied by case studies and realistic practical examples that students are asked to solve each week using Matlab. Moreover, the module covers pricing and predictability of a large range of asset classes including equities, bonds, foreign exchange, commodities and hedge funds.

Students who have completed the module should be able to implement trading strategies, risk management techniques, stock selection, valuation and portfolio construction methods in a wide range of assets including equities, bonds, foreign exchange, commodities and derivatives.

Module outline:
The module covers static portfolio theory, market efficiency, factor models, return predictability, value-at-risk, tactical and strategic asset allocation, term structure of interest rates, carry trades, covered interest rate parity, spot-futures theorem, portfolio insurance/options, and stock selection. Portfolio performance measurement and the determinants of the information ratio are discussed in the context of mutual funds and hedge funds. Case studies include the asset allocation example of Harvard Management Company.

This module closely follows the excellent ‘Bodie, Kane and Marcus’ and ‘Cochrane’ textbooks to build a thorough foundation in investments and portfolio management. The textbook is complemented with more advanced material from research papers, case studies and selected chapters from other books.

Key Texts:
The two main text books are:

Assessment:
- Coursework (20%)
- Exam (80%)
3.10.3 BS1030 Risk Management and Valuation (Autumn Term)

Module Leader:
Name: Rustam Ibragimov
Room: 53 Prince’s Gate - Room 4.09A
Telephone: 020 7594 9344
Email: i.rustam@imperial.ac.uk

Module Instructor:
Name: Enrico Biffis
Room: 53 Prince’s Gate - Room 4.04
Telephone: 020 7594 9767
Email: e.biffis@imperial.ac.uk

Teaching Assistant:
Name: Yuxin Zhang
Email: y.zhang11@imperial.ac.uk

Module Outline:
- Identification of categories of risk faced by corporations, such as market, currency, credit, liquidity, operational, and reputational risks.
- The rationale for risk management: why is risk costly to firms; post-loss financing tools; hedging, insurance, and self-insurance.
- Regulation: Basel principles and standards for managing the key risk types faced by banks; Dodd-Frank and EMIR regulation for over-the-counter derivative markets; Solvency II regulation for insurers.
- Risk measures: Value-at-Risk (VaR) and other risk measures.
- Market risk: measuring and managing market risk; VaR models; stress-testing; derivative portfolios.
- Overview of credit risk: structural and reduced form models, rating systems and metrics, capital requirements
- Operational risk, definition and management, capital requirements

Key text:

Supplementary reading:

Assessment:
- Coursework (20%)
- Exam (80%)
3.10.4 BS1022 Stochastic Calculus for Finance (Autumn Term)

Module instructor:
Name: Pietro Millossovich (Visiting Lecturer)
Email: p.millossovich@imperial.ac.uk

Teaching Assistant:
Name: Daren Wei
Email: d.wei12@imperial.ac.uk

Module Aims:
This module intends to provide the students with the essential piece of knowledge in stochastic calculus and especially its continuous-time application to finance. A reasonable balance between rigorous mathematical proofs, intuitive explanations and real-life examples of the financial industry is achieved. Students are expected to have had some exposure to probability (random variables, distributions etc.) and ordinary calculus (differentiation, integration etc.) concepts.

Module Outline:
The module begins with a brief overview of the probability theory including indicatively Probability Spaces, Measures, Events, σ-algebra, Conditional Expectation, Radon-Nikodym derivative.

With this piece of machinery at hand, the module progresses to the introduction of Brownian Motion, Poisson Process, Martingales, Markov processes and the world of continuous-time stochastic calculus. Topics to be covered include Stochastic Integration, Ito Integral and Ito Isometry, the derivation and applications of Ito’s Lemma, Stochastic Differential Equations and the mechanics of various Stochastic Processes that are heavily used to solve problems of practical importance (e.g. arithmetic Brownian Motion, geometric Brownian Motion, Ornstein-Uhlenbeck, CIR, etc.).

Linking stochastic calculus with asset pricing and risk-neutral valuation involves the definition of concepts like the Martingale Representation Theorem and the Girsanov Theorem. The financial notions of self-financing portfolios, replication and risk-neutral pricing are developed and the Black-Scholes-Merton Partial Differential Equation is derived. The link between partial differential equations and stochastic processes via the Feynman-Kac formula is subsequently covered, which effectively gives a clear view of the fundamental formula for the pricing of contingent claims.

Subject to time constraints, further advanced topics will be potentially covered, like the Heston Stochastic Volatility framework (linked to implied volatility and volatility skew/smile), Jump processes and corresponding Stochastic Integration theory.

Key text:

Optional text:

Assessment:
- Coursework (20%)
- 2-hour closed-book final exam (80%)
Spring Term Core Modules

3.10.5 BS1033 Empirical Finance: Methods & Applications (Spring Term)

Module Leader:
Name: Karim Abadir
Room: 53 Prince’s Gate – Room 3.03
Telephone: 020 7594 3293
Email: k.m.abadir@imperial.ac.uk

Module Teaching Assistant:
Name: Ras Molnar
Email: r.molnar12@imperial.ac.uk

Module Aims:
The aim of this module is to introduce tools used to tackle key problems in empirical finance and economics. The lectures and tutorials are complementary. Tutorials contain new material that cements the knowledge acquired in the lectures, and the coursework gives you hands-on experience.

At the end of the notes for each lecture, you will find a section containing the material that is covered in the tutorials. In that final section, technical Remarks and Optional Exercises are not examinable. At the very end of the lecture notes (end of Lecture 8), you’ll find the few formulae that you need to memorize.

Topics covered:

   a. Density estimation, with application to hazard rates and to interest rates
   b. Nonparametric regression, with application to stock prices and volumes

2. Robust inference, with applications to interest rates and exchange rates [Het 5.3, 5.6.2, 5.6.4, 7.4.1 for part a; CLM 10.2 for part b; see references in the lecture notes for part c.]
   a. Robust estimation, recursive estimation, outliers, and breaks
   b. The term structure of interest rates: the expectation hypothesis (EH)
   c. Foreign exchange rates: the uncovered interest parity (UIP) theorem

3. Multivariate time-series models of the mean [Het 7.5--7.6 for part a; CLM 2.6 for part b.]
   a. Vector AR (VAR) models, error-correction mechanism (ECM), autoregressive distributed-lag (ADL), integration, co-integration, and spurious regressions
   b. Long memory

4. Application: predictability of the mean of asset returns [See references in lecture notes]
   a. Stock prices
   b. Present-value relations
   c. Economic value of predictability
5. Time-series models of the variance [CLM 12.2]
   a. Auto-regressive conditional heteroskedasticity (ARCH) models
   b. Stochastic volatility (SV)
   c. Multivariate extensions
   d. Applications: CAPM, value at risk, exchange rates

6. Parametric models for qualitative and limited dependent-variates [Het 6.1.1--6.1.4, 6.3]
   a. Qualitative dependent-variates: linear probability, probit, and logit models
   b. Models for truncated and censored variates, with an introduction to estimation
   c. Further estimation issues

   a. Generating pseudorandom numbers, variance-reduction techniques, and response surfaces
   b. Simulating the performance of estimators and tests
   c. Simulating option prices
   d. Resampling by the Jackknife and bootstrap: improved estimation and inference

   a. Exploratory data analysis (EDA) and parametric model specification
   b. Testing for misspecification (diagnostic tests)
   c. Model selection: general-to-specific methodology and encompassing
   d. An empirical example applying various tools learnt in this module

Key Text:

The lecture notes contain extensive material that does not require outside references. If you wish, you may also consult the following textbooks, the first for the methods and the second for the applications and most of the methods (except the methods of Lectures 3a, 6, 8).


A well-written and accurate introductory book is G.S. Maddala (2001) Introduction to Econometrics, Wiley. You may wish to consult it if you find gaps between this module and ones you have attended in earlier years.

Assessment:

- Coursework (15%)
- 2-hour closed book exam (85%)
3.10.6 BS1031 Financial Engineering (Spring Term)

Module Leader:
Name: Enrico Biffis
Email: e.biffis@imperial.ac.uk

Module Teaching Assistant:
Name: Engin Iyidogan
Email: e.iyidogan@imperial.ac.uk

Module Outline:
Definition: Financial engineering is the use of mathematical and computational methods to make trading, hedging, investment and risk management decisions.

Topics covered will include:
- Origin of derivatives markets and option pricing
- The Black-Scholes analysis in Equity Markets
- Replication, Hedging, Market incompleteness
- Fixed Income Markets and Interest Rate models
- Credit risk and Credit Default Swaps
- Credit Valuation Adjustment (CVA)
- Hints at Funding Valuation Adjustment (FVA)
- Post crisis valuation models
- Risk Measures and Derivatives
- Risk Measures: a case study
- Introduction to Optimal Execution and Algorithmic Trading

Teaching and learning methods:
Teaching and learning will be delivered through the use of lectures, readings, case studies using real life examples and class discussion.

Reading Materials:

Assessment:
- Coursework (20%) – details will be provided in class
- 2-hour closed-book final exam (80%)
3.11 Electives

There is a total of 27 contact hours for each elective. Electives are taught in the spring and summer terms.

Students choose and complete 4 electives, unless they get approval to do the Research Project (rather than the Applied Project) in which case they only take 3 electives.

KEY ELECTIVES

A number of modules within your programme will be designated as “Key” electives. These modules, whilst not compulsory, are considered to be central to your programme of study.

All students are required to choose a minimum of one ‘key’ elective.

ELECTIVES

Students should then choose three further electives (if completing the Applied Project) or two further electives (if completing the Research Project).

These additional modules can be selected from either the “Key” Electives or the Electives lists.

OPTIONAL ELECTIVES

Students who would like to learn more about C++ an optional module in the spring term.

Should you take and pass the optional C++ for Finance module, you will receive a certificate of completion. Your mark will not count towards your final grade and that module will not appear in the official transcript.

FURTHER INFORMATION

You will receive full information about the process of choosing your electives, and details of each module offered (including module outlines), via the Hub, during the autumn term.

Please Note: Electives run subject to student interest. Imperial College Business School reserves the right not to run electives that do not have sufficient student interest. Imperial College Business School reserves the right to change electives offered.
3.12 Final Project

The vast majority of students are expected to complete the Applied Project which has a practical focus and is designed for those who wish to pursue a career in a financial institution. For the small number of students who wish to follow an academic career and want to go on to a PhD programme, we offer the Research Project, which is more appropriate for this context.

Applied Project

This is a project undertaken by you independently, which you will work on over the Spring and Summer terms. In scope it is broadly equivalent to one elective and the work will be presented in a report of between 2,800 and 3,200 words.

Typically the Applied Project falls into one of these four categories:

- an equity evaluation,
- a quantitative analysis,
- an accounting topic, or
- writing a software application.

You will be issued with a booklet covering possible Applied Project topics and guidelines in December 2016. The final report must be submitted by 15 August 2017.

The Applied Project may involve an outside partner, such as a work placement sponsor or a prospective employer. Students who are successful in obtaining an approved work placement during July/August will automatically be transferred to the Applied Project (work-based) module. Work-based Applied Projects must be submitted by 31 August 2017.

Research Project

This is an original piece of academic financial research undertaken by you under the supervision of a member of academic faculty. You will work on the research project during the Spring and Summer terms and the research project must be submitted by 15 August 2017. In scope, the research project is broadly equivalent to two electives and the work will be presented in a report of a maximum of 10,000 words. You will be issued with a booklet on academic research project topics and guidelines in December 2016.

Leave of Absence

If you wish to leave the UK to take up an internship or do field work for your Applied or Research Project, you will be required to fill in a ‘Leave of Absence’ form, a copy of which can be found on the Hub. Your leave of absence will need to be approved by the Programme Director. If approval is granted, you must ensure that you update your address on student e-service. Further information about the approval process will be provided in the project guidelines.

Plagiarism

If your completed MSc project is discovered to contain verbatim material from other sources that have not been acknowledged, then this will be referred to the College authorities. If plagiarism is found to have taken place, your MSc qualification may be withdrawn (e.g. even if the plagiarism is discovered several years after submission). Please note that self-plagiarism is also disallowed (e.g. reusing your own essay or your other thesis/dissertation).
The Business School has produced a short course on plagiarism and this is available on the programme area on the Hub. This is a compulsory course and we expect you to have completed the course before you start writing your project report. You must also attend an additional, compulsory workshop in the summer term.

Further information on plagiarism is available in Section 4.3 of this Handbook and in the Academic Regulations & Policies document on the Hub.

Submission of your project

You must submit your project by the relevant deadline in August 2017. A plagiarism detection software will be used to check and test your project for plagiarism.

Late submission

Late submission will be allowed only for reasons of mitigating circumstance* such as serious illness (supported by a medical certificate) or death of a near relative. The option to defer submission to the following year is not available. The submission dates are inflexible deadline, so you should ensure you pace your work such that you can easily meet it.

If you fail to submit your project, or submit late without mitigating circumstances, you will be deemed to have failed your first attempt and will be given a further attempt in the next academic session. Your re-submitted report will be capped at the pass mark. Research Project students should also note that you will not have access to your academic supervisor after the original deadline.

* Further details on mitigating circumstances can be found in the 'Academic Regulations and Policies' document on the Hub.
4 INFORMATION FOR STUDENTS

4.1 Term Dates

The Department of Finance* dates for 2016/17 are:

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<thead>
<tr>
<th>Term</th>
<th>Start Date</th>
<th>End Date</th>
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<tbody>
<tr>
<td>September Term</td>
<td>Monday 5 September 2016</td>
<td>Friday 30 September 2016</td>
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<td>Test and Coursework Submission</td>
<td>3 – 7 October 2016</td>
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<td>Autumn Term</td>
<td>Monday 10 October 2016</td>
<td>Friday 9 December 2016</td>
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<td>Spring Term</td>
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<td>Exams</td>
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<td>Summer Term</td>
<td>Wednesday 19 April 2017</td>
<td>Friday 16 June 2017</td>
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<tr>
<td>Exams</td>
<td>19 June – 30 June 2017</td>
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<tr>
<td>Research and Applied Project (Desk-based) Submission deadline</td>
<td>15 August 2017</td>
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<td>Applied Project (Work-based) Submission deadline</td>
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<tr>
<td>Official End of Programme</td>
<td>31 August 2017</td>
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In addition, the following sessions will be held outside term time:

- **Valuation Workshop (Optional)**
  - Compulsory session for students who wish to take the 'Topics in Corporate Finance' elective in the Spring term
  - Sat 7 January 2017

- **International Elective 1:**
  - Introduction to Algorithmic Trading
  - Sat 25 March – Sat 1 April 2017

- **International Elective 2:**
  - Macroeconomics and Finance for Practitioners
  - Sat 1 – Sat 8 April 2017

* PLEASE NOTE:

The Department of Finance term dates may be different from other programmes in the Business School and/or in the wider Imperial College. Please, therefore, refer to the term dates above or those published on the Department of Finance webpages only.
4.2 Programme Director and Programme Team contact details

Students can contact the Programme Director for academic issues and they should contact the Programme Team for all other issues.

Email: rmfe.programme@imperial.ac.uk

Programme Team

Senior Programme Coordinator
Tracy Andrew
Tel: +44 (0)20 7594 9151
Room 3.05, 53 Princes Gate

Programme Coordinator
Sam McGarry
Tel: +44 (0)20 7594 1982
Room 3.05, 53 Princes Gate

Programme Coordinator (Cross-Programmes)
Lynette Dunford
Tel: +44 (0)20 7594 0885
Room 3.05, 53 Princes Gate

Assistant Director, Finance Programmes
Lisa Umenyiora
Tel: +44 (0)20 7594 9110
Room 3.05, 53 Princes Gate

Programme Director
Dr Lara Cathcart
Tel: +44 (0) 20 7594 9126
Room 3.09, 53 Princes Gate
4.3 Plagiarism and Cheating

Plagiarism is the presentation of another person’s words, ideas, judgement or data as though they were your own. For example:

- not referencing the source of your ideas or arguments when they are derived from your reading,
- taking verbatim the words of someone else’s work and putting it into your work without quotation marks and referencing,
- taking whole sections out of books, articles, lecture notes, other reports or students’ work, and including them in your report uncited.

When submitting your assessed coursework, via the Hub or in hardcopy, you will be required to confirm that you have read and understood the definition of plagiarism. Submitting the assignment will certify that the work presented is entirely your own, except where indicated. This includes your final project or essay as well as all other assessed work.

In relation to group work, you should be aware that you have a collective responsibility for the integrity of the piece of group work submitted for assessment. This means that if part of the work is plagiarised, all group members will be held accountable unless proof can be provided by each member of their contribution. You should, therefore, retain an audit trail of your contribution for this purpose.

The College has an online plagiarism module which has been designed to teach you everything you need to know about how to reference correctly and therefore avoid plagiarism. This is a compulsory module and we ask you to take this in the first term so that you reference correctly in your very first set of assignments. This online module contains such important information in helping you to avoid plagiarism that students who have not completed the module by the end of the first term will have their exam results for all modules withheld until the plagiarism module is successfully completed. There are a number of different penalties for plagiarism, dependent on the severity of the case and the weighting of the piece of work. Full information on plagiarism and cheating can be found in the Academic Regulations and Policies document on the Hub.

We strongly advise that you attend the Library referencing sessions and read the Harvard Referencing Guide, which can be found at http://www.imperial.ac.uk/admin-services/library/learning-support/reference-management/harvard-style/ Additional support and guidance is available from the Business Library Team (libbpd@imperial.ac.uk)

4.4 Module Excellence Surveys (MODES)

At the end of every module you will receive a survey (either by e-mailed link or paper hard copy), asking you to provide feedback on the content, instructor, learning environment and module overall. The School issues a survey per instructor and at the end of each term students are also asked to score and comment on the term as a whole.

The MODES feedback is taken very seriously and is used to identify examples of good practice and highlight areas that could be improved. The School really appreciates your support in completing the surveys. If only a small number of students respond, the feedback will not truly reflect the general thoughts of the cohort and therefore be less valid. MODES results are passed onto the lecturers, Programme Directors, Programme Managers, Department Heads, the Dean and the Associate Dean. Your feedback is completely anonymous and is not given to Faculty until they have completed and submitted their marking, so you can be assured that the feedback you provide will have no influence on the grades you receive. Once they have received the feedback, your Programme Director will post a response to the themes and issues raised in the MODES on the Hub.

At the end of each term the programme with the highest average response rate across the modules will be awarded a prize, details of which will be passed on by the Programme Team during the term.
## FINANCE DEPARTMENT CONTACT DETAILS

<table>
<thead>
<tr>
<th>Lecturer Details</th>
<th>Module(s) taught on Department of Finance Programmes</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Abadir, Karim</strong></td>
<td>Empirical Finance: Methods &amp; Applications (MSc Finance, MSc RMFE)</td>
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<td><strong>Allen, Franklin</strong></td>
<td>Brevan Howard Centre Director</td>
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<tr>
<td><strong>Andrikogiannopoulou, Angie</strong></td>
<td>Investments and Portfolio Management (MSc IWM)</td>
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<td>Derivatives (MSc Finance, MSc F&amp;A, MSc IWM)</td>
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<tr>
<td><strong>Buraschi, Andrea</strong></td>
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<tr>
<td><strong>Cathcart, Lara</strong></td>
<td>Advanced Options Theory (MSc Finance, MSc IWM, MSc RMFE)</td>
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<tr>
<td><em>Programme Director: MSc Finance &amp; MSc RMFE</em></td>
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<td><strong>Chemla, Gilles</strong></td>
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<td>Head of Department of Finance</td>
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<td>Miles, David</td>
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<td>Head of Department of Finance</td>
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</tbody>
</table>

**Course Offered:**
- **International Finance** (MSc Finance, MSc F&A, MSc IWM, MSc RMFE)
- **Financial Econometrics** (MSc Finance, MSc F&A, MSc IWM)
- **Management Accounting (MSc F&A)**
- **Financial Crises and Regulation** (MSc Finance, MSc F&A, MSc IWM, MSc RMFE)
- **Advanced Financial Statistics** (MSc Finance, MSc F&A, MSc IWM, MSc RMFE)
- **Risk Management and Valuation (MSc RMFE)**
- **Advanced Corporate Finance** (MSc Finance, MSc F&A)
- **Professor of Finance**
- **Introduction to Algorithmic Trading** (MSc Finance, MSc IWM, MSc RMFE)
- **Topics in Fintech Innovation** (MSc Finance, MSc F&A, MSc IWM, MSc RMFE)
- **Investments and Portfolio Management** (MSc Finance, MSc RMFE)
- **Wealth Management & Alternative Investments** (MSc Finance, MSc IWM, MSc RMFE)
- **Investments and Portfolio Management** (MSc F&A)
- **Macro Economics** (MSc IWM)
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<tr>
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<tr>
<td>Millossovich, Pietro</td>
<td>(Visiting Lecturer)</td>
<td>Stochastic Calculus for Finance  (MSc RMFE)</td>
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<td>Pagnotta, Emiliano</td>
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<td>Corporate Finance (MSc Finance, MSc F&amp;A) Introduction to Project Valuation (MSc IWM)</td>
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<td>Peydro (Alcalde) Jose Luis</td>
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<td>Robotti, Cesare</td>
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<td>Associate Professor of Finance</td>
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<td>Sundaresan, Savi</td>
<td>(from Jan 2017)</td>
<td>Assistant Professor</td>
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<td>Zaffaroni, Paolo</td>
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<td>Financial Modelling  (MSc Finance, MSc F&amp;A, MSc IWM, MSc RMFE) Financial Statistics  (MSc RMFE)</td>
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<td>Zis, Thalis</td>
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<td>VBA (MSc RMFE) VBA (Optional)  (MSc Finance, MSc F&amp;A, MSc IWM)</td>
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