Abstract

This document sets out the structure and regulations for the Applied Mathematics MSc Course 2016–17 at Imperial College London.

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1 General Information

1.1 The Department

The Department of Mathematics at Imperial College London is an internationally renowned department within one of the world’s most prestigious universities. Academic staff in the Department include several prize winners for mathematical excellence. The range of mathematical...
interests within the Department is broad, and is organised into four Sections with distinct research directions: Pure Mathematics, Applied Mathematics and Mathematical Physics, Statistics and Mathematical Finance.

The Applied Mathematics and Mathematical Physics (AMMP) Section currently contains more than 30 permanent members of staff. The section also contains a large number of PhD students working on all areas of applied mathematics. Research areas within the Section are broad, and include activities in Applied and Numerical Analysis, Biomathematics, Complexity Science, Dynamical Systems, Fluid Dynamics, Integrable Systems, and Mathematical Physics.

The Department has excellent facilities. There is a state-of-the-art Mathematics Learning Centre, located on Level 4 of the Huxley Building, which offers students a range of computing and study facilities. Extensive library facilities are available in the main College Library.

1.2 MSc Courses in the Department

The Department offers MSc courses in Applied Mathematics, Pure Mathematics, Mathematics and Finance, and Statistics. Further information about the MSc courses offered by the Department can be found at http://www.imperial.ac.uk/natural-sciences/departments/mathematics/study/admissions/postgraduate/.

1.3 Key members of Staff

- Prof. R. Craster (Head of Department)
- Prof. D. Evans (Director of Undergraduate Studies)
- Prof. H. Jensen (Director of Post Graduate Studies)
- Dr R. Barnett (Applied MSc Course Director)
- Prof. A. Skorobogatov (Pure MSc Course Director)
- Dr A. Jacquier (MSc in Mathematics and Finance Course Director)
- Dr E. Cohen (MSc in Statistics Course Director)
- Mr A. Santos (Postgraduate Administrator)
- Dr T. Bellotti (PG Tutor–Welfare)
- Ms L. Rowland (MSc Course Administrator)
- Ms H. Haines (Exams Officer)

1.4 MSc Room

There is a dedicated room for MSc students (Huxley 215). This room is reserved for students of the MSc in Statistics, the MSc in Pure Mathematics and the MSc in Applied Mathematics. Applied MSc students are also welcome to use the Mathematics Learning Centre (level 4 Huxley).

2 Useful Links

General
- Department of Mathematics: http://www.imperial.ac.uk/mathematics
- Applied Mathematics MSc: http://www.imperial.ac.uk/mathematics/study/admissions/postgraduate/msc/msc-in-applied-mathematics/
Procedures

- Academic and Examination regulations:
  [http://www.imperial.ac.uk/about/governance/academic-governance/regulations/](http://www.imperial.ac.uk/about/governance/academic-governance/regulations/)
- Mitigating circumstances policy and procedures:
  [http://www.imperial.ac.uk/about/governance/academic-governance/academic-policy/exams-and-assessment/](http://www.imperial.ac.uk/about/governance/academic-governance/academic-policy/exams-and-assessment/)
- The College’s Terms and Conditions:
  [http://www.imperial.ac.uk/students/terms-and-conditions/](http://www.imperial.ac.uk/students/terms-and-conditions/)
- Complaints and Appeals procedures:
  [http://www.imperial.ac.uk/about/governance/academic-governance/academic-policy/complaints-appeals-and-discipline/](http://www.imperial.ac.uk/about/governance/academic-governance/academic-policy/complaints-appeals-and-discipline/)
- Academic integrity:

Wellbeing and Support

- Information for students with disabilities, including the Disability Advisory Service:
- Student Support (Student Space):
  [http://www.imperial.ac.uk/student-space/](http://www.imperial.ac.uk/student-space/)
- Safety Department / Safety Services:
  [http://www.imperial.ac.uk/safety](http://www.imperial.ac.uk/safety)
- Centre for Academic English:
  [http://www.imperial.ac.uk/academic-english](http://www.imperial.ac.uk/academic-english)
- Information about the Library:
  [http://www.imperial.ac.uk/admin-services/library/](http://www.imperial.ac.uk/admin-services/library/)
- Imperial College Union (ICU):
  [http://www.imperialcollegeunion.org/](http://www.imperialcollegeunion.org/)
- Graduate Students’ Union (GSU):
  [https://union.ic.ac.uk/presidents/gsu/](https://union.ic.ac.uk/presidents/gsu/)
3 Key Dates

- Autumn Term: 1 October – 16 December 2016
- Spring Term: 7 January – 24 March 2017
- Summer Term: 29 April – 30 September 2017

4 MSc in Applied Mathematics

The Applied Mathematics MSc course is offered full and part-time. The full-time Applied MSc course lasts one calendar year, from October to September; the part-time course lasts two years.

4.1 Choice and Approval of Modules and Project

On enrolment, each student is assigned a Course Advisor, who will advise the student on module choices, which will be subject to approval by the Course Director, as well as the choice of project topic and Project Supervisor.

MSc students may take modules of two different types:

1. Those with codes M5, which are often also final year undergraduate MSci modules, as listed in Section 4.8 below.
2. Other modules approved by the the Course Director:
   (a) Up to 2 courses from the MSc in Pure Mathematics;
   (b) With permission from the Statistic MSc Director, 1 module from the MSc in Statistics;
(c) The module “Stochastic Processes” from the MSc in Mathematics and Finance;
(d) Under very exceptional circumstances, up to two modules may be taken from other
departments (if, for instance, such a course is directly relevant for the MSc project). Permission
will only be granted after internal discussion and with permission of the other Department. To request
permission to enrol in a module outside of the Mathematics Department, complete the form at https://goo.gl/hxohvy

Students may attend up to 9 modules, but will be examined in 8 modules (4 in each year
for part-time students). The choice of modules may not overlap in any important
aspect and together must form a coherent programme. Students will complete the
examination entry form early in Spring Term.

4.2 The Examination

The full-time course is examined in two sections:

1. The lecture modules are usually examined by written papers in May and/or June (or,
exceptionally, in January), though for some modules this written paper may be supple-
mented by coursework. Occasionally a module may be examined purely by project. You
will complete the Postgraduate Examination Entry Form with Ms Helen Haines early
in Spring Term (Ms Haines will email you a reminder). Candidates absent without good
cause from any examination for which they have entered will normally fail that module.

2. The project is examined by a written report and an oral presentation. This report
must be submitted by Thursday, 14 September 2017. The oral presentations will
take place on the 19th and 20th of September 2017. The oral presentation is an
integral part of the project work and is worth 10% of the project mark. It consists
of a 20 minute presentation plus a 5 minute question-and-answer session.

Part-time students will normally sit the written examinations in two parts, sitting 4 exami-
nations after their first year and sitting 4 examinations after their second year. The project
report must be submitted during September (precise date TBA) of the second academic year
for part-time students.

Past exam papers may be found at https://www.imperial.ac.uk/mathematics/study/
students/undergraduate/pastexampapers/. Students are encouraged to use these papers to
become familiar with the format and style of the examinations in the MSc. These papers may
also be used to supplement exam revision. Any queries about the examination for a particular
module should be directed in the first instance to the lecturer of that module. General exam
queries should be directed to the Course Administrator or Course Director.

Students may find out in July from the Course Administrator which modules they have
passed/failed, but exact marks cannot be released until after the Exam Board meeting in late
October.

4.3 Work on the Project

The project must be the study of some mathematical topic in applied mathematics at the
postgraduate level. The project may be on a topic in statistics if the student can find a suitable
supervisor in the Section of Statistics, but prior approval of the Course Directors should be
sought.

The written report must be the student’s own work in the sense that the student must give
an original account of the material. The work on the project is done under the direction of
a supervisor. A list of projects and prospective supervisors will be issued in Autumn Term.
We expect students to choose a project and a supervisor at the end of Autumn Term so that
they can start working on their project early on. Students unable to find a supervisor by the
beginning of Spring Term should consult with their Course Advisor and Course Director.

It is essential for the student and supervisor to agree on a timetable for the work on the
project. This should be done as early as possible. Students are expected to work on their
project throughout the academic year and after the end of the exams in May. Students who
leave all the work until after the written examination may find that their supervisor is not as
regularly available as in term-time, due to other research and personal commitments. Students
are advised to devote at least one month to writing up and revising the report. Work on the
project and writing the project report should account for about a third of the student’s total
study-time.

The purpose of the project is largely to train and test the student’s ability to work indepen-
dently. The supervisor will provide a reading list and give general guidance on the work for the
project and the writing of the report. The supervisor cannot be expected to provide a list of all
the individual results that should go in the report, although a few major items will probably be
mentioned. The student is strongly advised to pass a first draft of the report to the supervisor.

Reports should be typeset on A4-sized paper (typically using LaTeX). It is important that
students sign the declaration “The work contained in this thesis is my own work
unless otherwise stated”. Each report should include (i) a brief summary, (ii) an introduction
(iii) the main body of the report, and (iv) a bibliography. A report should normally consist of
30-60 pages. This is only a rough guideline: the appropriate length is a function of the project
itself and its subject matter. Excess length disproportionate to the content may be penalised.
Two copies of the report must be submitted to Ms Rowland by 14 September 2017.
Late submission will normally delay consideration of the report to the following
year.

Marking for the written report is weighted as follows. Presentation and Structure (basic
organisation, style, clarity, layout, typography) 30%. Basic Content (mathematical sophistica-
tion, accuracy, quality of exposition, referencing) 30%. Student Initiative and Further Work
(initiative, independence and originality, suitability of the work for wider dissemination) 40%.

In addition to submitting a written report, students will give an oral presentation, to take
place on 19-20 September 2017. The oral presentation is an integral part of the
project work and is worth 10% of the project mark. It consists of a 20 minute presenta-
tion followed by a brief question and answer session. Typically, presentations are computer-aided
(e.g. using LaTeX or Power Point generated slides), but using the white-board during a presenta-
tion is also permitted. If you plan a computer presentation, it is best to either bring a USB
drive containing your presentation, or leave your presentation in PDF format on your College
computer account where it can be accessed from the computer in the lecture room. The au-
dience will consist of two appointed staff members (other than your Supervisor). Additional
staff members as well as fellow students are also permitted (and encouraged) to attend. You
are strongly advised to prepare your oral presentation carefully, as it is an integral part of your
training. Bear in mind that you only have 20 minutes, and that you should not assume or
expect that the audience are experts in the area of your project. The purpose of the oral is not
(primarily) to test your technical mastery of the material, but rather to see how you can convey
main ideas and results in your work to a general mathematical public.

4.4 No Plagiarism

The College and Department are against all forms of plagiarism. While discussing among fellow
students and consulting relevant literature and internet resources to gain genuine understanding
are accepted as part of your learning process, producing coursework identical, or nearly identi-
tical, to others, or using materials from published literature and/or web sites without proper
acknowledgement will be viewed as plagiarism and be investigated. Once an act of plagiarism
is established, all parties involved will be penalised, which may include marks for coursework or project being zeroed and/or disciplinary actions by the Department and the College. Records of plagiarism and penalty imposed may be kept in the student records.

4.5 Title of Degree

Successful candidates will be awarded the degree of MSc in Applied Mathematics. A **Pass mark** will be awarded to students who

- Register for, and take the examination in, 8 module papers. Students must earn a pass mark (i.e., a score of at least 50%) in 6 module papers, with more than 40% in every paper, and score an average of at least 50% over all papers. A part-time student must register for, and take the examinations for 4 modules during each year, (8 in all). Part time students must earn a pass mark in at least 6 module papers, with more than 40% in each paper, and score an average of at least 50% over all papers. A student who earns below 40% in a module paper will have to resit that paper.
- Earn a pass mark (i.e., a score of at least 50%) in the project.

A **Merit mark** will be awarded to students who

- Earn a pass mark in all 8 module papers, with an average mark of 60% or above, and who score 60% or above on the project.

A **Distinction mark** will be awarded to students who

- Earn a pass mark in all 8 module papers, with an average mark of 70% or above, and who score 70% or above on the project.

MSc degrees are awarded only once each year, following the Examiners’ Meeting which is normally held by the end of October.

4.6 Resit Rights and Procedure

A full-time candidate who at first entry fails in either the written examination or the report, may re-enter once, a year later, in the failed section (or in both failed sections). There are no further resit rights.

A part-time candidate taking the examination in two parts who fails an examination in Part I of the examination may normally resit the examination one year later, at the same time as Part II. There are no further resit rights for Part I. A candidate failing an examination in Part II may resit the examination or the report (or both) a year later, with the Part I marks being carried over. There are no further resit rights.

Any resit that requires further attendance at the College is subject to the approval of the College. A **full-time candidate who fails the written examination, and intends to resit, should proceed with the report and submit it by 14 September of the same year**. A part-time candidate must submit the project by in September of the second year. **Students must, before the end of January, inform Ms Haines the modules that they intend to resit.**

4.7 Mitigating Circumstances

If you want mitigating circumstances to be taken into account, you need to fill in the appropriate mitigating circumstances form and submit it to the MSc Administrator within 5 working days of the examination or coursework submission date. Forms for Mitigating Circumstances are available on the registry webpage. During term time they are also available in front of the Undergraduate Maths Student office.
### 4.8 Applied MSc Modules

This is the list of M5 modules on offer in 2016–17. Modules will run provided there is sufficient demand. Descriptions of these courses are provided on the Applied Mathematics MSc webpage: [http://www.imperial.ac.uk/mathematics/study/admissions/postgraduate/msc/msc-in-applied-mathematics/applied-courses-2016-2017/](http://www.imperial.ac.uk/mathematics/study/admissions/postgraduate/msc/msc-in-applied-mathematics/applied-courses-2016-2017/)

#### Term 1

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<thead>
<tr>
<th>Module Code</th>
<th>Module Name</th>
<th>Lecturer</th>
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<tbody>
<tr>
<td>M5A2</td>
<td>Fluid Dynamics 1</td>
<td>Prof Ruban</td>
</tr>
<tr>
<td>M5A6</td>
<td>Special Relativity and Electromagnetism</td>
<td>Dr Pruessner</td>
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<tr>
<td>M5A16</td>
<td>Geometric Mechanics</td>
<td>Prof Holm</td>
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<td>M5A42</td>
<td>Applied Stochastic Processes</td>
<td>Prof Pavliotis</td>
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<td>M5A43</td>
<td>Inference, Control and Driving in Natural Systems</td>
<td>Dr Jones</td>
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<td>M4A49</td>
<td>Mathematical Biology</td>
<td>Dr Tettaman-Boshier</td>
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<td>M5M3</td>
<td>Introduction to Partial Differential Equations</td>
<td>Dr Zatorska</td>
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<td>M5M6</td>
<td>Methods of Mathematical Physics</td>
<td>Dr Marshall</td>
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<td>M5M7</td>
<td>Asymptotic Analysis</td>
<td>Prof Wu</td>
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<td>M5M9</td>
<td>Applied Functional Analysis</td>
<td>Prof Degond</td>
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<tr>
<td>M5PA23</td>
<td>Dynamical Systems</td>
<td>Dr Rasmussen</td>
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<td>M5PA38</td>
<td>Advanced Dynamical Systems (Seminar Course)</td>
<td>Prof Lamb</td>
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<td>M5PA48</td>
<td>Dynamics of Games</td>
<td>Prof Turaev</td>
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<td>M5N7</td>
<td>Numerical Solution of ODEs</td>
<td>Dr Shevchenko</td>
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<td>M5N9</td>
<td>Computational Linear Algebra</td>
<td>Dr Keaveny</td>
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<td>M5F22</td>
<td>Mathematical Finance: An Introduction to Option Pricing</td>
<td>Prof Bingham</td>
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</table>

#### Term 2

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<tr>
<th>Module Code</th>
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<tr>
<td>M5A4</td>
<td>Mathematical Physics I: Quantum Mechanics</td>
<td>Dr Jevtic</td>
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<tr>
<td>M5A7</td>
<td>Tensor Calculus and General Relativity</td>
<td>Dr Barnett</td>
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<tr>
<td>M5A10</td>
<td>Fluid Dynamics 2</td>
<td>Prof Hall</td>
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<td>M5A28</td>
<td>Introduction to Geophysical Fluid Dynamics</td>
<td>Dr Berloff</td>
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<td>M5A29</td>
<td>Theory of Complex Systems</td>
<td>Prof Jensen</td>
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<td>M5A30</td>
<td>Hydrodynamic Stability</td>
<td>Prof Mughal</td>
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<tr>
<td>M5A32</td>
<td>Vortex Dynamics</td>
<td>Prof Crowdy</td>
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<tr>
<td>M5A34</td>
<td>Dynamics, Symmetry and Integrability</td>
<td>Prof Holm</td>
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<td>M5A44</td>
<td>Computational Stochastic Processes</td>
<td>Prof Pavliotis</td>
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<tr>
<td>M5A47</td>
<td>Finite Elements: Numerical Analysis and Implementation</td>
<td>Dr Cotter, Dr Ham</td>
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<tr>
<td>M5M8</td>
<td>Advanced Topics in PDEs</td>
<td>Prof Degond</td>
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<td>M5PA24</td>
<td>Bifurcation Theory</td>
<td>Prof Turaev</td>
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<td>M5PA36</td>
<td>Ergodic Theory (Seminar Course)</td>
<td>Dr Rasmussen</td>
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<td>M5PA50</td>
<td>Introduction to Riemann Surfaces and Conformal Dynamics</td>
<td>Dr Bianchi</td>
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<td>M5N10</td>
<td>Computational Partial Differential Equations</td>
<td>Prof Mestel</td>
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