Imperial College
London

Faculty of Natural Sciences
Department of Mathematics

UG Programmes

STUDENT HANDBOOK
2018-19
1. Introduction to the Department ................................................................. 5
   Academic and administrative staff .......................................................... 6
   Maths Central & Departmental Notifications ........................................... 7
   Key dates 2018–19 ................................................................................... 8
2. Programme information ............................................................................. 9
   The Department of Mathematics .............................................................. 9
   The Purpose, Objectives and Relevance of the Undergraduate Degree Programme ................................................................. 9
   Undergraduate Degree Courses ............................................................... 10
   Degree Programme Requirements ......................................................... 11
   Degree Changes ...................................................................................... 12
   English language requirement ............................................................... 13
   Year Programmes .................................................................................... 14
   First Year Programme ............................................................................. 15
   Second, Third and Fourth Year Programmes ........................................... 20
   Second Year Programme ....................................................................... 21
   Third and Fourth Year Programmes ....................................................... 22
   Academic Structure and Support ........................................................... 29
   Lectures ................................................................................................. 29
   Problem Sheets ...................................................................................... 30
   Problems Classes ................................................................................... 30
   Meet Your Marker ................................................................................. 31
   Office Hours .......................................................................................... 31
   Personal Tutorials .................................................................................. 31
   Peer Tutorial Support Classes ............................................................... 31
   Imperial Mobile app ............................................................................... 32
   Imperial Success Guide ......................................................................... 32
3. Assessment .................................................................................................. 33
   Forms of Assessment ............................................................................. 33
   Submitting Assessed Work ....................................................................... 33
   Feedback to Students on Work .............................................................. 36
   Instruction to Candidates for Examinations ............................................. 36
Support for disabled students ................................................................. 65
Support for international students ....................................................... 66
Advice Services ....................................................................................... 66
  Library and IT ..................................................................................... 67
  Religious support ............................................................................. 68
11. Student Records and Data ................................................................. 69
12. Work-life balance ............................................................................ 70
Imperial College Union ............................................................................ 70
  Physical Activity Sport ..................................................................... 70
  Maths Activities outside the Curriculum ......................................... 70
13. Student feedback and representation .............................................. 72
14. Student surveys ............................................................................... 73
15. And finally ....................................................................................... 74
  Alumni services ................................................................................ 74
  Opportunities for further study ....................................................... 74

Please note that material in the Handbook is subject to change. Updates will be posted on Maths Central on Blackboard. https://bb.imperial.ac.uk
Welcome to the College

Congratulations on joining Imperial College London, the only university in the UK to focus exclusively on science, medicine, engineering and business.

From Fleming’s discovery of Penicillin to Gabor’s invention of holography, Imperial has been changing the world for well over 100 years.

You’re now very much a part of this community of discovery and we hope you will take this opportunity to make your own unique contribution.

We’re committed to providing you with the very best academic resources to help you reach your true potential.

We also provide a dedicated support network and a range of specialist support services to make sure you have access to the appropriate help, whether that’s further training in an academic skill like note taking or simply having someone to talk to.

We actively encourage you to seek out help when you need it and try to maintain a healthy work-life balance. Our choice of over 380 clubs, societies and projects is one of the largest of any UK university, making it easy to do something different with your downtime. You also have access to gym and swimming facilities (for an annual fee of £30 in 2018-19) across our campuses.

Our Principles

In 2012 the College and Imperial College Union agreed ‘Our Principles’ a series of commitments made between students and the College. The Principles are reviewed annually by the Quality Assurance and Enhancement Committee and changes recommended for Senate approval.

Imperial will provide through its staff:
- A world class education embedded in a research environment
- Advice, guidance and support
- The opportunity for students to contribute to the evaluation and development of programmes and services

Imperial will provide students with:
- Clear programme information and assessment criteria
- Clear and fair academic regulations, policies and procedures
- Details of full programme costs and financial support
- An appropriate and inclusive framework for study, learning and research

Imperial students should:
- Take responsibility for managing their own learning
- Engage with the College to review and enhance provision
- Respect, and contribute to, the Imperial community

The Imperial College Students’ Union will:
- Support all students through the provision of independent academic and welfare assistance
- Encourage student participation in all aspects of the College
- Provide a range of clubs, societies, student-led projects and social activities throughout the year
- Represent the interests of students at local, national and international level

www.imperial.ac.uk/students/our-principles
Hello and welcome to Imperial!

You’re about to have a brand new start and set off on the next part of your learning career, so on a personal note from me, congratulations on your choice of university because what better place to be than here!

Here at Imperial we really try to live up to the cliché of “something for everyone” and offer as wide and diverse an experience as possible. Imperial College Union is here for all of your needs right from the word go, through your studies and beyond.

Imperial College Union is proud to say we’re an organisation for students, led by students, tackling issues that matter to students. You’ll see your five Officer Trustees, one of which is myself, around our campuses, on posters and sending you all emails. We’re a group of five students that have taken time out of our studies to represent you. If you ever have questions or ideas that your department can’t help with, we’re normally a great place to start.

We have over 380 clubs and societies for you to get involved in which is a great chance to try something new over your time at Imperial. We run your academic and wellbeing representative networks as well as help with student-led campaigns on issues that matter to you. We offer a wide range of volunteering opportunities and have an entire team dedicated to your personal development.

No matter what problems you have or opportunities you are looking for, Imperial College Union is here to help. We’re located on Level 2 in Beit Quadrangle or you can check out our website for more information.

Have a great year and I will see you around.

Rob Tomkies

*Imperial College Union President 2018-19*

union.president@imperial.ac.uk

imperialcollegeunion.org
1. Introduction to the Department

Welcome to the Department of Mathematics at Imperial College London!

The Department has a very strong reputation, both nationally and internationally, for the high quality of its degrees and Research. You are now part of that process – on a daily basis you will be interacting with researchers in the forefront of a wide range of mathematical disciplines, as well as with other good mathematicians of your age. To maintain the standard of the programme, however, it is necessary to set high standards for you to achieve.

The programme is challenging and adjustment from school to university mathematics is not easy. Although many of the topics you meet in the First Year may be familiar, do not fall into the trap of thinking “I already know this” and so failing to take on board new ideas. You need to develop a deeper insight into even the simplest concepts and should acquire a feel for rigorous mathematical argument. We will also require you to be able to perform the basic mathematical tasks quickly and clearly, without formula sheets or calculators. Try to avoid leaving gaps in your knowledge – the Second and Third Year material requires a firm foundation. If, for example, you decide “I can pass the First Year without understanding much about complex numbers”, you will find some of the later modules very difficult indeed. In order to progress from one year to the next, it is necessary to pass all programme elements.

This booklet contains much information and advice about the various mathematics courses. This is your personal copy – keep it safe, you may want to refer to it during your years here, although most of what is contains can be found on Maths Central pages of Blackboard. Some of the details about the Second, Third and Fourth Years may change in future but the big picture should remain as described here.

Above all, you should enjoy mathematics, both doing it yourself and learning about it from others. If you never come away from a lecture thinking “wow, that’s a really cool result” or “that makes perfect sense – it all fits together beautifully” you will be missing out on a large part of the experience. We hope and trust you have a successful and rewarding time here.

A Rigorous Mathematical Argument

You’re not being rational. Oh get real.

Professor David Evans  Director of Undergraduate Studies  October 2018
**Academic and administrative staff**

Contact details for Department of Mathematics staff members can be viewed on Blackboard Maths Central in the General Information section, under Contacts (https://bb.imperial.ac.uk).

or online at:

http://www.imperial.ac.uk/natural-sciences/departments/mathematics/about-us/people/

Staff research interests can be viewed online at:

http://www.imperial.ac.uk/natural-sciences/departments/mathematics/research/

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Maths Central & Departmental Notifications

All current programme information is available for students on the Maths Central page of Blackboard. If any information is missing, students should contact Inkeri Hibbins.

Important Year and programme announcements will be sent by email to students’ Imperial email addresses. Please check this email account daily.

Notices may also be posted on the Departmental noticeboards around the building as well as on Blackboard on Maths Central or individual module pages.

Attendance and absence

It is a College regulation that students are required to attend to the satisfaction of the Head of Department. Missed attendances will be recorded in the student’s file.

You must inform your Year Tutor if you are absent from the College for more than three days during term. If the absence is due to illness you must produce a medical certificate after seven days. For any absence longer than five days you must consult the Undergraduate Senior Tutor. If you miss an examination through illness you must contact your Undergraduate Senior Tutor on the day and provide a medical certificate within five working days. If illness has impacted on your ability to take assessment, you should seek advice and support about making a claim for mitigating circumstances. Please note that there is a deadline of 5 working days from the date the assessment is due (hand-in date or examination date for example) to make a claim.

The Registry will be informed of all student non-attendances as the College is obliged to report the non-attendance of students on Tier 4 visas to the Home Office.

Departmental information:

Students must not miss compulsory meetings or events without prior permission to do so.

You should inform the relevant person in advance if you are going to miss an assessed work deadline or progress test or an appointment. Please email academic members of staff directly if you cannot make an appointment.

If you miss a certain number of appointments/compulsory Year or Tutor meetings, you will be called in for a meeting by the Year Tutor/Undergraduate Senior Tutor. Should your attendance not improve, you may be asked to withdraw from the College.

Attendance in 2018-2019 is recorded at: start of Year Meetings, Personal Tutor Meetings, Tests and CW hand-ins, Examinations and Project supervisory meetings/presentations.
Key dates 2018–19

Term dates
Autumn term: 29 September - 14 December 2018
Year 1 Induction: 1 October, 9.30am, Clore (continuing throughout weeks 1-2)
Start of Year Meetings (Yrs 2-4): 3 October
(9.30am Year 2, 10.30am Year 3, 11.30am Year 4)
Meet Your Personal Tutor Week (Yrs 2-4): 15-19 October & 19-23 November

Spring term:
5 January - 22 March 2019
January Tests (Year 1): 7 - 8 January 2019
Meet Your Personal Tutor Week (Yrs 2-4): 21-25 January & 25 February – 1 March

Summer term:
27 April- 28 June 2019
Meet Your Personal Tutor Week (Yrs 1-2, 3 continuing on MSci): 3 – 7 June
Examinations May – June 2019 (exact dates to be confirmed in 2019)
Project Dates
28 May – 21 June (Year 1)
28 May – 19 June (Year 2)
12-14 June (Year 3&4 Project orals)
11 June (Year 3&4 Project due date)

Board of Examiners 28 June 2019

Closure dates
Christmas/New year: 24 December 2018 – 1 January 2019
(College reopens on 2 January 2019)
Easter holiday: 18 April – 23 April 2019
(College reopens on 24 April 2019)
Early May bank holiday: 6 May 2019
Spring bank holiday: 27 May 2019
Summer bank holiday: 26 August 2019
2. Programme information

The Department of Mathematics

The principal aims of the Department of Mathematics are to train professional mathematicians, to pursue the study of scientific and technological problems by mathematical methods and to provide mathematical skills that will be useful to those who wish to take up scientific and other jobs or to undertake research in the various branches of the subject. The Department is large, with over 650 undergraduates, over 350 postgraduates and over 70 academic staff. The range of modules available is both wide and deep.

The Department is in the Faculty of Natural Sciences in the College. We have a large degree of autonomy but in many respects we are constrained by Faculty or College regulations.

We are also guided by College Principles and expect our students to work with us and develop a maturity of outlook, including responsibility for and control of their own learning.

Further information about College Principles can be found online at:

http://www.imperial.ac.uk/students/our-principles/

The Purpose, Objectives and Relevance of the Undergraduate Degree Programme

What is mathematics?

The general perception is that ‘mathematics is using numbers’. This is imprecise and incomplete. A better description might be that ‘mathematics is the science of patterns’ although important features are abstraction (looking at basic ideas and constructs) and precision of calculation and of argument.

The degree programmes within the Department of Mathematics have been structured in order to make the study of mathematics an enriching and enjoyable experience. While the First Year is underweighted for Honours in comparison with later years, the compulsory and option material is progressive throughout the programme so that a solid understanding needs to be developed and maintained.

Learning needs to be ‘active’ rather than ‘passive’. Mathematics is not a spectator sport. The very lifeblood of mathematics is contained in doing problems and this often involves trying to break down a difficult task into a sequence of more straightforward ones. Ideally, learning should be aimed to be ‘deep’, involving strong understanding of the structure and interrelationship of knowledge, rather than ‘shallow’, where the emphasis is on pure memory work.

The overall objectives of the undergraduate degree programme are:

- to present a wide range of mathematical ideas, to encourage enthusiasm for the subject as a discipline that is of value in its own right and, at the same time, to develop students’ critical and intellectual abilities
- to provide a good knowledge of basic mathematics and a more advanced knowledge of selected parts of the subject for those students who wish to pursue mathematics, or other scientific or engineering disciplines, to research level
- to provide mathematical and communication skills that will be useful to those who wish to take up scientific or other jobs.

The compulsory parts of the degree programme aim to give an appropriate balance between ‘mathematics for its own sake’ and ‘mathematics for applications’.

The subject requires considerable effort and perseverance over an extended period for success to be achieved. However, that success stays for a lifetime - it is worthwhile in its own right and is rightly valued by employers. The skills developed as part of mathematics degrees, including experience in
computation and communication, are extremely relevant to the needs of society, rendering graduates eminently suited to successful technical, managerial and other careers.

The College has extensive Qualitative Assurance procedures concerning the content, delivery and assessment of programmes. Programme Specifications for the BSc/MSci degree programmes detailed here have been constructed in accord with the Quality Assurance Agency Subject Benchmarking for Mathematics, Statistics and Operational Research.

Further information about quality assurance can be viewed online at:
https://www.imperial.ac.uk/about/governance/academic-governance/senate-subcommittees/

Further information about programme specifications can be viewed online at: http://www.imperial.ac.uk/staff/tools-and-reference/quality-assurance-enhancement/programme-information/programme-specifications/

**Undergraduate Degree Courses**

<table>
<thead>
<tr>
<th>Degrees on Offer</th>
<th>BSc 3 Year</th>
<th>MSci 4 Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mathematics</td>
<td>G100</td>
<td>G103</td>
</tr>
<tr>
<td>Mathematics with Mathematical Computation</td>
<td>G102</td>
<td>-</td>
</tr>
<tr>
<td>Mathematics (Pure Mathematics)</td>
<td>G125</td>
<td>-</td>
</tr>
<tr>
<td>Mathematics with Applied Mathematics/Mathematical Physics</td>
<td>G1F3</td>
<td>-</td>
</tr>
<tr>
<td>Mathematics with Statistics</td>
<td>G1G3</td>
<td>-</td>
</tr>
<tr>
<td>Mathematics with Statistics for Finance</td>
<td>G1GH</td>
<td>-</td>
</tr>
<tr>
<td>Mathematics, Optimisation and Statistics</td>
<td>GG31</td>
<td>-</td>
</tr>
<tr>
<td>Mathematics with a Year Abroad</td>
<td>-</td>
<td>G104</td>
</tr>
</tbody>
</table>

(Includes study abroad year at a partner institute in Europe/North America)

The Department offers seven BSc Honours degrees and two MSci Honours degrees. The first two years of the BSc and MSci degrees are essentially the same so there is some opportunity for transfer between these degrees.

The overall objectives within the various degree programmes are to give excellence in chosen areas of study, to impart basic knowledge of other areas, to give basic competence in certain marketable skills and to instil and maintain enthusiasm.

In order to achieve this aim the undergraduate degree programme remains under continuous review with respect to overall structure, individual module content and teaching methods. In particular, the Department is planning to introduce a revised programme structure for students starting in 2019-20. **Students who start in 2018-19, but then interrupt their studies will therefore have a different programme structure when they resume their studies. They may need to study a small amount of additional material to adjust to the new programme structure.**

**BSc Degrees:** Every graduating student qualifies for a BSc G100 Mathematics degree. Alternatively, they may opt for a specialist degree – G102, G125, G1F3, G1G3, G1GH or GG31 [see below for further information].

**MSci Degrees:** The MSci is essentially an undergraduate ‘Masters’ degree with a final year at the level of a taught postgraduate MSc programme. On successful completion, a degree title on the lines of ‘Master in Science (incorporating Bachelor’s level study)’ is awarded. The department offers two MSci degrees – G103 and G104.
G103: The primary criterion for eligibility to remain on G103 is to achieve a year total of at least 60 percent in Second Year. Students who score 60 percent in Second Year, 58 percent in Third Year and pass all their Third Year modules, have the automatic right to continue on to the Fourth Year of the MSci degree. Anyone scoring less than 58 percent in their Third Year, or who fails a module, does not have this right and may be graduated with a BSc at the Department’s discretion.

Those who score less than 60 percent in their Second Year may be allowed to remain on G103 at the Undergraduate Senior Tutor’s discretion but will have conditions set for their Third Year performance that take precedence over the rule above, and will normally require a 3rd year total of 65 percent or more.

G104: Students registered for G104 Mathematics with a Year Abroad spend their Third Year (of four) studying mathematics modules/project material at another institution. At the end of Second Year, students must be in a position to take advantage of the Third Year of the course, both mathematically (students must score 60 percent or above in Second Year) and linguistically [see section 5 of this Handbook on G104].

Note: Whilst G104 students must pass the language examinations at the end of First and Second Year in order to stay on G104, language examination results do not directly contribute to their mathematics degree Honours mark.

Selection of second-year students wishing to spend their third year abroad at MIT will take place early in Spring term.

Note: Some modules are also attended by students on the Joint Mathematics and Computer Science degree.

The First Year, and most of the Second Year, course of study is common to all the degree codings. The overall programme design is such that the modules, from which individual choices are expected to be made in the later Third (and possibly Fourth) Year of study, mainly fall into the various subject groups: Pure Mathematics, Applied Mathematics, Mathematical Physics, Numerical Analysis, Statistics and Mathematical Methods. Students may choose freely from the overall set of modules available to them (subject to Departmental approval). There is considerable flexibility so that individual students may remain broad in their interest or become more specialised. A final choice of degree registration among G100, G102, G125, G1F3, G1G3, G1GH and GG31 is not necessary until the commencement of Final Year studies.

Degree Programme Requirements

Every graduating student qualifies for a BSc G100 Mathematics degree. To qualify for a degree a student must satisfy the overall College requirements. To qualify for the BSc specialist degrees, G102, G125, G1F3, G1G3, G1GH or GG31, a suitable number of lecture modules must eventually be passed from subsets of the general list to follow.

A student who does not satisfy the requirements for a specialist degree, but who does satisfy the overall requirements, will be awarded a BSc degree in G100 Mathematics. Very occasionally, circumstances may require the Department to graduate an MSci student with a BSc.

As part of the continuing review of the undergraduate programme of study, amendments to this list can be expected, including changes in module numbering. Not all of the individual modules listed below are offered every session.
<table>
<thead>
<tr>
<th>Code</th>
<th>Requirement</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>G102</td>
<td>4 from Mathematics with Mathematical Computation</td>
<td>M3N7, M3N9, M3N10, M3SC, M3R, M3C, M3A47, M3A50</td>
</tr>
<tr>
<td>G125</td>
<td>6 from Mathematics (Pure Mathematics)</td>
<td>M2PM5, M3P5, M3P6, M3P7, M3P8, M3P10, M3P11, M3P12, M3P14, M3P15, M3P17, M3P18, M3P19, M3P20, M3P21, M3P22, M3P23, M3P60, M3P65, M3R.</td>
</tr>
<tr>
<td>G1F3</td>
<td>6 from Mathematics with Applied Mathematics/Mathematical Physics</td>
<td>M2AM, M3A2, M3A4, M3A6, M3A7, M3A47, M3A10, M3PA16, M3F22, M3A28, M3A29, M3A49, M3A50, M3A52, M3PA34, M3M6, M3M7, M3M11, M3PA23, M3PA24, M3PA48, M3SC, M3R.</td>
</tr>
<tr>
<td>G1G3</td>
<td>6 from Mathematics with Applied Mathematics/Mathematical Physics</td>
<td>M2AM, M3A2, M3A4, M3A6, M3A7, M3A47, M3A10, M3PA16, M3F22, M3A28, M3A29, M3A49, M3A50, M3A52, M3PA34, M3M6, M3M7, M3M11, M3PA23, M3PA24, M3PA48, M3SC, M3R.</td>
</tr>
<tr>
<td>G1GH</td>
<td>6 from Mathematics with Applied Mathematics/Mathematical Physics</td>
<td>M2AM, M3A2, M3A4, M3A6, M3A7, M3A47, M3A10, M3PA16, M3F22, M3A28, M3A29, M3A49, M3A50, M3A52, M3PA34, M3M6, M3M7, M3M11, M3PA23, M3PA24, M3PA48, M3SC, M3R.</td>
</tr>
<tr>
<td>GG31</td>
<td>6 from Mathematics with Applied Mathematics/Mathematical Physics</td>
<td>M2AM, M3A2, M3A4, M3A6, M3A7, M3A47, M3A10, M3PA16, M3F22, M3A28, M3A29, M3A49, M3A50, M3A52, M3PA34, M3M6, M3M7, M3M11, M3PA23, M3PA24, M3PA48, M3SC, M3R.</td>
</tr>
</tbody>
</table>

**MSci Courses**

**G103/G104**

Mathematics/Mathematics with a Year Abroad

A substantial Fourth Year project is compulsory. Almost all 4th Year examinations are 2.5 hour long.

Students are normally required to maintain a good level of performance in Mathematics (60% or greater) in order to remain on this coding in their Third and Fourth Year.

**G104**

Mathematics with a Year Abroad

A four year course with the Third Year spent studying at a host institution outside the UK.

At the end of Second Year, students must be in a position to take advantage of the Third Year of the course, both mathematically and linguistically.

On the rare occasion that a G104 student performs very poorly in their year away they may, at the discretion of the Undergraduate Senior Tutor, be transferred to the BSc G100 Mathematics degree and take M3 subjects in their Final Year.

**Note:** The Department of Mathematics has the discretion to modify the normal requirements in special cases.

All degrees are subject to the College Academic Regulations and can be viewed online at: [http://www.imperial.ac.uk/about/governance/academic-governance/regulations/](http://www.imperial.ac.uk/about/governance/academic-governance/regulations/)

**Degree Changes**

Students are able to change between mathematics degrees within certain constraints mentioned elsewhere in this document. By default, students who do not meet the requirements for a speciality degree (G102, G1F3, G1G3, G125, GG31 or G1GH) will graduate on the G100 code. We do not
encourage students who would prefer the speciality degree but who believe they will not qualify for the speciality degree to transfer to G100 of their own accord, as the Department does have the discretion to modify the normal requirements in special cases.

International students on a Tier-4 visa are advised to consult the International Student Support Office prior to making ANY degree change as you may be required to apply for a new visa (outside of the UK).

To request a degree change, students must complete a Degree Change form which can be found on Blackboard MathsCentral or outside the UG Office. The form must be printed and completed as we require a handwritten signature in order to process the request.

**Transfer from BSc to MSci**

In order to change, from a BSc to an MSci degree after First Year, see more information of mark requirements on page 10-11 of this Handbook.

**Transfer into MSci G104 Mathematics with a Year Abroad**

Students on one of the other degrees may be able to transfer into G104 if they can satisfy the Department of their language skills (if wishing to go to a partner institution in Europe) and have good examination results. Normally such transfers will be considered at the end of the First Year of study. Students should make their interest known as early as possible so that funding for any additional year can be obtained. Selection for the Year Abroad at MIT takes place in the second year. Places are limited.

**DEADLINE FOR DEGREE TRANSFERS EACH ACADEMIC YEAR:** 31st of March

**English language requirement**

If you are not a native English speaker you must meet the College’s English language requirements. See the Admissions website for details:

- www.imperial.ac.uk/study/ug/apply/requirements/english

For information on English language support available while you’re here, see page 66.

For students who are identified as benefiting from extra language support through the English language test given at the beginning of Term 1, English language classes are timetabled in addition to the Mathematics modules. Attendance is compulsory. Good working knowledge of English is seen as vital to success on the programme.
## Year Programmes

The academic programme takes place over three terms – Term 1 (also known as Autumn Term), Term 2 (also known as Spring Term) and Term 3 (also known as Summer Term).

### 1st Year (BSc/MSci) - M1

<table>
<thead>
<tr>
<th>8 compulsory modules</th>
</tr>
</thead>
<tbody>
<tr>
<td>+ Mathematical Computation M1C</td>
</tr>
<tr>
<td>+ compulsory M1R Individual Poster Project with oral presentation (in Term 3)</td>
</tr>
<tr>
<td>+ language (if required) for G104</td>
</tr>
<tr>
<td>+ English language (if required)</td>
</tr>
</tbody>
</table>

### 2nd Year (BSc/MSci) - M2

<table>
<thead>
<tr>
<th>7 compulsory modules</th>
</tr>
</thead>
<tbody>
<tr>
<td>+ 1 option module (M2PM5, M2AM or M2S2)</td>
</tr>
<tr>
<td>+ compulsory M2R Group Project with oral presentation (in Term 3)</td>
</tr>
<tr>
<td>+ language (if required) for G104</td>
</tr>
</tbody>
</table>

### Final Year (BSc) – M3

8 modules from a wide range of M3 modules, M2 option modules, Centre for Languages, Culture and Communication modules and Business School modules.

### Third Year (MSci) – M3

≥ 60% required

8 modules from a wide range of M3 modules, M2 option modules, Centre for Culture, Languages and Communication modules and Business School modules.

### Graduation

Mathematics with a Year Abroad

Third Year (of four) spent at a partner institution.

### Final Year (MSci) – M4

6 modules from a wide range of M4 modules, Centre for Culture, Languages and Communication modules and Business School modules + compulsory M4R individual project with oral presentation.

### Graduation
First Year Programme

The programme of study in the First Year is broadly based so that students are given a variety of basic modules, each of which is a prerequisite for developments in later years of the various degree programmes. Certain minor variations are indicated below.

In the First Year, all programme elements are compulsory. There are eight lecture modules in Mathematics which are primarily assessed by an examination in May/June.

For G104 Mathematics with a Year Abroad an appropriate language module is also normally required in addition to the mathematics modules taken. However, students who are especially well prepared in the language for their proposed year of study away may exceptionally have the language module requirements waived.

Note: Whilst G104 students must pass the language examinations at the end of First and Second Year in order to stay on G104, language examination results do not directly contribute to their mathematics degree Honours mark.
For students who are identified as benefiting from extra language support through the English language test given at the beginning of Term 1, English language classes are timetabled in addition to the Mathematics modules. Attendance is compulsory. Good working knowledge of English is seen as vital to success on the programme.

Students must also take M1C Mathematical Computation, currently using Matlab and Python, assessed by coursework during Term 1 and Term 2. Following the May/June examinations in Term 3, students participate in the M1R Individual Poster Project. M1C Mathematical Computation and the M1R Individual Poster Project must be passed in order to progress into the Second Year.

<table>
<thead>
<tr>
<th>Module Codes</th>
<th>Module Title</th>
<th>No. of Lectures/Classes (Approx.)</th>
<th>Terms</th>
<th>Weighting</th>
<th>ECTS Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>M1F</td>
<td>Foundations of Analysis</td>
<td>30 / 10</td>
<td>1</td>
<td>1</td>
<td>6.5</td>
</tr>
<tr>
<td>M1GLA</td>
<td>Geometry and Linear Algebra</td>
<td>30 / 10</td>
<td>1</td>
<td>1</td>
<td>6.5</td>
</tr>
<tr>
<td>M1M1</td>
<td>Mathematical Methods 1</td>
<td>30 / 10</td>
<td>1</td>
<td>1</td>
<td>6.5</td>
</tr>
<tr>
<td>M1S</td>
<td>Probability and Statistics 1</td>
<td>30 / 10</td>
<td>1</td>
<td>1</td>
<td>6.5</td>
</tr>
<tr>
<td>M1A1</td>
<td>Mechanics</td>
<td>30 / 10</td>
<td>2</td>
<td>1</td>
<td>6.5</td>
</tr>
<tr>
<td>M1M2</td>
<td>Mathematical Methods 2</td>
<td>30 / 10</td>
<td>2</td>
<td>1</td>
<td>6.5</td>
</tr>
<tr>
<td>M1P1</td>
<td>Analysis 1</td>
<td>30 / 10</td>
<td>2</td>
<td>1</td>
<td>6.5</td>
</tr>
<tr>
<td>M1P2</td>
<td>Algebra 1</td>
<td>30 / 10</td>
<td>2</td>
<td>1</td>
<td>6.5</td>
</tr>
<tr>
<td>M1C</td>
<td>Mathematical Computation</td>
<td>4+video lectures/20</td>
<td>1 + 2</td>
<td>0.5</td>
<td>4</td>
</tr>
<tr>
<td>M1R</td>
<td>Individual Poster Project</td>
<td>6 / 6</td>
<td>3</td>
<td>0.5</td>
<td>4.5</td>
</tr>
</tbody>
</table>

Language

G104 students normally take an appropriate language module **in addition** to the mathematics modules taken. Depends on module taken 1 + 2 0 6
First Year Syllabus Details

**M1F  FOUNDATIONS OF ANALYSIS**  
Professor K. Buzzard  
(Term 1)

An introductory module involving basic material, which will be widely used later.

Number systems. Integers, rational numbers, real numbers, decimal expansions for rational and real numbers. Inequalities, complex numbers.  
Induction; examples and applications.  
Sets, functions, countability, logic.  
Permutations and combinations. The Binomial Theorem.  
Equivalence relations and arithmetic modulo n.  
Euclid's algorithm.

**M1GLA GEOMETRY AND LINEAR ALGEBRA**  
Professor R. Thomas  
(Term 1)

This module details how Euclidean geometry can be developed in the framework of vector algebra, and how results in algebra can be illuminated by geometrical interpretation.

2 dimensional geometry: Vectors, lines, triangles, Cauchy-Schwarz inequality.  
Matrices and linear equations: Gaussian elimination, matrix algebra, inverses, determinants of 2x2 and 3x3 matrices.  
Eigenvalues and eigenvectors, diagonalisation of matrices and applications.  
Conics and quadrics: Matrix methods, orthogonal matrices and diagonalisation of symmetric matrices.  
3 dimensional geometry: Lines, planes, vector product, relations with distances, areas and volumes.  
Vector spaces: Axioms, examples, linear independence and span, bases and dimension, subspaces.

**M1M1 MATHEMATICAL METHODS 1**  
Dr C. Ford  
(Term 1)

The module supplies a firm grounding to A-level topics such as differentiation, integration, complex numbers and series expansions.

Functions: Polynomial, rational, trigonometric, exponential, logarithmic and hyperbolic functions; even and odd functions. Inverse functions.  
Limits: basic properties and evaluation; continuity and discontinuous functions.  
Differentiation: definition as limit; differentiability; logarithmic and implicit differentiation; higher derivatives; Leibniz's formula; stationary points and points of inflexion; curve sketching; parametric representation, polar co-ordinates.  
Power Series: Mean Value theorem; Taylor's theorem with remainder; infinite power series; Radius of convergence; the ratio test; Taylor and Maclaurin series; de L'Hôpital's rule.  
Integration: definition as Riemann limit; indefinite & definite integrals; the fundamental theorem of calculus; integration by substitution and by parts; partial fractions; Existence of improper and infinite integrals. Integrals over areas and volumes.  
Complex Numbers: definition; the complex plane; standard and polar representation; de Moivre's Theorem; exp(z) and log(z).  
First order differential equations; separable, homogeneous, linear. Linear higher order equations with constant co-efficients.
M1S  PROBABILITY AND STATISTICS 1  
Professor E.J. McCoy  
(Term 1)

Sample spaces and events. Probability: definition, axioms, interpretations. Conditional probability, theorem of total probability, Bayes theorem.  
Counting techniques: combinatorics.  
Discrete random variables and distributions, generating functions, expectation, variance and covariance.  
Continuous random variables and distributions. Univariate transformations. Joint distributions, marginal and conditional distributions. Expectations (and other calculation techniques) for sums of random variables.  
The central limit theorem.

M1A1  MECHANICS  
Dr O. Schnitzer  
(Term 2)

This introductory module on Applied Mathematics is centred on Newtonian mechanics. It includes far-reaching ideas on energy, linear and angular momentum, simple oscillatory systems, motion under central forces such as planetary motion, and rigid-body dynamics.


M1M2  MATHEMATICAL METHODS 2  
Dr V. Shahrezaei  
(Term 2)

This module continues and extends the techniques introduced in M1M1, with further differential equations and partial differentiation. There are brief introductions to difference equations, curve fitting and scaling, together with a variety of applications of integration.

First and second order differential equations.  
Homogeneous and inhomogeneous linear differential equations.  
Phase plane analysis: Qualitative analysis of solutions of differential equations and stability.  
Bifurcation of first order non-linear differential equations.  
Partial differentiation: Definitions, implicit partial differentiation, total differential, change of variables.  
Functions of two variables: Taylor’s theorem, stationary points and their classification, contours.  
Vector calculus: Definitions and physical meaning of grad, div, curl.  
Applications of partial differentiation: Optimisation and Lagrange multipliers.  
Applications of integration – area under curves, arc length, surface area and volume of revolution; double integrals – geometry, mass, moments of inertia; simple triple integrals.
M1P1    ANALYSIS 1
Dr I. Krasovsky
(Term 2)

A rigorous treatment of the concept of a limit, as applied to sequences, series and functions.

Real and complex sequences. Convergence, divergence and divergence to infinity.


Limits and continuity of real and complex functions. Left and right limits and continuity. Maxima and minima of real valued continuous functions on a closed interval. Inverse Function Theorem for strictly monotonic real functions on an interval.

An introduction to differentiability: definitions, examples, left and right derivative.

M1P2    ALGEBRA 1
Dr C. Kestner
(Term 2)

Introductions to three topics in abstract algebra: The theory of vector spaces and linear transformations, the theory of groups and the theory of rings.

Vector spaces: Linear maps, rank-nullity theorem, connections with linear equations and matrices.

Groups: Axioms, examples. Cyclic groups, dihedral groups, symmetric groups. Lagrange’s theorem and applications.

Rings: Polynomial rings, rings of the form \( \mathbb{Z}[\sqrt{d}] \). Euclid’s algorithm for certain rings. Uniqueness of factorisation for these rings. Applications in number theory.

M1C    MATHEMATICAL COMPUTATION
Dr P.J. Ramsden
(Term 1) Matlab (Term 2) Python

In M1C, you will learn computational principles, and how to use them to solve mathematical problems. In the first term, you will use Matlab (a specialised mathematical computing environment), and in the second term you will use Python (a general-purpose programming language).

You will discover how to make a range of mathematical diagrams, including plots in two and three dimensions, and will learn how to write loops (which perform the same tasks over and over again) and how to get your programs to behave differently in different sets of circumstances. You will write your own customised functions to perform specialised tasks and learn to handle data one piece at a time, and also in the form of large unified structures. The mathematical themes you will meet will include sequences and series, iterative methods, differential equations, chaos, fractals, linear algebra, number theory and computational complexity.
M1R INDIVIDUAL PROJECT
Supervised by Various Academic Staff
Coordinator: Dr C. Kestner
(Term 3)

Following the May/June examinations, all students must produce a poster based on a subject suggested by one of the compulsory special seminar series. In the last week of term, students will be required to present their poster and explain it orally. Modules on LaTeX and presentation skills will be offered to assist students.

Imperial Horizons (First Year)

The College has created the ‘Imperial Horizons’ programme to broaden students’ education and enhance their career prospects. This programme is open to all undergraduate students. The programme allows students to take not-for-credit modules in topics such as psychology, business, languages, sound technology, etc., in addition to their core mathematics modules. Students will need to register for their desired options separately through the Horizons Programme at the start of the year.

The Department of Mathematics always endeavours to avoid timetabling Mathematics modules during the times allocated for Horizons modules. First Year Horizons classes take place on Tuesdays from 16.00 to 18.00.

Note that modules on this programme do not contribute to degree Honours marks but they do have an ECTS value of 6.

Further information about the ‘Imperial Horizons’ programme can be viewed online at:
http://www.imperial.ac.uk/horizons/course-options/first-year-undergraduates/

Second, Third and Fourth Year Programmes

In the Second, Third and Fourth Year programmes, as with the First Year programme, with very few exceptions, each module listed below has nominally 30 lectures or their equivalent, together with support classes.

The following information is taken from the 2018-2019 Second, Third and Fourth Year Guides to Optional Modules and should be regarded as a rough guide only.

Second, Third and Fourth Year Guides to Optional Modules can be viewed on the Maths Central Pages of Blackboard under Course Information (https://bb.imperial.ac.uk).
Second Year Programme

The Second Year programme extends and enhances major themes that feature in the First Year programme of study. The option available at Second Year level should be regarded as an opportunity to familiarise yourself with areas of special interests.

The programme has ten examined mathematics modules that have up to 30 lectures or their equivalent. Seven of the modules are compulsory and students must then choose one module from the remaining three module options. There is also the (compulsory) assessed M2R Group Project in Term 3, which involves written, oral and collaborative elements.

The choice of 2nd Year option should not crucially restrict the availability of options in later years. It should be regarded as an opportunity to ‘taste’ special interests. This is especially true for the BSc degree codings G102, G125, G1F3, G1G3, G1GH, GG31, but all students have a free choice.

For G104 Mathematics with a Year Abroad an appropriate language module is also normally required in addition to the mathematics modules taken for students looking to attend another European university. However, students who are especially well prepared in the language for their proposed year of study away may exceptionally have the language module requirements waived.

**Note:** Whilst G104 students must pass the language examinations at the end of First and Second Year in order to stay on G104, language examination results do not contribute to their overall mathematics degree mark.

Following the May/June examinations, in Term 3, students participate in the M2R Group Project, which involves written, oral and collaborative elements.

Students registered on the specialist degrees should select their options carefully to ensure they meet their degree requirements. Students registered on BSc G100 Mathematics and MSci G103 Mathematics have a free choice and G103 students will be expected to plan their Third and Fourth Year programme of options jointly as they progress into the Third Year.

<table>
<thead>
<tr>
<th>Module Codes</th>
<th>Module Title</th>
<th>Terms</th>
<th>Weighting</th>
<th>ECTS Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>M2AA1</td>
<td>Differential Equations</td>
<td>2</td>
<td>1</td>
<td>7</td>
</tr>
<tr>
<td>M2AA2</td>
<td>Multivariable Calculus</td>
<td>1</td>
<td>1</td>
<td>7</td>
</tr>
<tr>
<td>M2AA3</td>
<td>Introduction to Numerical Analysis</td>
<td>2</td>
<td>1</td>
<td>7</td>
</tr>
<tr>
<td>M2PM1</td>
<td>Real Analysis</td>
<td>1</td>
<td>1</td>
<td>7</td>
</tr>
<tr>
<td>M2PM2</td>
<td>Algebra 2</td>
<td>1</td>
<td>1</td>
<td>7</td>
</tr>
<tr>
<td>M2PM3</td>
<td>Complex Analysis</td>
<td>2</td>
<td>1</td>
<td>7</td>
</tr>
<tr>
<td>M2S1</td>
<td>Probability and Statistics 2</td>
<td>1</td>
<td>1</td>
<td>7</td>
</tr>
<tr>
<td>One from</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>M2AM</td>
<td>Fluids and Dynamics</td>
<td>2</td>
<td>1</td>
<td>7</td>
</tr>
<tr>
<td>M2PM5</td>
<td>Metric Spaces and Topology</td>
<td>2</td>
<td>1</td>
<td>7</td>
</tr>
<tr>
<td>M2S2</td>
<td>Statistical Modelling 1</td>
<td>2</td>
<td>1</td>
<td>7</td>
</tr>
<tr>
<td>G104 only</td>
<td>Language</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>G104 students normally take an</td>
<td>1 + 2</td>
<td>0</td>
<td>6</td>
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<td></td>
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</tbody>
</table>

One from the above modules plus (for G104 students only) a language module.
Appropriate language module in addition to the mathematics modules

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>M2R</td>
<td>Group Project</td>
<td>3</td>
</tr>
</tbody>
</table>

**Imperial Horizons (Second Year)**

This programme is open to all Second Year undergraduate students. Students must register for their desired options through the Horizons Programme.

The Department of Mathematics always endeavours to avoid timetabling Mathematics modules during the times allocated for Horizons modules. Second Year Horizons classes take place on Mondays from 16.00 to 18.00.

**Note** that modules on this programme do not contribute to degree marks but they do have an ECTS value of 6.

Further information about the ‘Imperial Horizons’ programme can be viewed online at:

http://www.imperial.ac.uk/horizons/course-options/second-year-undergraduates/

**Third and Fourth Year Programmes**

In the **Third Year**, students must take eight modules from a wide variety of selections from within the Department and from certain modules elsewhere. Modules approved for this are listed below, but students may apply for permission to take other modules within the College. Each module has nominally up to 30 lectures or their equivalent.

In the **Fourth Year**, students choose six modules made available to them in the Department and from certain modules elsewhere and complete a M4R project equivalent to two lecture modules.

The M3 modules below marked * are also available in M4 ‘…with Advanced Study’ form for Fourth Year MSci students. Any offered module is usually, but not always, available in both forms. **No student may take both the M3 and M4 forms of a module.**

Some modules may require another module as a prerequisite.

All modules are equally weighted, with the exception of M4R which is double-weighted.

**Note**: Not all of the individual modules listed below are offered every session and the Department may cancel a particular module if, for example, the number of students attending that module does not make it viable. Similarly, some modules are occasionally run as ‘Reading Courses’
The following notes relate to the tables on optional modules for Year 3 and 4 as below:

All M3 and M4 modules are equally weighted and worth 8 ECTS points unless otherwise specified (M2 modules are worth 7 ECTS)

Column on % Exam – this indicates a standard closed-book written exam, unless otherwise indicated

Column on % CW – this indicates any coursework that is completed for the module. This may include in-class tests, projects, or problem sets to be turned in.

The groupings of modules below have been organised to indicate some natural affinities and connections.

Modules marked with a * are available in both M3 and M4 options.

**APPLIED MATHEMATICS/MATHEMATICAL PHYSICS/NUMERICAL ANALYSIS**

**FLUIDS**

<table>
<thead>
<tr>
<th>Module Codes</th>
<th>Module Title</th>
<th>Terms</th>
<th>% exam</th>
<th>% CW</th>
</tr>
</thead>
<tbody>
<tr>
<td>M3A2*</td>
<td>Fluid Dynamics 1</td>
<td>1</td>
<td>100</td>
<td>0</td>
</tr>
<tr>
<td>M3A10*</td>
<td>Fluid Dynamics 2</td>
<td>2</td>
<td>100</td>
<td>0</td>
</tr>
<tr>
<td>M3A28*</td>
<td>Introduction to Geophysical Fluid Dynamics</td>
<td>2</td>
<td>100</td>
<td>0</td>
</tr>
<tr>
<td>M4A30</td>
<td>Hydrodynamic Stability</td>
<td>2</td>
<td>90</td>
<td>10</td>
</tr>
<tr>
<td>M4A32</td>
<td>Vortex Dynamics</td>
<td>2</td>
<td>100</td>
<td>0</td>
</tr>
<tr>
<td>M3M7*</td>
<td>Asymptotic Analysis</td>
<td>1</td>
<td>100</td>
<td>0</td>
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</table>

**DYNAMICS**

<table>
<thead>
<tr>
<th>Module Codes</th>
<th>Module Title</th>
<th>Terms</th>
<th>% exam</th>
<th>% CW</th>
</tr>
</thead>
<tbody>
<tr>
<td>M3PA48*</td>
<td>Dynamics of Games</td>
<td>1</td>
<td>40 (Oral)</td>
<td>60</td>
</tr>
<tr>
<td>M3PA23*</td>
<td>Dynamical Systems</td>
<td>1</td>
<td>100</td>
<td>0</td>
</tr>
<tr>
<td>M3PA24*</td>
<td>Bifurcation Theory</td>
<td>2</td>
<td>100</td>
<td>0</td>
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<tr>
<td>M4PA40</td>
<td>Random Dynamical Systems and Ergodic Theory: Seminar Course</td>
<td>2</td>
<td>40 (oral)</td>
<td>60</td>
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<tr>
<td>M3PA16*</td>
<td>Geometric Mechanics</td>
<td>1</td>
<td>90</td>
<td>10</td>
</tr>
<tr>
<td>M3PA34*</td>
<td>Dynamics, Symmetry and Integrability</td>
<td>2</td>
<td>90</td>
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### FINANCE

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<tr>
<th>Module Codes</th>
<th>Module Title</th>
<th>Terms</th>
<th>% exam</th>
<th>% CW</th>
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</thead>
<tbody>
<tr>
<td>M3F22*</td>
<td>Mathematical Finance: An Introduction to Option Pricing</td>
<td>1</td>
<td>90</td>
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### BIOLOGY

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<tr>
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<th>Module Title</th>
<th>Terms</th>
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<th>% CW</th>
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</thead>
<tbody>
<tr>
<td>M3A49*</td>
<td>Mathematical Biology</td>
<td>1</td>
<td>90</td>
<td>10</td>
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<tr>
<td>M3A50*</td>
<td>Methods for Data Science</td>
<td>1</td>
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### MATHEMATICAL PHYSICS

<table>
<thead>
<tr>
<th>Module Codes</th>
<th>Module Title</th>
<th>Terms</th>
<th>% exam</th>
<th>% CW</th>
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</thead>
<tbody>
<tr>
<td>M3A4*</td>
<td>Mathematical Physics 1: Quantum Mechanics</td>
<td>1</td>
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<tr>
<td>M3A6*</td>
<td>Special Relativity and Electromagnetism</td>
<td>1</td>
<td>90</td>
<td>10</td>
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<tr>
<td>M3A29*</td>
<td>Theory of Complex Systems</td>
<td>2</td>
<td>0</td>
<td>100</td>
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<tr>
<td>M3A52*</td>
<td>Quantum Mechanics II</td>
<td>2</td>
<td>90</td>
<td>10</td>
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<tr>
<td>M3A7*</td>
<td>Tensor Calculus and General Relativity</td>
<td>2</td>
<td>90</td>
<td>10</td>
</tr>
<tr>
<td>M3M6*</td>
<td>Methods of Mathematical Physics</td>
<td>1</td>
<td>90</td>
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### APPLIED PDEs, NUMERICAL ANALYSIS and COMPUTATION

<table>
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<tr>
<th>Module Codes</th>
<th>Module Title</th>
<th>Terms</th>
<th>% exam</th>
<th>% CW</th>
</tr>
</thead>
<tbody>
<tr>
<td>M4A51</td>
<td>Stochastic Differential Equations</td>
<td>1</td>
<td>100</td>
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</tr>
<tr>
<td>M3M3*</td>
<td>Introduction to Partial Differential Equations</td>
<td>1</td>
<td>90</td>
<td>10</td>
</tr>
<tr>
<td>M3M11*</td>
<td>Function Spaces and Applications</td>
<td>1</td>
<td>90</td>
<td>10</td>
</tr>
<tr>
<td>M3M12*</td>
<td>Advanced Topics in Partial Differential equations</td>
<td>2</td>
<td>90</td>
<td>10</td>
</tr>
<tr>
<td>M3A47*</td>
<td>Finite Elements: Numerical Analysis and Implementation</td>
<td>2</td>
<td>50</td>
<td>50</td>
</tr>
<tr>
<td>Module Codes</td>
<td>Module Title</td>
<td>Terms</td>
<td>% exam</td>
<td>% CW</td>
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<tr>
<td>--------------</td>
<td>-------------------------------------</td>
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<td>--------</td>
<td>------</td>
</tr>
<tr>
<td>M3N7*</td>
<td>Numerical Solution of Ordinary</td>
<td>1</td>
<td>0</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>Differential Equations</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>M3N9*</td>
<td>Computational Linear Algebra</td>
<td>1</td>
<td>0</td>
<td>100</td>
</tr>
<tr>
<td>M3N10*</td>
<td>Computational Partial Differential</td>
<td>2</td>
<td>0</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>Equations</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>M3SC*</td>
<td>Scientific Computation</td>
<td>2</td>
<td>0</td>
<td>100</td>
</tr>
</tbody>
</table>

**PURE MATHEMATICS**

**ANALYSIS**

<table>
<thead>
<tr>
<th>Module Codes</th>
<th>Module Title</th>
<th>Terms</th>
<th>% exam</th>
<th>% CW</th>
</tr>
</thead>
<tbody>
<tr>
<td>M3P6*</td>
<td>Probability</td>
<td>2</td>
<td>100</td>
<td>0</td>
</tr>
<tr>
<td>M3P7*</td>
<td>Functional Analysis</td>
<td>2</td>
<td>90</td>
<td>10</td>
</tr>
<tr>
<td>M3P18*</td>
<td>Fourier Analysis and Theory of</td>
<td>2</td>
<td>90</td>
<td>10</td>
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<tr>
<td></td>
<td>Distributions</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>M3P19*</td>
<td>Measure and Integration</td>
<td>1</td>
<td>90</td>
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</tr>
<tr>
<td>M3P60*</td>
<td>Geometric Complex Analysis</td>
<td>2</td>
<td>90</td>
<td>10</td>
</tr>
<tr>
<td>M4P41</td>
<td>Analytic Methods in Partial</td>
<td>2</td>
<td>90</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>Differential Equations</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>M4P67</td>
<td>Stochastic Calculus with Applications to non-Linear Filtering</td>
<td>2</td>
<td>100</td>
<td>0</td>
</tr>
<tr>
<td>M4P70*</td>
<td>Markov Processes</td>
<td>1</td>
<td>90</td>
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**GEOMETRY**

<table>
<thead>
<tr>
<th>Module Codes</th>
<th>Module Title</th>
<th>Terms</th>
<th>% exam</th>
<th>% CW</th>
</tr>
</thead>
<tbody>
<tr>
<td>M3P5*</td>
<td>Geometry of Curves and Surfaces</td>
<td>1</td>
<td>90</td>
<td>10</td>
</tr>
<tr>
<td>M3P20*</td>
<td>Geometry 1: Algebraic Curves</td>
<td>1</td>
<td>90</td>
<td>10</td>
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<tr>
<td>M3P21*</td>
<td>Geometry 2: Algebraic Topology</td>
<td>2</td>
<td>90</td>
<td>10</td>
</tr>
<tr>
<td>M4P33</td>
<td>Algebraic Geometry</td>
<td>2</td>
<td>90</td>
<td>10</td>
</tr>
<tr>
<td>M4P51</td>
<td>Riemannian Geometry</td>
<td>2</td>
<td>90</td>
<td>10</td>
</tr>
<tr>
<td>M4P52</td>
<td>Manifolds</td>
<td>1</td>
<td>90</td>
<td>10</td>
</tr>
<tr>
<td>M4P54</td>
<td>Differential Topology</td>
<td>2</td>
<td>90</td>
<td>10</td>
</tr>
<tr>
<td>M4P57</td>
<td>Complex Manifolds</td>
<td>2</td>
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## ALGEBRA AND DISCRETE MATHEMATICS

<table>
<thead>
<tr>
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<th>Module Title</th>
<th>Terms</th>
<th>% exam</th>
<th>% CW</th>
</tr>
</thead>
<tbody>
<tr>
<td>M3P8*</td>
<td>Algebra 3</td>
<td>1</td>
<td>90</td>
<td>10</td>
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<tr>
<td>M3P10*</td>
<td>Group Theory</td>
<td>1</td>
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<tr>
<td>M3P11*</td>
<td>Galois Theory</td>
<td>2</td>
<td>90</td>
<td>10</td>
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<tr>
<td>M3P12*</td>
<td>Group Representation Theory</td>
<td>2</td>
<td>90</td>
<td>10</td>
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<tr>
<td>M3P17*</td>
<td>Algebraic Combinatorics</td>
<td>1</td>
<td>90</td>
<td>10</td>
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<tr>
<td>M4P46</td>
<td>Lie Algebras</td>
<td>2</td>
<td>90</td>
<td>10</td>
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<tr>
<td>M4P55</td>
<td>Commutative Algebra</td>
<td>1</td>
<td>90</td>
<td>10</td>
</tr>
<tr>
<td>M4P61</td>
<td>Infinite Groups</td>
<td>1</td>
<td>90</td>
<td>10</td>
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<tr>
<td>M4P63</td>
<td>Algebra 4</td>
<td>2</td>
<td>90</td>
<td>10</td>
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<tr>
<td>M3P65*</td>
<td>Mathematical Logic</td>
<td>1</td>
<td>90</td>
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<tr>
<td>M4P72</td>
<td>Modular Representation Theory</td>
<td>2</td>
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## NUMBER THEORY

<table>
<thead>
<tr>
<th>Module Codes</th>
<th>Module Title</th>
<th>Terms</th>
<th>% exam</th>
<th>% CW</th>
</tr>
</thead>
<tbody>
<tr>
<td>M3P14*</td>
<td>Number Theory</td>
<td>1</td>
<td>100</td>
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<tr>
<td>M3P15*</td>
<td>Algebraic Number Theory</td>
<td>2</td>
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<td>10</td>
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<tr>
<td>M4P32</td>
<td>Number Theory: Elliptic Curves</td>
<td>1</td>
<td>90</td>
<td>10</td>
</tr>
<tr>
<td>M4P58</td>
<td>Modular Forms</td>
<td>1</td>
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## STATISTICS

<table>
<thead>
<tr>
<th>Module Codes</th>
<th>Module Title</th>
<th>Terms</th>
<th>% exam</th>
<th>% CW</th>
</tr>
</thead>
<tbody>
<tr>
<td>M3S1*</td>
<td>Statistical Theory</td>
<td>2</td>
<td>90</td>
<td>10</td>
</tr>
<tr>
<td>M3S2*</td>
<td>Statistical Modelling 2</td>
<td>2</td>
<td>75</td>
<td>25</td>
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<tr>
<td>M3S4*</td>
<td>Applied Probability</td>
<td>1</td>
<td>90</td>
<td>10</td>
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<tr>
<td>M3S8*</td>
<td>Time Series</td>
<td>1</td>
<td>90</td>
<td>10</td>
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<tr>
<td>M3S9*</td>
<td>Stochastic Simulation</td>
<td>1</td>
<td>75</td>
<td>25</td>
</tr>
<tr>
<td>M3S14*</td>
<td>Survival Models and Actuarial</td>
<td>2</td>
<td>90</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>Applications</td>
<td></td>
<td></td>
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<tr>
<td>Module Codes</td>
<td>Module Title</td>
<td>Terms</td>
<td>Project Coordinator</td>
<td>% exam</td>
</tr>
<tr>
<td>--------------</td>
<td>--------------------------------------------------------</td>
<td>-----------</td>
<td>---------------------</td>
<td>--------</td>
</tr>
<tr>
<td>M3S16*</td>
<td>Credit Scoring</td>
<td>1</td>
<td></td>
<td>75</td>
</tr>
<tr>
<td>M3S17*</td>
<td>Quantitative Methods in Retail Finance</td>
<td>2</td>
<td></td>
<td>75</td>
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<tr>
<td>M4S18</td>
<td>Topics in Advanced Statistics (choose one of each of the A/B options below; requires permission from DUGS)</td>
<td>2</td>
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<tr>
<td>M4S18A1</td>
<td>Multivariate Analysis</td>
<td>2</td>
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<td>(5 ECTS)</td>
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<td></td>
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</tr>
<tr>
<td>M4S18A2</td>
<td>Machine Learning</td>
<td>2</td>
<td></td>
<td>0</td>
</tr>
<tr>
<td>(5 ECTS)</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>M4S18B1</td>
<td>Graphical Models</td>
<td>2</td>
<td></td>
<td>100</td>
</tr>
<tr>
<td>(5 ECTS)</td>
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<td></td>
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<tr>
<td>M4S18B2</td>
<td>Bayesian Methods</td>
<td>2</td>
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<td>80</td>
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<tr>
<td>(5 ECTS)</td>
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**PROJECT (Available Only to Final Year BSc Students)**

<table>
<thead>
<tr>
<th>Module Codes</th>
<th>Module Title</th>
<th>Terms</th>
<th>Project Coordinator</th>
<th>% exam</th>
<th>% CW</th>
</tr>
</thead>
<tbody>
<tr>
<td>M3R</td>
<td>Research Project in Mathematics</td>
<td>2 + 3</td>
<td>Dr. J. Britnell</td>
<td>0</td>
<td>100</td>
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</tbody>
</table>

**PROJECT (Compulsory for Final Year MSci students)**

<table>
<thead>
<tr>
<th>Module Codes</th>
<th>Module Title</th>
<th>Terms</th>
<th>Project Coordinator</th>
<th>% exam</th>
<th>% CW</th>
</tr>
</thead>
<tbody>
<tr>
<td>M4R</td>
<td>Research Project in Mathematics</td>
<td>All year</td>
<td>Dr. J. Britnell</td>
<td>0</td>
<td>100</td>
</tr>
</tbody>
</table>

**OTHER MATHEMATICAL OPTIONS (restrictions apply, please see below)**

<table>
<thead>
<tr>
<th>Module Codes</th>
<th>Module Title</th>
<th>Terms</th>
<th>% exam</th>
<th>% CW</th>
</tr>
</thead>
<tbody>
<tr>
<td>M3T</td>
<td>Communicating Mathematics</td>
<td>2 + 3</td>
<td>0</td>
<td>100</td>
</tr>
</tbody>
</table>
In addition to the Department of Mathematics modules, students may attend modules run by the Centre for Languages, Culture and Communication and some by the Business School.

Third Year BSc students are permitted to take two options from this list. MSci students may take one option in each of their Third and Fourth Years for credit. **No more than two of these options may be taken as part of a student's degree.** Students may opt to take additional Imperial Horizons courses (not for credit) as in the First and Second Years.

M3T, M3B or M3C may also be taken as alternatives to a Centre for Languages, Culture and Communication/Business School option. However, as a Department of Mathematics module, their ECTS values are 8.

**CENTRE FOR LANGUAGES, CULTURE AND COMMUNICATION/BUSINESS SCHOOL/ OTHER MODULE OPTIONS**

<table>
<thead>
<tr>
<th>Module Codes</th>
<th>Module Title</th>
<th>Terms</th>
<th>ECTS Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>HGC31</td>
<td>Lessons from History</td>
<td>1 + 2</td>
<td>6</td>
</tr>
<tr>
<td>HGC33</td>
<td>Creative Futures</td>
<td>1 + 2</td>
<td>6</td>
</tr>
<tr>
<td>HSCS3001</td>
<td>Advanced Creative Writing</td>
<td>1 + 2</td>
<td>6</td>
</tr>
<tr>
<td>HSCS3002</td>
<td>History of Science, Technology and Industry</td>
<td>1 + 2</td>
<td>6</td>
</tr>
<tr>
<td>HSCS3003</td>
<td>Philosophy of Mind</td>
<td>1 + 2</td>
<td>6</td>
</tr>
<tr>
<td>HSCS3004</td>
<td>Contemporary Philosophy</td>
<td>1 + 2</td>
<td>6</td>
</tr>
<tr>
<td>HSCS3006</td>
<td>Humanities Project</td>
<td>1 + 2</td>
<td>6</td>
</tr>
<tr>
<td>HSCS3007</td>
<td>Conflict, Crime and Justice</td>
<td>1 + 2</td>
<td>6</td>
</tr>
<tr>
<td>HSCS3008</td>
<td>Visual Culture, Knowledge and Power</td>
<td>1 + 2</td>
<td>6</td>
</tr>
<tr>
<td>HSCS3011</td>
<td>Psychology of Music</td>
<td>1 + 2</td>
<td>6</td>
</tr>
<tr>
<td>HSCS3012</td>
<td>How do you Know?</td>
<td>1 + 2</td>
<td>6</td>
</tr>
<tr>
<td>HSCS2007</td>
<td>Music Technology</td>
<td>1 + 2</td>
<td>6</td>
</tr>
<tr>
<td>BS0808</td>
<td>Finance and Financial Management</td>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td>BS0820</td>
<td>Managing Innovation</td>
<td>1</td>
<td>6</td>
</tr>
</tbody>
</table>

**Note:** Centre for Languages, Culture and Communication modules extend throughout Terms 1 and 2 and some modules may be examined in January. Taking the HSCS3006 Humanities Project normally requires permission from the Centre for Languages, Culture and Communication and the Department of Mathematics.

Syllabus and timetabling information can be viewed online at: Centre for Languages, Culture and Communication: [http://www.imperial.ac.uk/horizons/course-options/third-and-fourth-year-undergraduates/](http://www.imperial.ac.uk/horizons/course-options/third-and-fourth-year-undergraduates/)
Subject to the Department's approval, instead of the Centre for Languages, Culture and Communication or Business School options, students may take up to two Mathematical modules given outside the Department, e.g. in the Department of Physics. Students must discuss this with the Director of Undergraduate Studies if they wish to consider such an option.

BSc students are permitted to take at most one of the "other mathematical options" M3C, M3B, or M3T if it is taken in conjunction with an 'External' module from the CLCC, from the Business School list of Options or (at the discretion of the Director of Undergraduate Studies) from another department. In this case, at most one such 'External' module can be taken. If no 'External' modules are taken, BSc students may take all three of the options M3C, M3B or M3T in their final year. Students on degree codes other than G100 should note the special requirements of these programmes and consult with the Director of Undergraduate Studies if they wish to take all three of M3C, M3B, and M3T. Please note that not all of the modules M3C, M3B, M3T may run every year.

BSc students who are considering transfer to the MSci should ensure that they take no more than one module from the combined list of 'less Mathematical' and CCS/Business School options during their third year. Otherwise they will not be able to satisfy the programme requirements of the MSci.

Subject to the Department's approval, students may take a module given outside the Department, e.g. in the Departments of Physics or Computing. Students must obtain permission from the Director of Undergraduate Studies if they wish to consider such an option. The DUGS will determine whether the module can be substituted for a Mathematics option, or whether it will count as one of the less (or non-) Mathematical options.

Academic Structure and Support

The Director of Undergraduate Studies has overall responsibility for the Undergraduate degree programme and meets with students regularly through Year group meetings. Any questions about the academic programme should be addressed to them.

The transition from school mathematics to university mathematics is not an easy one, especially because of the need to introduce formal mathematical reasoning. Mathematical topics are put on a firm basis and treated in a more mature way. There is also a change of pace from that experienced in school. All students can expect to be 'stretched' by the experience.

Students are encouraged to take advantage of all of the study and support opportunities provided by the Department, through lectures, problems classes, tutorials and office hours.

Lectures

The teaching of modules within the Department of Mathematics is carried out by a combination of lectures, tutorials, study groups and problem classes. Students are expected to attend lectures and actively participate by taking notes and responding to questions from the lecturers. Students should note their questions down and raise these at appropriate times, in problems classes and office hours.

Lectures are a fundamental way of delivering and pacing study material. A big difference between school and university is that the material is now much more concentrated - in about 12 lectures per week enough is provided to keep students occupied for (at least) the other 156 hours. The pace in a lecture is such that it is vital to develop a good set of notes from what is presented at the time, annotated later in private study. For a good proportion of the material a full understanding can only be gained at the later stage through contemplation and by doing problems.

What is a 'good' set of notes? There is an element of personal taste, but it is important to write clearly and carefully. It helps in keeping good order to number pages and in later private study to
highlight important results using suitable colours. When notes are written down in a lecture it is sensible to leave enough space for later annotations.

Naturally the understanding of a particular lecture is usually vastly improved if sufficient time has been invested in understanding previous lectures.

It is very important to concentrate in a lecture and not to get distracted. Students should not chat to their neighbour(s) or text or surf the Web etc. This is not only bad manners but can be highly distracting to others. Phones should normally be switched off.

Questions may be asked during the lecture and/or at its conclusion. Further points can be raised in tutorial classes or at the Module Lecturer's 'office hour'. Sometimes what might appear to be a 'silly' question is anything but silly; in any event it is very likely that others are having the same difficulty.

Problem Sheets

For almost all modules, the lecturers regularly distribute sets of questions and other materials, as appropriate, and it is essential that students should work at these in order to master the ideas in each module and their application. **Skill at solving problems develops over time. It cannot be learned in a rush just before an examination.**

It is important to recognise that strategies for problem solving need to be developed by example and practice. It is not necessarily usual for a suitable strategy for a problem to be immediately apparent at the outset. Quite often some experimentation is required – good starting points are the various pieces of given information and a statement of what is needed for demonstrating the required result(s), together with consideration of, for example, any relevant theory and examples from lecture notes.

Dealing with problems is normally an essential part of learning mathematical theory. It is important in developing appreciation and understanding of the topics in the module and of the lecture material.

It is expected that Module Lecturers will set some straightforward questions to give students confidence and also some more challenging ones to stretch their understanding. It is expected that students will also attempt the more demanding questions in order to give themselves the necessary practice in problem solving and prepare themselves for the examinations.

Problems Classes

For First Year modules and most modules in Second Year, there is a weekly timetabled class in addition to the lectures. For other modules there is expected to be a class provision as part of the timetabled periods.

**Students should attend Problems Classes regularly in order to raise questions about problems on the sheets they are unsure of. It is important to come to the Problems Classes well prepared, having at least attempted problem sheets or assessed coursework and having identified some of the difficulties and being in a position to discuss them. Students should feel that they can ask questions from previous weeks' problem sheets or lectures as well as gaining additional feedback on assessed coursework/tests.**

Problem Solving Classes are designed to help students to master the module material, develop problem solving skills, involve students actively in their study of mathematics, and foster an interest in the subject and to generate discussion. They are attended by Module Lecturers and Graduate Teaching Assistants.

Regular attendance is essential since it is here that specific expert assistance can be given on lecture notes, problem sheets and connections with other modules. A pace for digestion of the module content is being set here and this is meant to be broadly manageable by the majority of the class.
While regular attendance does not guarantee success, experience has shown that poor performance is usually associated strongly with poor attendance.

Most Lecturers and GTAs will spend time addressing individual points/difficulties; on other occasions it may be appropriate for particular groups of students to be addressed as a whole and open orderly discussion is very much to be encouraged.

One or more of the following techniques may be used in any given class:

- present model solutions to problems on the board
- go around the class asking individual students about their difficulties
- explain solutions to small groups of students with common problems
- have students work on unseen problems in groups

In order that this precious resource is used properly it is necessary that all of the student class members as well as the Tutors are active and engaged with the material.

It is expected that Module Lecturers will provide sufficient problems to keep the class busy. Solutions/hints for problems should be provided, but it is best if these are not given out until sufficient time has elapsed after the issue of the original problem sheet or assessed coursework deadline.

Meet Your Marker

At their Problem Solving Classes, First and Second Year students will also have an opportunity to meet the markers of their progress tests/assessed coursework to gain more feedback.

Office Hours

‘Office hours’ are indicated times normally set aside by each Module Lecturer, for students to consult them individually or in small groups about the module notes and any problems not covered in the class periods. These provide a valuable backup support for students. Many older students have commented on how useful these are, when seeking clarification or when feeling behind; we encourage you to try them out. Module Lecturers are able to respond to individual queries on a one-to-one basis.

Personal Tutorials

Personal Tutors should provide detailed subject help in the First Year, although this is not their only role (please see more information about Personal Tutors below). Their prime concern should be that of overall academic and other welfare. It is important to maintain regular contact with your Personal Tutor. In the First Year you should meet each week.

Most First Year modules designate a question specifically for discussion with your Personal Tutor at these weekly meetings and it is in these meetings that marked First Year assessed coursework and progress test scripts will be returned.

Peer Tutorial Support Classes

Fourth Year MSci/MSc and some Third Year students run small weekly Peer Tutorial Support Classes for First Year Students. These classes are held in Terms 1 and 2. Attendance is compulsory. Students are encouraged to send their tutors questions ahead of time. All students will also be encouraged to solve unseen problems on the board with the help of the other students in the group/the Peer Tutor. This is to help develop problem solving methods to support them throughout their studies.

First and Second year students also benefit from the “Q&A” drop in sessions run by older students once a week. The older students will be available to help students on a one-to-one basis at these
weekly sessions, helping answer questions they have on the course problems or understanding material from lectures.

**Imperial Mobile app**
Don't forget to download the free Imperial Mobile app for access to College information and services, including your programme timetable, College emails and a library catalogue search tool.

[www.imperial.ac.uk/imperialmobile](http://www.imperial.ac.uk/imperialmobile)

**Imperial Success Guide**
The Imperial Success Guide is an online resource with advice and tips on the transition to university level study. More than just a study guide, it is packed with advice created especially for undergraduate students, including information on support, health and well-being and ideas to help you make the most of London.

[www.imperial.ac.uk/success-guide](http://www.imperial.ac.uk/success-guide)
3. **Assessment**

**Forms of Assessment**

In addition to end-of-year examinations, assessment takes a number of forms during term-time and is designed to motivate and monitor the progress of each student throughout their courses. It is important that students complete this term-time assessed work individually and submit it on time. Naturally, a student who does not do this work will require a correspondingly better examination performance (if an examination is available) in order to achieve a Pass or higher grade.

**Assessed Coursework and Progress Tests**

For many modules, particular pieces of work are set as assessed coursework or progress tests and they contribute up to 10% of the overall assessment of the module concerned. Some Module Lecturers may choose to use a combination of assessed coursework and progress tests whilst others may choose to only set assessed coursework or only set progress tests. Some of these tasks may be group assignments.

The exact nature and frequency of these forms of assessment is decided by individual Module Lecturers. In Year 1 and 2 the timing and assessments for different modules are staggered as far as possible so that the submission dates for assessed coursework and the sitting dates for progress tests are not all clustered together. Assessed coursework is not normally set with a submission deadline after the end of the current term.

Marked assessed coursework and progress test scripts are returned to students to provide useful feedback. For CW/tests counting for less than 10% of the module mark, this should normally take no longer than two weeks.

**Assignments and Projects**

Some modules have assignments that contribute more substantially to overall module assessment (over 10%).

Some modules are wholly project based and have no end-of-year examination. For some of these modules, oral presentations about the project(s) may form part of the overall assessment for the module. In Year 3 and 4 some modules assessed wholly by project may have submission dates after the end of term.

Assignment and project scripts normally need to be retained by the Department as External Examiners have the right to see them. **Students should keep a copy of all assignments and project work submitted.** For modules where assignments are worth over 10%, if work is returned to students, they will be asked to return the marked work to the Department to be reviewed by the External Examiners.

**Submitting Assessed Work**

**Please Note:** When submitting assignments or projects (as opposed to assessed coursework), please follow separate instructions if provided by the Module Lecturer, Project Supervisor or the Undergraduate Maths Student Office.

Most assessed work is submitted via the Undergraduate Maths Student Office or electronically via Blackboard. If submitting via the Office, you will need to place your work in the correct pigeon hole in the corridor opposite the Office in between offices 652 and 654.
Please note that these are not the pigeon holes inside the Office on the side – these are for collecting your work.

The corridor pigeonholes are in three sections. These three sections are arranged by TID number for First Year students and alphabetically for all other years. Please place your work in the relevant section and slot, according to your TID/first letter of your surname, beneath the sign specific to your coursework.

**Plagiarism is a serious offence and all assistance MUST be referenced. Each piece of work MUST be accompanied by a signed declaration, 'This is my own unaided work unless stated otherwise'.** This is printed on the coversheets available for assessed coursework and assignments, which can be found outside the Undergraduate Maths Student Office.

- Pink for 1st Year Maths & JMC1 Students
- Blue for 2nd Year Maths & JMC2 Students
- Yellow for 3rd Year Maths & JMC3 Students
- Mauve for 4th Year Maths & JMC4 Students
- Green for Erasmus/Other Students

When submitting electronically, you will be asked to agree to the statement upon your submission, or place a statement in your assignment.

**Missed Assessed Work and Extensions**

If, due to illness or a serious personal matter, you miss a scheduled progress test, please inform your Year Tutor by completing an orange Illness/Personal Issue form. These are available from outside the Undergraduate Maths Student Office or on Blackboard Maths Central. The Year Tutor will decide whether or not to award pro-rata marks and inform the student. If you know ahead of time that you will be absent on the day, please liaise with the Year Tutor to discuss whether you are able to apply for pro-rata or not, or whether (in exceptional circumstances) other arrangements can be made.

**Policy on Coursework Deadline Extensions**

Students may apply for a deadline extension on assessed coursework. The procedure for such applications depends on the module; different rules apply according to whether the total coursework element is (a) greater than 10% or (b) 10% or less.

(a) Modules where the total coursework element exceeds 10%

In exceptional cases, deadline extensions can be granted for coursework in modules where the total coursework element exceeds 10%. Extension requests should be directed to the Undergraduate Senior Tutor with a completed mitigating circumstances form. If the extension request is on health grounds medical evidence will be required. Lecturers should not be approached for extensions - the Undergraduate Senior Tutor will liaise with the lecturer on students' behalf.

(b) Modules where the total coursework element is 10% or less

Deadline extensions of up to 24 hours can be granted for modules where the total coursework does not exceed 10%. Extension requests should be directed to the Year Tutor. If the extension request is on health grounds medical evidence will be required. Extension requests greater than 24 hours are not normally granted. If students have a valid reason for not submitting minor coursework within 24 hours of the deadline an orange illness/personal issues form should be submitted to the Undergraduate Office. These are available from outside the Undergraduate Maths Student Office or on Blackboard Maths Central. The Year Tutor will decide whether or not to award pro-rata marks and inform the student. Lecturers should not be approached for deadline extensions or pro-rata marks.
Deadlines

If you want to submit assessed work before the deadline date, please hand your work directly to the Undergraduate Maths Student Office.

Unless you are instructed otherwise by your Module Lecturer or Project Supervisor, the deadlines for the submission of assessed work are as follows:

- M1 modules - 12 noon
- M2 modules - 14.00
- M3, M4, M5 modules - 16.00
- Projects - 16.00

Time/date deadlines will be strictly adhered to by the Office.

Late Submission of Coursework

College has strict guidelines on late work. Late work will not be accepted if solutions have already been distributed. Further information on College regulations regarding penalties for the late submission of assessed work can be found on:

http://www.imperial.ac.uk/about/governance/academic-governance/academic-policy/exams-and-assessment/ (look under the Marking and Moderation section).

Departmental Policy on Late Submission of Coursework

Submission of Work
Students must submit coursework assessment by the published deadline (date and time). Submission dates and times are in UK local time.

Penalties for Late Submission

Work submitted more than 24 hours late will not be accepted as a valid attempt and a mark of zero will be recorded. Work submitted up to 24 hours after the deadline will be marked but capped at the pass mark.

This is the default penalty for late submissions of assessed work and should be deviated from only in exceptional circumstances.

Following is a list of circumstances in which the default penalty may be amended

(a) Mitigating circumstances which are declared by the candidate in writing. Mitigating circumstances must be independently corroborated and of sufficient severity to have affected the candidate's ability to meet the deadline, for example illness or family bereavement;

(b) If, in the judgement of the Undergraduate Senior Tutor, the default penalty is considered unreasonably harsh in the circumstances, for example, where it will impact adversely on the progression or graduation of a candidate, or if one member of a group has submitted work late which impacts on the rest of the group through no fault of their own.

Feedback for Late Submissions

Work submitted more than 24 hours late will normally be returned with a notional mark and feedback. If the work has not been submitted within a reasonable time period the department may decide that it would not be educationally helpful to provide feedback.
Collection of Marked Assessed CW and Tests

If a particular piece of assessed work or progress test has been marked and is available, the marks will be made available on Blackboard. Once marks are visible on Blackboard, work submitted by paper-copy will be available for collection from the pigeon-holes inside the UG office. Any feedback for electronic submissions will normally be made available via Blackboard.

The Department works towards a two week turnaround deadline on tests and short CW assignments (worth 10% or less). Larger CW pieces may take longer to return. If there is a delay, please contact the UG office.

Some work (i.e. assignments and projects) is not returned to students and you might receive a feedback form instead.

First Year assessed work will be returned by Personal Tutors (except at the end of term).

Marked assessed coursework, progress tests and feedback forms for M1 (at the end of term), M2, M3 and M4 modules will be returned via the pigeonholes in the Undergraduate Maths Student Office.

The pigeonholes are in four sections:

- First Year Students (used at the end of term)
- Second Year Students
- Third Year Students
- Fourth Year Students & Erasmus/Other Students & MSc (Pure/Applied) Students.

For First and Second Years the sections are arranged by TID number, for Third, Fourth and other, the sections are arranged alphabetically by surname.

If your work should be in the pigeonholes but you cannot find it, it could be because another student has misfiled the paperwork after having looked through the scripts. Please check the surrounding pigeonholes before making enquiries in the Undergraduate Maths Student Office.

Feedback to Students on Work

Feedback for students is provided by discussions on problem sheet questions, test and exam questions by Module Lecturers, Personal Tutors, Graduate Teaching Assistants (in problem solving classes and via the Department’s ‘Meet Your Marker Scheme’) and by Tutors in the Peer Tutorial Support Classes. Students receive written feedback on marked assessed coursework and progress tests. Student assessed work provisional marks (for minor CW) are also made available on Blackboard. Please note that all marks available on Blackboard are provisional and subject to ratification by the Exam Board.

Past Examination papers, along with mark schemes and comments from the markers are available on Maths Central on Blackboard to provide general feedback on the examinations.

Instruction to Candidates for Examinations

Students who are candidates for examinations are asked to note that all examinations are conducted in accordance with the College’s Academic Regulations, the Regulations for Programmes of Study and the Examination Regulations.
May/June Examinations and September Examinations

A small number of modules are assessed by project but most modules are primarily assessed by examinations that take place in May/June, Term 3. There is a separate examination for most modules in the programme, normally two hours in duration and consisting of four questions.

Examined work in each module is given a percentage mark as well as a Pass/Fail rating.

For year 1, 2 and 3 modules (that is, modules with codes beginning with M1, M2, M3), the module pass mark is 40 percent. For 4th year (MSci) modules (that is, modules with codes beginning with M4) the module pass mark is 50 percent.

It is very important to prepare properly during the year for the examinations. Indeed you should realise that most extreme examination anxiety is caused by lack of preparation and so you need to work hard during the year with the May/June examinations in mind.

Students who do not obtain Passes in modules at the first attempt will be expected to attend resit examinations. September resits are available to First and Second Year students followed by resit opportunities the following May/June. Third and Fourth Year students have resit opportunities the following May/June (NOT normally in September).

Two resit attempts are normally available to students. However, First Year students who fail six or more of the 10 First Year course elements (eight lecture modules, M1C and M1R), will normally be instructed to terminate their studies and withdraw from the College.

Note: September resits are usually not available for M3 and M4 modules and may not be offered for modules assessed solely by project/coursework.

Resit examinations are for Pass credit only – a maximum mark of the pass mark for the module (40 percent for M1, M2, M3 modules; 50 percent for M4 modules) will be credited. Once a Pass is achieved, no further attempts are permitted.

Students who have not achieved the required Passes by the beginning of the new academic year are required by College to spend a year out of attendance. During this time they are not considered College students. This may create a number of issues and hold visa implications.

Students who are required to take a year out due to failed examinations or who take an interruption are not normally permitted to resubmit any coursework previously submitted during their year out. The coursework mark from the initial year stays and is included in the mark at reassessment.

Examination Procedures

The main Department of Mathematics examinations occur in May/June with resit examinations for Years 1 & 2 taking place over the course of a week in early September.

Examination registration takes place at the beginning of Term 2.

Note for Year 3 and 4 optional modules: Students who take modules which are wholly assessed by project will be deemed to be officially registered on the module through the submission of a specified number of pieces of assessed work for that module. Thus, once a certain point is reached in these modules, a student will be committed to completing the module.

Examination information, including rules and regulations, candidate instructions, extra time arrangements and registration information, can be viewed on Blackboard (https://bb.imperial.ac.uk) Maths Central in the Examinations section.
Information about resit procedures can be found online at:


Marks, Year Totals and Year Weightings

Within the Department each total module assessment is rescaled so that overall performances may be compared. The normal rescaling on to the scale 0-100 marks is such that 40 then corresponds to the lowest Pass mark, 60 to the lowest Upper Second Class, and 70 corresponds to a the lowest First Class performance.

In year 1, marks from the eight lectured modules, M1C and the M1R project are combined (with M1C and M1R weighted half that of a lectured module) into a year total expressed as a percentage.

Year totals for each subsequent year of study are computed similarly and the overall total for the degree is produced by combining the year totals with the appropriate weightings.

For three year BSc codings, the 1st: 2nd: 3rd year weightings are 1:3:5.

For the four year MSci coding G103, the year weightings is 1:3:4:5.

For the four year MSci coding G104, the year weightings will be 1:3:3:5.

These differences in year weighting reflect the increasing level of mathematical complexity.

How Module Marks are Determined

Most modules are examined by a two-hour examination in May/June (Fourth Year students’ exams are normally 2.5 hours in length). For First - Third Year modules, there will usually be four questions each of which is marked out of 20.

If the module has assessed coursework/progress tests then the marks for these are combined with the total mark for the paper in the appropriate proportions to produce a raw mark for the module. The marks for each module are then re-scaled in a piecewise-linear fashion according to the following procedure.

Based on students’ performances in the module assessments and performances in the module relative to average performance in other modules, the module examiners make a decision about what they consider to be the pass/fail boundary (P), the 2(i)/2(ii) Boundary (T), the 2(i)/1st Boundary (E) and the maximum mark (M) which was realistically possible for the module. In the case of M1, M2 and M3 modules, the raw marks P, T, E and M are mapped to 40, 60, 70 and 100 respectively (with 0 being mapped to 0). These choices of grade boundaries (PTEM) are compared by a sub-Board of the Board of Examiners (the Liaison Panel) and further adjustments are made to ensure comparability of marks across modules. Once the values of the grade boundaries for a module have been finalised, an individual raw mark is then mapped to the 0–100 scale by linear interpolation and this becomes the student’s mark for that module.

For M4 modules where the pass mark is 50, the process is the same except that P is mapped to 50.

Marks for different modules are then added together (with a weighting, if appropriate) in order to produce a year total.

Note: A small number of Third and Fourth Year modules have a bigger coursework element. This is announced at the beginning of the module. There are variations to this procedure for modules that involve assignments, projects or January tests.
Note: Until 2016-17, examination papers included a system of ‘bonus marks’ designed to give extra reward to high-scoring answers. You will see this when you look at past papers. Following a consultation exercise, this practice was discontinued in all years from 2017-18.

Examination Support

Past Examination Papers and information on examination technique and study support can be found on Blackboard (https://bb.imperial.ac.uk) Maths Central in the Examinations section.

Querying Marks

Assessed Coursework

Sometimes students believe they have been marked harshly or incorrectly.

At their Problem Solving Classes, First and Second Year students will have an opportunity to meet the individual markers of their progress tests/assessed coursework and have the rationale behind the attribution of marks explained. This is part of our ‘Meet Your Marker’ Scheme.

If the mark query relates to assessed coursework, progress tests, assignments or projects, First and Second Year students should first consult the Marker. Any other queries should be addressed to the Personal Tutor (First Years) or the Module Lecturer (First and Second Years). Third and Fourth Year students should consult the Module Lecturer.

In some circumstances it may be appropriate to consult your Year Tutor or the Undergraduate Liaison Officer.

If a mark change is authorised, the Undergraduate Maths Student Office must be notified so the mark can be amended on the Departmental database. The mark change must come from the marker.

Note that the First Year January Test scripts are returned to students and so count as Progress Tests rather than full Examinations, and have Meet Your Marker sessions.

Summer Examinations

If the mark query relates to summer examinations, students should be aware that examinations are double marked and checked very carefully. College regulations do not permit students to have their examination scripts returned and marks may only be changed if there has been an administrative error. An arithmetic mark check may be requested.

The Department will allow students to view their 1st and 2nd Year summer exam scripts for feedback purposes in the following autumn term. Students will be asked to sign up to see specific exams ahead of time.

Information on post examination appeals procedures can be viewed on http://www.imperial.ac.uk/student-records-and-data/for-current-students/undergraduate-and-taught-postgraduate/exams-assessments-and-regulations/appeals/

Mitigating Circumstances

Extenuating/mitigating circumstances are the terms used by College to describe all factors/events that affect a student’s academic performance in relation to examinations, major pieces of coursework and projects, and also difficulties impacting upon a substantial part of the academic year. It is vital
that we know and have documentary support if you want us to take your mitigating circumstances into consideration with respect to your academic performance.

If you wish any mitigating (i.e. special) circumstances to be taken into account when we make decisions about your results or examinations, you must complete a Mitigating Circumstances form.

A mitigating circumstances form should be filled in for any long term illness/issue affecting your performance throughout the year, for any extension requests for large pieces of CW (over 10%) and for any specific issues around exams (eg. illness from an exam). An illness form should be used for any absence from a test that counts for less than 10%.

Mitigating Circumstances forms can be found outside the Undergraduate Maths Student Office or on Blackboard Maths Central (https://bb.imperial.ac.uk) under General Information.

Please use the form to report all major mitigating circumstances during your time in the Department of Mathematics at the end of each year for that year. Use extra sheets if necessary and please include relevant dates. In cases of serious long-term illness, it is important to submit a Mitigating Circumstances form for each year where you felt you had been negatively impacted by the illness.

Allowance is normally considered only in cases of long-term serious illness (not odd bouts of flu), close family bereavements, serious family problems etc. Even when mitigating circumstances are accepted there is no guarantee that the Examination Board will make any allowance for them.

The completed form should be returned, together with any required documentary evidence, to the Undergraduate Maths Student Office by specified deadlines (dependent on event). No allowance can be made if your form is not submitted in time.

**Examination Absences**

If, for medical or other reasons, you are absent for an examination you must:

- inform the Undergraduate Senior Tutor by email or phone the Undergraduate Liaison Officer on the day of the missed examination
- complete a Mitigating Circumstances form and return it to the Undergraduate Maths Student Office within 5 days of the event

*Note:* If any allowance is to be made then documentary evidence to support your case will be needed. In the case of illness your doctor needs to see you the same day (or as soon as possible, while you are still ill).

If your case is accepted by the Examination Board, no attempt at the examination is considered to have been made and, if a first attempt at the examination is made at a later date, it is not treated as a resit. If your case is not accepted by the Examination Board an attempt is normally considered to have been made and a later attempt is regarded as a resit, which is for Pass credit only.

A Mitigating Circumstances form must also be completed if circumstances prohibit you from completing a major piece of assessed work, such as the M1R and M2R projects.

**Examination Withdrawals**

You may only withdraw from an examination with the permission of the Undergraduate Senior Tutor. Otherwise, a score of zero will be recorded and the resit paper will be capped at the pass mark.
**First Year Assessment**

*Students are required to pass all programme elements in order to progress into the Second Year.*

**Assessed Coursework and Progress Tests**

For each of the eight main lecture modules, particular pieces of work are set as progress tests. These are marked and returned to students as part of the overall assessment for these modules.

The Term 1 modules of M1F, M1GLA, M1M1 and M1S have regular progress tests throughout the term. For each module, the marks from these tests are worth 5 percent of the overall marks for the module. Some of these tests will be individual, some may be group assessments.

The Term 2 modules of M1A1, M1M2, M1P1 and M1P2 have regular progress tests, assessed coursework or group work or a combination. For each module, the marks from these assessments are worth 10 percent of the overall marks for the module.

**Mathematical Computation**

The assessment of M1C consists of marked projects and tests each term. This module counts in the assessment of Honours, currently for the equivalent of half of one of the lectured modules:

- Term 1: Matlab computational projects (50 percent of marks for the module)
- Term 2: Python computational projects (50 percent of marks for the module)

**January Tests**

There is one written test in January for each of the Term 1 modules of M1F, M1GLA, M1M1 and M1S. Formal examination rules and regulations apply except that marked scripts are returned to the students. Also, pro-rata marks may be awarded if, due to illness or a serious personal matter, a student misses a test and subsequently submits an Illness/Personal Issue form along with documentary evidence supporting their case.

The results of each of these tests count 5 percent towards the overall marks for these modules.

**May/June Examinations and September Resit Examinations**

There is one written examination in each of M1F, M1GLA, M1M1, M1S, M1A1, M1M2, M1P1 and M1P2 (worth 90 percent of the marks for each module).

September resits are available followed by resit opportunities the following May/June.

**Resit examinations are for Pass credit only – only a maximum mark of 40 percent will be credited.** Once a Pass is achieved in a module, no further attempts are permitted.

Two resit attempts are normally available to students. However, First Year students who fail six or more of the 10 First Year course elements (eight lecture modules, M1C and M1R), will normally be instructed to terminate their studies and withdraw from the College.

*Note: Resits for modules assessed solely by project/coursework (M1R and M1C) will be arranged individually as determined appropriate by the Examinations Board.*
M1R Individual Poster Project

Following the May/June examinations, all students must produce a poster based on a subject suggested by one of the compulsory special seminar series. Towards the end of Term 3, students will be required to present their poster and explain it orally.

Students who do not pass the M1R Individual Poster Project may be required to submit a written project by September for Pass credit only.

The M1R Individual Poster Project must be passed in order to progress into the Second Year. It counts in the assessment of Honours, currently for the equivalent of half of one of the lectured modules.

Second, Third and Fourth Year Assessment

Second Year Assessment

M2AA1, M2AA2, M2AA3, M2AM, M2PM1, M2PM2, M2PM3, M2PM5, M2S1 and M2S2 have a summer exam worth 90 percent of the overall marks for the module and assessed coursework and progress tests that count for the remaining 10 percent.

In Term 3, students participate in the M2R Group Project. The M2R Group Project must be passed in order to progress into the Third Year. Its weighting is currently half that of a lectured module. Group oral presentations form part of the assessment.

Students who do not obtain Passes in examinations at the first attempt will be expected to attend resit examinations where appropriate. September resits are available to Second Year students followed by resit opportunities the following May/June. Two resit attempts are normally available to students.

Note: September resits may not be offered for modules assessed solely by project.

Resit examinations are for Pass credit only – a maximum mark of 40 percent will be credited. Once a Pass is achieved, no further attempts are permitted.

Third and Fourth Year Assessment

In the Third and Fourth Years, some modules are assessed wholly by project/assignments, while others follow a similar assessment pattern of small coursework assignments (usually up to 10%) and final exam. Some modules are assessed solely by a final exam, or may have an oral assessment component. The assessment structure will be made clear at the start of each module. Further details can be found in the Programme Specifications and Year Guides.

M3R and M4R are examined by project supplemented by an oral presentation.

M3T is assessed by a journal of teaching activity, teacher’s assessment, oral presentation, and an end of module report.

Note: Students who take modules which are wholly assessed by project will be deemed to be officially registered on the module through the submission of a specified number of pieces of assessed work for that module. Thus, once a certain point is reached in these modules, a student will be committed to completing the module.

Due to the amount of work Project-only modules require, students will be allowed to sign up for only one Project-only module per term. If students wish to apply for more, they will need to seek special permission from the Undergraduate Senior Tutor.
Students who do not obtain Passes in examinations at the first attempt will be expected to attend resit examinations where appropriate. For students in their final year, provided the aggregate mark for the year is at least the pass mark, the Examinations Board may recommend that final year failures be compensated, and that a student may graduate. Further details can be found in the Programme Specifications. Third and Fourth Year students have resit opportunities the following May/June (NOT normally in September). Two resit attempts are normally available to students; however, MSci students who fail a module in their Third Year only have at most one resit opportunity to be able to progress to the Fourth Year, and may be graduated with a BSc.

Resit examinations are for Pass credit only – a maximum mark of the pass mark will be credited (40 percent for M3 modules, 50 percent for M4 modules). Once a Pass is achieved, no further attempts are permitted.

Fourth Year Mastery Material

All Fourth Year mathematics modules’ final exams will be 2.5 hours in length (unless otherwise specified). The papers will include five questions, the four questions given to 3rd year students on the module, plus a fifth question ‘mastery’ question, testing the subject in greater depth.

Academic Integrity and Academic Misconduct

As your programme of study continues, you will be taught the concept of academic integrity and how you can ensure that any work that you complete now, or in the future, conforms to these principles. This means that your work acknowledges the ideas and results of others, that it is conducted in an ethical way and that it is free from plagiarism.

Academic misconduct is the attempt to gain an academic advantage, whether intentionally or unintentionally, in any piece of assessment submitted to the College. This includes plagiarism, self-plagiarism, collusion, exam offences (cheating) or dishonest practice. Full details of the policy can be found at:


Definitions of the main forms of academic misconduct can be found below:

Plagiarism

Plagiarism is the presentation of another person’s thoughts, words, images or diagrams as though they were your own. Another form of plagiarism is self-plagiarism, which involves using your own prior work without acknowledging its reuse.

Plagiarism must be avoided, with particular care on coursework, essays, reports and projects written in your own time and also in open and closed book written examinations.

Where plagiarism is detected in group work, members of that group may be deemed to have collective responsibility for the integrity of work submitted by that group and may be liable for any penalty imposed, proportionate to their contribution.

Collusion:

This is the term used for work that has been conducted by more than one individual, in contravention of the assessment brief. Where it is alleged that there has been collusion, all parties will be investigated under the Academic Misconduct procedure.
Exam offences
Exam offences include behaviour such as bringing unauthorised material into an exam, attempting to communicate with others apart from the invigilator, trying to remove examination material without permission, taking an exam for someone else or getting someone else to take an exam for you.

Dishonest practice
Examples of dishonest practice include bribery, contact cheating (buying work from an essay mill or other individual to submit as your own), attempting to access exam papers before the exam, making a false claim for mitigating circumstances or providing fraudulent evidence, falsifying documentation or signatures in relation to assessment.

From the Department:
Academics trade in original thought and insight. They take great pride in crediting others by meticulously quoting and referencing all sources and aim to instil the same appreciation and respect for academic work and original thought in their students. To credit others is a matter of academic integrity.

All the assessed work and projects that you submit count towards your degree. They are therefore part of the examination process and governed by its rules. Violation of these rules counts as plagiarism and is regarded as an examination offence:

- if you have worked with or consulted other people on assessed work or a project you must acknowledge their input
- if you copy text or diagrams from a book or a journal or the internet or another person this must be acknowledged in the text and there must be a corresponding reference in the bibliography
- assessed work and projects must be your own unaided work
- each piece of work must be accompanied by a signed declaration, ‘This is my own unaided work unless stated otherwise’, or the statement must be accepted when uploading work electronically.

Plagiarism is taken very seriously in the Department of Mathematics and various means are available for detecting it. Appropriate punishments can be severe. If plagiarism is suspected, you will be interviewed by the Undergraduate Senior Tutor and a relevant staff member. If the plagiarism is deemed minor, punishment will be imposed by the Department of Mathematics. Plagiarism deemed major will be referred to the College Registry. This can result in students losing their entire degree.

The source and recipient are normally treated equally – which means that if you share your work, you will be liable for the same punishments as the student who copies your work. Students who share their work are often strong students and thus the punishments can hurt them much more than if already at the bottom of the year group. Thus do NOT pass on your solutions/your code to other people as even though they may say they will not copy, you have already given your work to them, allowing for the possibility.

The severity of plagiarism is judged on the basis of the extent of plagiarism in the piece of academic work concerned; it is not judged on the basis of the weight of that piece in the overall degree. For example, a single sentence copied from an online source without appropriate citation may be deemed minor and penalised with a loss of mark. A typical punishment is the loss of all marks in the academic piece.

By comparison, a major case of plagiarism would involve, for example, significant collaboration without acknowledgement in a single piece of assessed work.

If deemed major, the typical punishment for plagiarism is the loss of all marks in all written work for the entire year. This includes all exams, whether they have already taken place or not. In these
cases, a resit for Pass credit only is normally available. Cases of major plagiarism in the Final Year normally lead to a severe reduction of the degree classification.

In addition, a letter is normally placed in the student’s file, which will adversely influence any letters of reference. Students who have committed major plagiarism therefore often find it difficult to pursue their academic careers. Major plagiarism could also result in expulsion from College.

Plagiarism/cheating often takes place when students are stressed/struggling with the work. If this is the case, please make sure that you reach out for support from your lecturer/Personal Tutor/Undergraduate Liaison Officer before you copy someone else’s work and get into trouble. It is better to get a lower mark than to copy someone else’s work.

If you are unsure about what plagiarism is, or how to properly cite your sources, please speak to the Mathematics Librarian or the Undergraduate Senior Tutor.

Progression & Graduation

Progression

Students are required to pass all programme elements in order to progress into the following year either through the May/June examinations or resits.

MSci G103 Mathematics and G104 Mathematics with a Year Abroad students must normally maintain high marks (at an Upper Second level or above) in order to remain on the MSci programmes.

Performance at a high level, both mathematically and linguistically, is normally necessary for G104 students for the progression to the year abroad to be permitted.

Graduation

It is normally required that students pass all course components in order to graduate. However, the College may compensate a student for a narrowly failed module in the Final Year of study. The Department will endeavour to graduate students at the first possible opportunity. Students may not opt to resit failed examinations if the Department has made the decision to graduate them. In general, applications for postponement of consideration for graduation will only be granted by the Department for special cases, such as absence through illness.

The total marks for examinations, assessed coursework, progress tests, assignments and projects, with the appropriate year weightings, is calculated and recommendations are made to the Examiners’ Meeting (normally held at the end of June) for consideration by the Academic Staff and External Examiners. Degrees are formally decided at this meeting.

Graduating students may be awarded Honours degrees classified as follows: First, Second (upper and lower divisions) and Third, with a good Final Year being viewed favourably by the External Examiners for borderline cases.

Rarely, circumstances may require the Department to graduate an MSci student with a BSc.

Further information on degree classes can be found in the Scheme for the Award of Honours available online at:

http://www.imperial.ac.uk/mathematics/undergraduate/course-structure-and-content/

Students graduating with MSci G103 Mathematics or G104 Mathematics with a Year Abroad will receive an MSci degree that incorporates Bachelor’s level study.
Information about Commemoration (Graduation) ceremonies can be found online at: 
http://www.imperial.ac.uk/graduation/

Prizes

Each year prizes, both from the Department of Mathematics and external bodies, are awarded for good examination performances and outstanding projects. The Department also nominates students for College and prestigious national awards, in which they are often successful. More information on Prizes can be found on Maths Central.

A reception for award winners is usually held on Commemoration (Graduation) Day.

European Credit Transfer System (ECTS)

As part of the compliance with the European ‘Bologna Process’, Department of Mathematics courses and degrees are required to be rated via the European Credit Transfer System (ECTS) – which is based notionally on hour counts for elements in the degree.

First Year mathematics modules have an ECTS value of 6.5 except for M1R which has an ECTS value of 4.5 and M1C which has ECTS value of 4. Each Second Year mathematics module has an ECTS value of 7 with M2R having an ECTS value of 5. Language modules, taken by First and Second Year G104 Mathematics with a Year Abroad students, have an ECTS value of 6. Third and Fourth Year mathematics modules, including M3C, M3B and M3T, have an ECTS value of 8 except for M4R which has an ECTS value of 16. Horizons modules and Centre for Languages, Culture and Communication/Business School modules have an ECTS value of 6.

MSci students who wish to increase their ECTS counts from roughly 240 to 270 must undertake additional study over the summer vacations of their Second and Third Years. Contact the Director of Undergraduate Studies for further information.

Further information about the ‘Bologna Process’ and ECTS can be viewed online at: http://www.imperial.ac.uk/study/ug/courses/our-degrees/ects/

Department of Mathematics ECTS ratings can be viewed within the Programme Specifications online at: http://www.imperial.ac.uk/staff/tools-and-reference/quality-assurance-enhancement/programme-information/programme-specifications/.

Professional Accreditation and Exemptions

Department of Mathematics graduates are eligible for associateship of the Royal College of Science (ARCS): http://www.rcsa.org.uk/ and membership of the Institute of Mathematics and its Applications (IMA): http://www ima.org.uk/.

Exemptions from some actuarial examinations may be available following agreements between The Actuarial Profession http://www. actuaries.org.uk/ and Imperial College London. Information for 2018-2019 is pending, more information will be available on Maths Central once available.
4. Board of Examiners

Board of Examiners

The Board of Examiners for the Department consists of all of the Lecturers teaching in said year, the Year Tutors, Undergraduate Senior Tutor, Director of Undergraduate Studies, Deputy Heads and Head of Department.

External Examiners (confirmed for 2018-2019 as of start of September 2018)

- Dr Timo Betcke, University College London
- Professor Anthony Carbery, The University of Edinburgh
- Dr Emilian Parau, University of East Anglia
- Professor Christopher Jennison, University of Bath
- Professor Mark Kambites, University of Manchester

External examining acts as an essential part of the College’s quality assurance and enhancement process, serving to ensure that academic standards are maintained. The knowledgeable and independent views of external examiners are invaluable in certifying that the College’s awards are appropriate and comparable as well as highlighting good practice and potential areas of enhancement.

It is inappropriate for you to submit complaints or representations direct to external examiners or to seek to influence your external examiners. Inappropriate communication towards an examiner would make you liable for disciplinary action.

A summary of External examiners reports from the previous academic year can be found here:

www.imperial.ac.uk/staff/tools-and-reference/quality-assurance-enhancement/external-examining/information-for-staff
5. **G104 Programme**

Co-ordinator for European Exchanges Dr R. Nurnberg: robert.nurnberg@imperial.ac.uk  
Co-ordinator for MIT Exchanges Dr Sheehan Olver: s.olver@imperial.ac.uk.

There is an increasing demand for graduates with international experience. Employers are increasingly interested in graduates with language skills and these are essential for graduates wishing to work abroad.

G104 Mathematics with a Year Abroad is a four year Honours degree programme leading to an MSci qualification. Three years are spent in the Department of Mathematics at Imperial College and one year (the Third Year) at a host institution abroad.

Current Host Institutions for the Year Away from Imperial College

- ENSIMAG Grenoble, France
- ENS Lyon, France
- EPFL Lausanne, Switzerland
- Humboldt Berlin, Germany
- ETH Zurich, Switzerland
- UAM Madrid, Spain
- MIT, Cambridge, MA, USA

For students going to host institutions in Europe: Suitable arrangements will be anticipated for the year away when a student is first accepted onto the course and more detailed planning will proceed at the completion of the First Year programme. Every effort will be made to send a student to their country of choice but a particular host institution cannot be guaranteed.

For MIT, selection of students is competitive and takes place in the second year of study. Places are limited and due to this mark requirements for application are high.

**Course Structure**

G104 students looking to go to a European institution need to have at least a GCSE (or equivalent) in their chosen language prior to starting in the programme. Throughout the programme, students are required to take all core modules in the Department. An appropriate language module is also normally required in addition to the mathematics modules taken. However, students who are especially well prepared in the language for their proposed year of study away may exceptionally have the language module requirements waived. Students are required to register for their language module themselves.

Further information on the free language modules available at Imperial College London for G104 Mathematics with a Year Abroad students, and any pre-requisites which may be required, can be found online at:

[http://www.imperial.ac.uk/languages/year-in-europe/](http://www.imperial.ac.uk/languages/year-in-europe/)

**Note:** Whilst G104 students must pass the language examinations at the end of First and Second Year in order to stay on G104, language examination results do not directly contribute to their mathematics degree Honours mark.

All G104 students must be in a position to take advantage of the Third Year of the course (spent away). Mathematically, students are normally required to have attained a good level of performance in Mathematics (gaining 60 percent or better in Year 2). Linguistically, students needing a second language should have passed Level 3 in their chosen language at the Centre for Culture, Languages and Communication (or its equivalent elsewhere).
First and Second Years

G104 students follow the same mathematics modules as all other students, but take additional language classes (as necessary).

Third Year (Spent at a Host Institution)

Performance at a high level is normally necessary for the progression to the year abroad to be permitted. In addition, there is a language requirement for the year away at European universities.

Students will follow an approved set of modules at the host institution, where they will also be assessed. On their return, the achieved exam results will be converted to the Imperial Maths scale. Details on the applied conversion procedure for European Universities can be found on the Maths Central Blackboard page under Course Information, G104 information. MIT conversion information will be available in 2019.

Fourth Year

Students will have a free choice of core modules and options from the list currently available - on the same basis as students registered on the MSci G103 Mathematics degree. G104 students may also take the M3T module as an option in this year.

Pass Requirement and Assessment for Honours

Students are normally expected to pass all programme elements in order to progress into successive years.

Performance at a high level both in mathematics and their language modules is normally necessary for the progression to the year abroad to be permitted.

When students return to College for their Final Year of study they are expected to take on a programme of study in line with the MSci G103 Mathematics degree.

The weighting for final Honours purposes of modules/projects first taken in First, Second, Third and Fourth Years is 1:3:3:5.

On the rare occasion that a student performs very poorly in their year away they may, at the discretion of the Undergraduate Senior Tutor, be transferred to the BSc G100 Mathematics degree and take M3 subjects in their Final Year. In this case, the year weightings will be 1:3:0:5. If a student remains on G104 in their fourth year and there is reason to suspect that through no fault of the student, the mark abroad is out of line with the performance at Imperial, the Examinations Board will also consider the effect of discounting further the Year Abroad in their deliberations with regard to degree classification.

Students who satisfy the degree requirements receive consideration for Honours in the normal way: First Class, Second Class (Upper and Lower Divisions).

Transfer between G104 and Other Degrees

Students who do not perform well at Second Year may be unable to spend their Third Year overseas and may be transferred to BSc G100 Mathematics.

Students who perform very poorly in their year away may be transferred onto the G100 degree and take M3 subjects in their Final Year. This is a departmental decision – students may not choose this path.
Students who choose to transfer from MSci G104 Mathematics to a three year BSc degree will only be allowed to do so with the permission of the Department. This permission is not normally possible after undertaking study abroad.

Students on a BSc degree may be able to transfer into the MSci G104 Mathematics degree to go to Europe if they can satisfy the Department of their language skills and have good examination results. Normally such transfers will be considered at the end of the First Year of study. Students should make their interest known as early as possible. Transfer to the MIT Year Abroad programme is through selection only.
6. Location and facilities

Imperial has a number of campuses in London and the South East. All have excellent travel links and are easily accessible via public transport.

Your main location of study will be:

Huxley Building, 180 Queen’s Gate
South Kensington Campus, Imperial College London, Sw8 2AX

Huxley Building Guide

| Level 1 | Lecture Theatres/Classrooms: | 130, 139, 140, 144 |
|         | Lockers: | Please see the Technical Services Manager (131) if you require a locker |

| Level 2 | Lecture Theatres/Classrooms: | Clore Lecture Theatre (213) |
|         | Undergraduate Common Room: | 212. This room has space for relaxation, work stations, a photocopier/scanner/printer and a hot and cold water unit. |

| Level 3 | Lecture Theatres/Classrooms: | 340, 341, 342 |
|         | Departmental Noticeboards |

| Level 4 | Computing Rooms: | 408, 409 (for 4th Year students only), 410 |
|         | Maths Learning Centre (MLC) (computer workstations/photocopiers/scanners/printers) |
|         | Information and Communication Technologies (ICT): | 411. Please see ICT if you have problems with computing or printing equipment or Department issued printing credit |

| Level 5 | Academic Staff Offices |

| Level 6 | Lecture Theatres/Classrooms: | 642, 658 |
|         | Departmental Administrative Offices |
|         | Undergraduate Liaison Officer’s Office: 632 |
|         | Undergraduate Senior Tutor’s Office: 657 |
|         | Director of Undergraduate Studies’ Office: 661 |
Undergraduate Maths Student Office: 649 (open Monday to Friday 10am-4pm)
Central Office: 649a
Academic Staff Offices
Staff Post Racks: 655a
Student Post Racks: 649
Submission of Assessed Work Pigeonholes: Corridor, opposite the Undergraduate Maths Student Office (649), in between rooms 652 and 654.
Collection of Marked Work Pigeonholes: 649

Level 6M  Academic Staff Offices

Level 7  Academic Staff Offices

*Any letters or documents issued by the Department of Mathematics, which aren’t being posted or emailed, can only be collected from the Undergraduate Maths Student Office. Picture ID and signature are required upon collection.

Facilities

Mathematics Learning Centre (MLC)

The Mathematics Learning Centre (level 4, Huxley Building) is a major space within the Department for individual and group study. Departmental computing workstations and printers and copiers are available for students to use. There are three side rooms in the MLC: MLC1, MLC2 and MLC3 which can be booked out and used for small group tutorials, careers sessions, Seminars, etc.

The MLC is at times used for teaching, and students are required to vacate the computer stations required for these sessions. During tests/exams for the modules, students may be asked to leave the MLC.

Other Computing Rooms

Departmental workstations are located in the Huxley Building in rooms 212, 408, 409 (for Fourth Year students only), 410 and the Maths Learning Centre (level 4, Huxley Building). 410 is designated as a silent study area. 408 and 410 are at times used for teaching purposes. A timetable will be placed on the doors.

Maths Common Room (Huxley 212)

Huxley 212, next to the Clore, is a computing/common room for all Mathematics Undergraduate Students. Students may use the room for socialising, working together, having lunch, playing board
games, etc. Notices from MathSoc and the Year Reps will be posted in this room. Students are reminded to be courteous to each other while using all of the rooms and are asked to not leave their personal possessions in the rooms while not in them.

**Student Post**

There are student post racks for ‘regular’ post only in the Undergraduate Student Office, opposite the pigeon holes from which to collect marked work from. These racks are cleared at the end of each academic year; please make sure you check the racks for any letters you may be expecting.

Any letters or documents issued by the Department of Mathematics, which aren't being posted or emailed, can only be collected from the Undergraduate Maths Student Office. Photo ID and signature are required upon collection.

**Lockers**

Student lockers are situated on level 1 in the Huxley Building. Please see the Technical Services Manager (room 131, Huxley Building) if you require a locker.

At the start of the academic year, students should put a padlock on their chosen locker and then register their locker by completing a form found outside room 131. At the end of the academic year, students are required to remove their locks and empty their lockers. If this is not done, locks will be cut off and the locker contents will be disposed of.

**Printing Credit**

At the start of the academic year, the Department will provide students with printing credit. Students who complete the Student Online Evaluation Surveys (SOLE) will receive further credit.

Value loaders and a change machine are situated just inside the Wolfson IT Suite on level 1 in the Central Library. Students can also pay online via ePay: [http://www.imperial.ac.uk/admin-services/ict/self-service/computers-printing/printing/buy-credit/](http://www.imperial.ac.uk/admin-services/ict/self-service/computers-printing/printing/buy-credit/)

If you experience any problems with the Department issue printing credit, please contact ICT (room 411, Huxley Building).

**Letters**

Students should contact the Student Hub and Registry for any official letters, for example

- Statement of Attendance letter
- Transcripts
- Confirmation of Degree Letter
- Visa letters/CAS
- Letter to open a bank account
- Council Tax exemption certificates


If you require some other type of letter, please ask at the Undergraduate Maths Student Office. Official transcripts can only be requested from Registry through the Student Hub.
To request a letter, students must complete an Undergraduate Letter Request form. These can be found online on Blackboard Maths Central (https://bb.imperial.ac.uk) under General Information or outside the Undergraduate Maths Student Office.

The online form must be printed and completed as we require a handwritten signature in order to process the request.

References

The Department of Mathematics is able to provide references for students.

- all references must be for a specifically named postgraduate course or job; the Department is not prepared to write open references
- each member of staff may only provide you with up to five references per academic year
- you must provide a statement explaining why you are applying for the courses or posts listed and attach a current CV and any relevant referee forms to your application
- references can take up to three weeks to prepare so please plan ahead; references cannot be provided at very short notice
- referees may ask to see you before they provide a reference
- if you are applying to a number of postgraduate programmes, if possible, please try to ask for all references at the same time
- if your reference is being posted, you will receive an email (to your university email address if you are a current student) informing you when it has been sent. References will be posted 2nd class
- if your reference is for collection, you will receive an email (to your university email address if you are a current student) informing you of your reference's availability and from where and when it can be collected
- if you want someone else to collect your reference(s) for you, you must send the Undergraduate Maths Student Office (maths-student-office@imperial.ac.uk) an email from your university email account authorising the release of your reference(s) to the person named. The person collecting your reference(s) must bring their own picture ID with them for identification purposes

The person you ask to be your referee should be someone who knows you well enough to give a fair assessment of you. Normally your Personal Tutor will be the main person to write references for you but you may also approach a Project Supervisor or your Year Tutor. The Undergraduate Senior Tutor may also be approached.

Remember that we cannot respond to direct requests for references from third parties; we can only provide a reference for you if you make the initial request.

Please talk to your Personal Tutor for any help with questions, or contact the Undergraduate Liaison Officer.

The Reference Request Form can be printed from the Maths Central pages on Blackboard (https://bb.imperial.ac.uk) under General Information.
**Blackboard**

Blackboard is Imperial College's Virtual Learning Environment (VLE) and provides online academic resources to students. Provisional student assessed work marks (subject to ratification by the Exam Board) are also made available through Blackboard.

The Maths Central pages on Blackboard will include pertinent information to all UG students on the study programme, regulations, examinations, etc. Important messages to Year Groups will also be sent through Blackboard.

Blackboard can be used to:

- deliver module materials (including text, images, video and audio)
- deliver quizzes and surveys.
- set and receive assignments.
- communicate with students through online discussions, real-time chat and an interactive whiteboard
- track student progress and manage grades
- provide feedback to students

**Note:** Not all Department of Mathematics Module Lecturers use Blackboard; many choose to maintain their own websites. Blackboard pages for each module will still exist to hold marks for assessed CW for each module. You will be notified at the beginning of each module where to access information for that module.

**Panopto Lecture Recordings**

The Department may record lectures using the Panopto lecture recording system.

The lecture recordings are in place in order to support students’ learning. Students are encouraged to use the recordings to review material they did not understand in lecture, to aid in revision prior to examinations, or to cover material when absent due to illness/other serious personal issue. The lecture recordings are not to replace actual attendance at lectures, and the Department expects students to attend all lectures.

Students should understand that due to unforeseen circumstances, there may be times when the technology fails. If students have missed a lecture that has failed to record, they are responsible to gain the missed material themselves from a colleague.

Students can access recorded lectures through the Panopto site on the Imperial College website: [https://imperial.cloud.panopto.eu/Panopto/Pages/Default.aspx](https://imperial.cloud.panopto.eu/Panopto/Pages/Default.aspx) Students will automatically be given access to all compulsory courses that are being recorded for their year group, but some optional courses may require special permissions.

More information about Panopto and the College’s guidelines on recordings can be viewed here: [http://www.imperial.ac.uk/admin-services/ict/self-service/teaching-learning/elearning-services/panopto/students-use/](http://www.imperial.ac.uk/admin-services/ict/self-service/teaching-learning/elearning-services/panopto/students-use/)

**Mathematics Education Technology – Research at Imperial College (METRIC)**

The METRIC project develops a set of Web-based learning modules consisting of self-test exercises, interactive explorations of concepts and mathematical tools (such as plotters). These resources are available through the College VLE (Blackboard), and on the Web.
All First Year Mathematics Undergraduates are recommended to log on to METRIC over the summer to spend some time preparing prior to the first week; the resources are widely used by other Departments.

METRIC also supports delivery of the College's Mathematics outreach activities, via masterclasses, summer schools and training for teachers.

Lead contact (Dr P.J. Ramsden): p.ramsden@imperial.ac.uk

Further information about METRIC can be viewed online at: https://imperial.mapleserver.com/imperial/

Shuttle bus

A free shuttle bus runs between our South Kensington, White City and Hammersmith Campuses on weekdays. Seats are available on a first-come, first-served basis. You need to show your College ID card to board. Download the timetable at:

www.imperial.ac.uk/estates-facilities/travel/shuttle-bus

Maps

Campus maps and travel directions are available at:

www.imperial.ac.uk/visit/campuses

Accessibility

Information about the accessibility of our South Kensington Campus is available online through the DisabledGo access guides:

www.disabledgo.com/organisations/imperial-college-london-2

Smoke-Free Policy

All Imperial campuses and properties are smoke-free. This means that smoking by staff and students is not permitted on or within 20 metres of College land. The policy covers all College properties, including student accommodation and sports grounds.

www.imperial.ac.uk/smoke-free
7. Working while studying

If you are studying full-time, the College recommends that you do not work part-time during term time. If this is unavoidable we advise you to work no more than 10–15 hours per week, which should be principally at weekends and not within normal College working hours.

Working in excess of these hours could impact adversely on your studies or health.

If you are here on a Tier 4 visa you can work no more than 20 hours a week during term time. Some sponsors may not permit you to take up work outside your studies and others may specify a limit.

If you are considering part-time work during term time you are strongly advised to discuss this issue with your Personal Tutor. If you are on a Tier 4 visa you should also seek advice from the International Student Support team regarding visa limitations on employment. [http://www.imperial.ac.uk/study/international-students/visas-and-immigration/work-rules-during-your-studies/](http://www.imperial.ac.uk/study/international-students/visas-and-immigration/work-rules-during-your-studies/)

The College’s examination boards will not normally consider as mitigating circumstances any negative impact that part-time work during term-time may have had on your performance in examinations or in other assessed work. Examinations or vivas cannot be rescheduled to accommodate your part-time working arrangements.
8. Health and safety

You are responsible for looking after your own health and safety and that of others affected by your College-related work and leisure activities. You must:

- comply with all local and College policies, procedures, and codes of practice and with the arrangements which the College has in place to control health and safety risks.
- ensure that your activities do not present unnecessary or uncontrolled risks to yourself or to others.
- attend appropriate induction and training.
- report any accidents, unsafe circumstances, or work-related ill health of which you become aware to the appropriate person.
- not interfere with any equipment provided for Health and Safety.
- inform your supervisor or the person in charge of the activity in cases where you are not confident that you are competent to carry out a work or leisure activity safely, rather than compromise your own safety or the safety of others.

The College’s Health and Safety Policy can be found at:


Your Departmental safety contact is:

- Andy Pope
  - Huxley 131
  - 020 7594 8544 (internal: 48544)
  - a.pope@imperial.ac.uk

You will be required to complete inductions and attend training sessions to safely complete this course. This includes:

- Safety Induction for all new students – Tuesday 2nd October

The current First Aid contacts in the Department are on Blackboard Maths Central ([https://bb.imperial.ac.uk](https://bb.imperial.ac.uk)) in General Information section.

The College Safety Department

The Safety Department offers a range of specialist advice on all aspects of safety. This includes anything which you feel might affect you directly, or which may be associated with teaching, research, or support service activities.

The College’s activities range from the use of hazardous materials (biological, chemical, and radiological substances) to field work, heavy or awkward lifting, driving, and working alone or late.

All College activities are covered by general health and safety regulations, but higher risk activities will have additional requirements.

The Safety Department helps departments and individuals ensure effective safety management systems are in place throughout the College to comply with specific legal requirements.

Sometimes the management systems fail, and an accident or a near-miss incident arises; it is important that we learn lessons from such situations to prevent recurrence and the Safety Department can support such investigations. All accidents and incidents should be reported online at:

[www.imperial.ac.uk/safety](http://www.imperial.ac.uk/safety)
To report concerns or to ask for advice you should contact your programme director, academic supervisor or departmental safety officer in the first instance. You may also contact the Safety Department directly.

**Occupational Health requirements**

The College Occupational Health Service provides services to:

- protect health at work
- assess and advise on fitness for work
- ensure that health issues are effectively managed

The Service promotes and supports a culture where the physical and psychological health of staff, students and others involved in the College is respected, protected and improved whilst at work.

[www.imperial.ac.uk/occupational-health](http://www.imperial.ac.uk/occupational-health)
9. College policies and procedures

Regulations for Students
All registered students of the College are subject to the Regulations for Students, the College Academic and Examination Regulations and such other regulations that the College may approve from time to time.

www.imperial.ac.uk/about/governance/academic-governance/regulations
www.imperial.ac.uk/students/terms-and-conditions

Academic Feedback Policy
We are committed in providing you with timely and appropriate feedback on your academic progress and achievement, enabling you to reflect on your academic progress. During your study you will receive different methods of feedback according to assessment type, discipline, level of study and your individual need. Further guidance on the Policy of Academic Feedback can be found on the Academic Governance website:

www.imperial.ac.uk/media/imperial-college/administration-and-support-services/registry/academic-governance/public/academic-policy/academic-feedback/Academic-feedback-policy-for-taught-programmes.pdf

For more information on feedback on academic work in the Department, please see section 3, Assessment.

Provisional Marks Guidance
Provisional marks are agreed marks that have yet to be ratified by the Board of Examiners. These results are provisional and are subject to change by the Board of Examiners. The release of provisional marks is permitted except in certain circumstances. Further information can be found in the Guidelines for Issuing Provisional Marks to Students on Taught Programmes:


In the Department, any marks made available to students prior to official results being released by Registry are provisional and subject to ratification by the Examinations Board.

Late Submission Policy
You are responsible for ensuring that you submit your coursework assessments on time and by the published deadline. Any piece of assessed work which is submitted beyond the published deadline (date and time) would be classed as a late submission. Further guidance on Late Submission of Assessments can be found on the Academic Governance website:

www.imperial.ac.uk/media/imperial-college/administration-and-support-services/registry/academic-governance/public/academic-policy/marking-and-moderation/Late-submission-Policy.pdf

Mitigating Circumstances
Some times during your studies you may be affected by sudden or unforeseen circumstances. You should always contact your personal tutor for advice and support. If this happens at the time of, or immediately preceding your assessments you may be able to make a claim for mitigating circumstances. If successful this claim enables the Board of Examiners when reviewing your marks at
the end of the year to have greater discretion with regards to offering repeat attempts (either capped or uncapped), a repeat year, or with your final classification.

All claims must be supported by independent evidence and submitted within 5 working days of the assessment deadline. Any claim made after this deadline is likely to be rejected unless there is a good reason (such as you were still unwell) until the point of submitting the claim. Further information can be found at [www.imperial.ac.uk/student-records-and-data/for-current-students/undergraduate-and-taught-postgraduate/exams-assessments-and-regulations/mitigating-circumstances/](http://www.imperial.ac.uk/student-records-and-data/for-current-students/undergraduate-and-taught-postgraduate/exams-assessments-and-regulations/mitigating-circumstances/).

Support for ongoing or long-term conditions, or for registered disabilities would not normally fall under the remit of mitigating circumstances and students should be supported through their studies with Additional Examination Arrangements. More details can be found at [www.imperial.ac.uk/disability-advisory-service/support/exams/](http://www.imperial.ac.uk/disability-advisory-service/support/exams/)

### Academic Misconduct Policy and Procedures

It is important that you learn how to properly attribute and acknowledge the work, data and ideas of others. Any proven form of academic misconduct is subject to penalties as outlined in the College’s Misconduct 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/)

### Appeal and Complaints Procedures

We have rigorous regulations in place to ensure assessments are conducted with fairness and consistency. In the event that you believe that you have grounds for complaint about academic or administrative services, or wish to appeal the outcome of an assessment or final degree, we have laid out clear and consistent procedures through which complaints and appeals can be investigated and considered:

[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)

### Student Disciplinary Procedure

The College has the right to investigate any allegation of misconduct against a student and may take disciplinary action where it decides, on the balance of probabilities, that a breach of discipline has been committed. The general principles of the Student Disciplinary Procedure are available on the College website:

[www.imperial.ac.uk/admin-services/secretariat/college-governance/charters/ordinances/students/](http://www.imperial.ac.uk/admin-services/secretariat/college-governance/charters/ordinances/students/)

### Intellectual Property Rights Policy

For further guidance on the College’s Intellectual Property Rights Policy is available on the College website:

[www.imperial.ac.uk/students/enterprising-students/intellectual-property/](http://www.imperial.ac.uk/students/enterprising-students/intellectual-property/)

### Use of IT Facilities

View the Conditions of Use of IT Facilities:

[www.imperial.ac.uk/admin-services/ict/self-service/computers-printing/staff-computers/conditions-of-use-for-it-facilities/](http://www.imperial.ac.uk/admin-services/ict/self-service/computers-printing/staff-computers/conditions-of-use-for-it-facilities/)
10. Well-being and advice

Student Space
The Student Space website is the central point for information on health and well-being.

www.imperial.ac.uk/student-space

Support in your Department

The Mathematics Department has a system of academic and pastoral care in place to make sure you have access to the appropriate support throughout your time here. This includes:

Personal Tutor

Your Personal Tutor is your first point of contact for pastoral support and advice. You can arrange to have a meeting with them at any time during your studies (although most Personal Tutors will have set office hours or may require you to make an appointment).

First Year students are expected to meet with their Personal Tutors on a weekly basis at their personal tutorial sessions; however, students should not feel that these are the only times they can meet with their Personal Tutor if they have any academic or personal concerns they would like to discuss.

Most First Year modules designate a problem sheet question specifically for discussion with your Personal Tutor at these weekly meetings and it is in these meetings that marked First Year assessed coursework and progress test scripts will be returned.

In Second, Third and Fourth Years, meetings with Personal Tutors will be less frequent but students should always feel free to contact their Personal Tutor with any issues. During ‘Meet Your Personal Tutor Weeks’, meeting with your Personal Tutor is compulsory.

It is important that Personal Tutors get to know their students well, so they can intervene early if something goes wrong academically or otherwise. Personal Tutors are experienced academics and they can become very important supporters. Ideally, a personal bond develops as students and their Personal Tutors meet on a regular basis and Personal Tutors witness the student’s academic development as they mature intellectually. Keeping Personal Tutors informed about academic and personal development will also enable them to write convincing, supportive references.
If, for whatever reason, students are unhappy with their Personal Tutors, they should notify their Year Tutor or the Undergraduate Liaison Officer.

**Year Tutors**

Year Tutors provide assistance both to individual students within their year group as well as to issues which might affect the year group as a whole.

Year Tutors should be contacted by individual students if they have an academic or personal issue they would like to discuss and their Personal Tutor is unavailable. They should also be contacted if a student has missed an assessed work deadline.

**Undergraduate Senior Tutor**

The Undergraduate Senior Tutor is available to help if Personal Tutors or Year Tutors do not feel qualified to advise a student on a particular matter. They also act as an intermediary between the student and the College where the student is experiencing problems.

**Undergraduate Liaison Officer**

The Undergraduate Liaison Officer works closely with the Director of Undergraduate Studies, the Undergraduate Senior Tutor and Year Tutors. Students will be able to approach the Undergraduate Liaison Officer in confidence to discuss any concerns they may have and, if necessary, they will be directed to the most appropriate people in the Department and/or College with whom to speak.

**Mums and Dads scheme**

Imperial College Union’s ‘Mums and Dads’ scheme matches first years with returning students in the Department to help you tap into the experience and peer support available from existing students.

https://www.imperialcollegeunion.org/your-union/mums-dads-2018

**Support in your hall of residence**

If you’re staying in College accommodation you will have access to a range of support within your hall.

**Well-being support**

All halls have their own Residential Support team who are on call 24/7 to look after your wellbeing and maintain a friendly living environment so that all residents can study, sleep, relax and enjoy themselves. They also play an important part in the social life of the hall, organising a rolling programme of events to bring everyone together. This is supported by the Hall Activities Fund, which all residents contribute to at a rate of £2/week (in 2018/19).

The team includes a number of returning students, known as Hall Seniors, who can offer first hand advice on making the most of life at Imperial.

**Administrative support**

Each hall has a Hall Supervisor or a Reception team who oversee the day-to-day running of the residence. So if you have any enquiries or want to report a maintenance issue there are people on hand to help you.

**Imperial College Union support**

All Imperial students automatically become members of Imperial College Union when they register at the College. The Union provides a range of support:
Imperial College Union (ICU) Advice Centre

Imperial College Union runs the Advice Centre independently of the College with advisers on hand to provide free, confidential, independent advice on a wide range of welfare issues including housing, money and debt, employment and consumer rights, and personal safety.

www.imperialcollegeunion.org/advice

Student representatives

The Union have many different opportunities for student representatives to get involved with issues they care about, including Liberation Officers ensuring views of under-represented and interest groups are heard, Academic Reps and Wellbeing Reps.

If you have any feedback about issues in your department relating to academic or wellbeing issues you can speak to one of your student representatives.

https://www.imperialcollegeunion.org/your-union/your-representatives/a-to-z

Officer Trustees

The Union is led by a team of Officer Trustees who are elected every year by the students of Imperial College. They take a year out of their studies and work full-time at the Union, representing the voices of students in the Union, the College and the wider community.

The Officer Trustees represent students in a variety of roles, including Education, Welfare, Finance & Service and Clubs & Societies. These elected students are here to represent your views as a student body do make sure you get in touch with them if there’s something you would like to discuss or change.

Health and well-being services

NHS Health Centre and finding a doctor

Even if you’re fit and healthy we recommend that you register with a local doctor (GP) as soon as you arrive in London. For help finding your nearest GP see the Student Space website:

www.imperial.ac.uk/student-space/here-for-you/find-a-doctor

There is the Imperial College Health Centre on our South Kensington Campus which you may visit during clinic hours if you’re feeling unwell. Students living within the practice catchment area are encouraged to register with the Centre.

www.imperialcollegehealthcentre.co.uk

NHS Dentist (based in the Imperial College Health Centre)

Imperial College Dental Centre offers a full range of NHS and private treatment options.

www.imperial.ac.uk/student-space/here-for-you/dentist
Counselling and Mental Health

The Student Counselling and Mental Health Advice Service offers short-term counselling to all registered students. The service is free and confidential. Counsellors are available at the South Kensington, Hammersmith and Silwood Park Campuses.

www.imperial.ac.uk/counselling

Financial well-being

If you’ve got any questions about student financial support (loans, scholarships and research council studentships, US and Canadian loans) then contact the Student Financial Support team:

020 7594 9014
student.funding@imperial.ac.uk

If you suddenly find yourself in financial difficulties or experience an unexpected change in circumstances, you may be eligible to apply for emergency financial help through the Student Support Fund. The Fund offers a one-off payment of up to £2,000 to cover such emergencies as last minute accommodation and travel necessities, equipment and childcare. It does not have to be repaid.

www.imperial.ac.uk/students/fees-and-funding/financial-assistance/student-support-fund/

For tuition fees queries, contact the Tuition Fees team:

020 7594 8011
tuition.fees@imperial.ac.uk

Support for disabled students

Disability Advisory Service

The Disability Advisory Service provides confidential advice and support for all disabled students and students with specific learning difficulties.

If you think you may have dyslexia or another specific learning difficulty but have never been formally assessed, the Disability Advisory Service offers initial screening appointments.

Room 566, Level 5, Sherfield Building, South Kensington Campus
020 7594 9755
disabilities@imperial.ac.uk
www.imperial.ac.uk/disability-advisory-service

Departmental Disability Officers

Departmental Disability Officers are the first point of contact within your department. They can apply for additional exam arrangements on your behalf, and will facilitate support within your Department.

The Disabilities Officer for the Department is the Undergraduate Senior Tutor, Dr Chris Ford.

More information on Departmental Disability Officers is available at:

www.imperial.ac.uk/disability-advisory-service/support/ddos
More information on procedures for the consideration of additional exam arrangements in respect of disability is available at:


**Support for international students**

**English language support**

The Centre for Academic English provides free in-sessional English courses for international students while they are studying. These include classes and workshops on academic language, social language, the four skills of reading, writing, listening and speaking, 1-1 consultations with a tutor to work on a piece of academic writing or an oral presentation, self-study resources in the VLE Blackboard, and the Conversation Project, which partners students with a native-speaker volunteer to practise social and conversational English.

We regard a good understanding of the English language as key to successful learning. For Year 1 students who do are identified as benefiting from further support in the English language test given at the beginning of Term 1, English language classes are timetabled. Attendance is compulsory. The Department sees the classes as a vital part of your programme here, supporting your studies.

- [www.imperial.ac.uk/academic-english](http://www.imperial.ac.uk/academic-english)

**International Student Support team**

Students from outside the UK make up around half of our student population, so our International Student Support team offers year-round support to help our international students settle into Imperial life. This includes UK visa and immigration advice and trips to different places of interest.

- [www.imperial.ac.uk/study/international-students](http://www.imperial.ac.uk/study/international-students)

**Visa support**

The International Student Support Team can help you with all of your visa questions: compliance issues, changing of degree course and visa implications, and other generic questions. Please visit their office (in Sherfield Building, level 3, near the Student Hub) or make an appointment to see an Advisor.

The booklet “your visa, your responsibilities” also includes good information, please look on:

- [http://www.imperial.ac.uk/study/international-students/visas-and-immigration/tier-4-general-student-visa-responsibilities/](http://www.imperial.ac.uk/study/international-students/visas-and-immigration/tier-4-general-student-visa-responsibilities/)

**Advice Services**

You have access to a number of specialist advice services:

**Careers Service**

The Careers Service has strong links to your Department and you will have a named Careers Consultant and Placement and Internship Adviser who will run both group sessions and individual meetings within your Department. You can arrange to meet with your linked Careers Consultant or Placement and Internship Adviser either in your Department or centrally at the South Kensington Campus on Level 5 Sherfield Building where the Careers Service is based.
Visit the Career Service's website to:

- Book a careers appointment
- Find resources and advice on successful career planning

www.imperial.ac.uk/careers

The Mathematics Careers Speed Dating Night

In addition to smaller year level information sessions, the Mathematics Careers Speed Dating Night is the main careers event for the Department of Mathematics. It is open to all Second, Third and Fourth Year students and takes place one evening in October. Students have the opportunity, in a ‘speed dating fashion’, to meet with a number of potential employers and alumni to talk about employment opportunities and graduate programmes.

The Departmental Careers Advisor is Dr Shahid Mughal.

Student Hub

The Student Hub represents a single point of contact for all key administrative information and support. The Student Hub team can help you with enquiries about:

- Accommodation (including checking contracts for private accommodation)
- Admissions
- International student enquiries
- Research degrees
- Student financial support
- Student records
- Tuition fees
- Exams
- UROP

Level 3, Sherfield Building, South Kensington Campus
020 7594 9444
student.hub@imperial.ac.uk
www.imperial.ac.uk/student-hub

Library and IT

Information and Communications Technologies (ICT)

If you’re having problems with technology (including computers, laptops and mobile devices), you can get help from ICT’s Service Desk.

020 7594 9000
www.imperial.ac.uk/ict/service-desk

Software shop

The Software shop offers a variety of general and subject specific software programs and packages for free or at a discounted price for Imperial students.

www.imperial.ac.uk/admin-services/ict/shop/software
Library services

The Central Library at South Kensington is open around the clock pretty much all year. Make sure you find out who your departmental librarian is as they’ll be able to help you find resources for your subject area. Also, don’t forget to check out the Library’s range of training workshops and our other campus libraries for access to specialist medicine and life sciences resources. Alongside these physical spaces and resources, the Library provides over 170,000 electronic books, journals and databases available both on and off campus and a free document delivery service to help you source books and articles from around the UK and the rest of the world:

www.imperial.ac.uk/library

Key Library Staff for the Department of Mathematics:

- Mathematics and Physics Librarian (Ms A. Brew): ann.brew@imperial.ac.uk

Ann Brew can support students with research skills and referencing. You can book individual appointments with her and she also runs workshops in the department at key points in the year.

Religious support

The Chaplaincy Multi-faith Centre has chaplains from many different religions, as well as prayer rooms and information on places of worship. In addition, it runs meditation classes and mindfulness workshops for stress management.

www.imperial.ac.uk/chaplaincy
11. Student Records and Data

The Student Records and Data Team are responsible for the administration and maintenance of the student records for all students studying at the College. This includes enrolments, programme transfers, interruption of studies, withdrawals and processing of examination entry for research degree students. The team also use this information to fulfil reporting duties to the Student Loans Company, Transport for London and the UKVI, as well as other external bodies.

The Team is responsible for the processing of student results and awards on the student record system as well as the production and distribution of academic transcripts and certificates of award.

The Student Records and Data Team produce a variety of standard document requests for both current and previous students including council tax letters, standard statements of attendance and confirmation of degree letters.

Student records and examinations

+44 (0)20 7594 7268
records@imperial.ac.uk

Degree certificates

+44 (0)20 7594 8037
certificates@imperial.ac.uk

Withdrawing from the Department

If, for whatever reason, you are considering withdrawing from your mathematics degree, please speak with your Personal Tutor, Year Tutor, the Undergraduate Senior Tutor or the Undergraduate Liaison Officer beforehand. Depending on the reason for your decision, there may be Departmental and/or College support systems in place, of which you may be unaware, which can assist you. You may find that withdrawing from your degree isn't the most appropriate course of action to take.

If, however, you have made a determined decision to leave, then the Department simply requires a letter, with a handwritten signature, stating your intention to do so. You should include a reason for your decision, eg. 'on personal grounds', 'on health grounds' or 'moving to another institution'. No detail is required. You should also speak with a member of staff at the Student Hub to ensure you have no outstanding commitments to the College.

The Department will notify Registry.
12. **Work-life balance**

The pace and intensity of study at Imperial can be demanding so it’s important to find time for outside interests.

**Imperial College Union**

The Union’s range of 380+ student-led clubs, societies and projects is one of the largest of any UK university, opening up lots of ways for you to enjoy your downtime.

[www.imperialcollegeunion.org/about-us](http://www.imperialcollegeunion.org/about-us)

**Physical Activity Sport**

Imperial College has a wide range of sports and activities on offer that cater for all standards and abilities. We have a recreational activity offer, competitive sports teams and an elite sport programme. We are dedicated to ensuring we have a diverse, inclusive and exciting offer for all.

With an annual fee of £30 you will get use of the gym and swimming facilities on our campuses.

[www.imperial.ac.uk/sport](http://www.imperial.ac.uk/sport)

**Maths Activities outside the Curriculum**

**The Mathematics Society (MathSoc)**

The Mathematics Society (MathSoc) plays an important part in the Department and arranges events for students and staff, including parties, outings, special lectures and careers events. Information is emailed to students and more information can also be found on the MathSoc website: [https://www.union.ic.ac.uk/rcsu/mathsoc/](https://www.union.ic.ac.uk/rcsu/mathsoc/)

**The Undergraduate Colloquium**

The Undergraduate Colloquium was initiated by students in 2012-2013 as a weekly lecture series where undergraduate students could present their research (e.g. UROP/projects/other independent research) to other undergraduates and members of the Department. The lectures take place during lunch and are advertised via email and on the Maths Central Pages of Blackboard under Student Life ([https://bb.imperial.ac.uk](https://bb.imperial.ac.uk)).

**PLUS!**

PLUS! is an interactive problems group that meets at regular intervals throughout Term 1 and Term 2, usually at lunch time. All students are welcome to turn up and leave as and when they wish. PLUS! problem sheets can be found on the Maths Central Pages of Blackboard under Student Life ([https://bb.imperial.ac.uk](https://bb.imperial.ac.uk)).
Women in Maths

Women in Maths get-togethers take place bi-weekly and hold talks from academics and alumni in an informal social atmosphere.

Other

Other events such as wellbeing teas and research and inspirational talks by academics take place regularly and are advertised via email.
13. Student feedback and representation

Feedback from students
The College and Union is committed to continually improving your education and wider experience and a key part of this is your feedback. Feedback is thoroughly discussed by your student representatives and staff.

Within the Department, Module Lecturers are keen to receive feedback on the pace and content of their modules. This is best done by a question or comment at the time or immediately after the lecture, but in other cases this can be done through Student Year Representatives or the Student Departmental Representative. Third- and fourth-year modules should also have a module representative who can act as a point of contact between students and lecturer. Constructive comments and suggestions should be made in good time, in order to benefit the current year as well as following years.

The UG Liaison Officer, UG Senior Tutor and Director of Undergraduate Studies may also be approached to provide feedback on the programme. Please contact the UG Liaison Officer on any general feedback. Students may also provide anonymous feedback through leaving a note in the UG Office letterbox.

Student representation
Student Representatives are recruited from every department to gather feedback from students to discuss with staff. More information about the role, and instructions on how to become an academic representative, are available on the Imperial College Union (ICU) website.

www.imperialcollegeunion.org/your-union/your-representatives/academic-representatives/overview

The Departmental Representative for Maths for 2018-2019 is Ankush Rajput
ankush.rajput16@imperial.ac.uk

Year Rep information for Mathematics can be found on the Maths Central Pages of Blackboard under Course Information (https://bb.imperial.ac.uk).

Staff-Student Committee
Staff-Student Committees are designed to strengthen understanding and improve the flow of communication between staff and students and, through open dialogue, promote high standards of education and training, in a co-operative and constructive atmosphere. College good practice guidelines for staff-student committees are available here:

www.imperial.ac.uk/about/governance/academic-governance/academic-policy/student-feedback

The Department of Mathematics has an active Staff/Student Committee that meets at various times (usually over lunch) throughout each session. Student and Staff Representatives discuss various academic matters to do with the structure and operational running of the courses. There are also matters to discuss and arrange to do with staff/student social interaction.

Information about the Staff/Student Committee and minutes of meetings can be viewed on the Maths Central Pages of Blackboard under Course Information (https://bb.imperial.ac.uk).
14. Student surveys

Your feedback is important to your department, the College and Imperial College Union.

Whilst there are a variety of ways to give your feedback on your Imperial experience, the following College-wide surveys give you regular opportunities to make your voice heard:

- UG SOLE lecture/module survey
- Student Experience Survey (SES)
- National Student Survey (for finalists only)

**The UG SOLE lecturer/module survey** runs at the end of the autumn, spring and summer terms. This survey is your chance to tell us about the modules you have attended and the lecturers who taught them. There are also separate surveys for your BPES and Horizon modules.

For **UG SOLE** your lecturers will receive their individual numerical results and comments shortly after the survey closes. To make the most of your opportunity to give your feedback, please do not use offensive language or making personal, discriminatory or abusive remarks as these may cause offence and may be removed from the results. While this survey is anonymous, please avoid self-identification by referring to personal or other identifying information in your free text comments.

The **Student Experience Survey (SES)** is another opportunity to leave your views on your experience. This survey will cover your induction, welfare, pastoral and support services experience.

The **National Student Survey (NSS)** is an annual survey of final year undergraduates at UK Higher and Further Education Institutions which runs in the spring term. It was first run in 2005 and is carried out by Ipsos Mori, commissioned by the Higher Education Funding Council for England.

When you are in the final year of your programme, you will be invited to take part in the **National Students Survey (NSS)**. NSS asks all final year undergraduates to rate a range of elements related to their student experience such as, academic support, learning resources and assessment and feedback. The nationwide survey compiles year on year comparative data for higher education institutions, with its results being made publicly available.

For Imperial’s results visit the Unistats website:

[unistats.direct.gov.uk/Institutions/Details/10003270](unistats.direct.gov.uk/Institutions/Details/10003270)

All these surveys are anonymous and the more students that take part, the more representative the results so please take a few minutes to give your views.

The Mathematics Department compiles responses to UG SOLE from Module Lecturers and sends these out to students. These are also available on Blackboard Maths Central in General Information section, UG Online Evaluation Survey (SOLE) ([https://bb.imperial.ac.uk](https://bb.imperial.ac.uk)).

The Union’s “You Said, We Did” campaign shows you some of the changes made as a result of survey feedback:

[www.imperialcollegeunion.org/you-said-we-did](www.imperialcollegeunion.org/you-said-we-did)

If you would like to know more about any of these surveys or see the results from previous surveys, please visit:

[www.imperial.ac.uk/students/academic-support/student-surveys/ug-student-surveys/](www.imperial.ac.uk/students/academic-support/student-surveys/ug-student-surveys/)

For further information on surveys, please contact the Registry’s Surveys Team at:

[surveys.registrysupport@imperial.ac.uk](mailto:surveys.registrysupport@imperial.ac.uk)
15. And finally

Alumni services
When you graduate you will be part of a lifelong community of over 190,000 alumni, with access to a range of alumni benefits including:

- discounts on further study at the College and at Imperial College Business School
- alumni email service
- networking events
- access to the Library and online resources
- access to the full range of careers support offered to current students for up to three years after you graduate
- access to our Alumni Visitor Centre at the South Kensington Campus, with free Wifi, complimentary drinks, newspapers and magazines, and daytime left luggage facility

Visit the Alumni website to find out more about your new community, including case studies of other alumni and a directory of local alumni groups in countries across the world.

www.imperial.ac.uk/alumni

For more information about Graduation, visit the graduation website

www.imperial.ac.uk/graduation

Opportunities for further study
After you have completed your mathematics degree, you may choose to continue your studies at the Masters or PhD level or enter the graduate job market. Previous graduates have gone on to graduate level study across the UK and abroad and entered a variety of fields of industry. You can read more about places our graduates go on the Careers Service website:

http://www.imperial.ac.uk/careers/exploring-your-options/destinations/undergraduates/

Postgraduate Courses and Research in Mathematics
Postgraduate work in mathematics is divided between advanced courses, which normally extend over about one year and lead to the degree of MSc, and research studies that normally extend over a period of up to about three years and lead either to the degree of MPhil or more usually to that of PhD. An important aspect of the structure of the Department is that it consists of several sections: Applied Mathematics and Mathematical Physics, Pure Mathematics, Statistics, Mathematics and Finance. The sections have their own thriving research activities and also give a valuable framework for teaching activities at all levels.

The Department offers the following postgraduate courses and research programmes:

Taught Masters programmes (MSc):

- Applied Mathematics (Programme Director: Dr R. Barnett)
- Pure Mathematics (Programme Director: Professor A. Skorobogatov)
- Statistics (Programme Director: Dr M. Evangelou)
- Mathematics and Finance (Programme Director: Dr A. Jacquier)

MRes/PhD programme:

Centres for Doctoral Training (CDT) which offer MRes/PhDs:

- **CDT in the Mathematics of Planet Earth** (Contact: Professor D. Crisan)
- **CDT in London School of Geometry and Number Theory** (Contact: Professor A. Corti)
- **CDT in Fluid Dynamics across Scales** (Contact: Professor P. Schmid)
- **CDT in Financial Computing & Analytics** (Contact: Dr Mikko Pakkanen)

PhDs:

Professor Henrik Jensen – Postgraduate Director

Dr Tony Bellotti – PG Tutor (Welfare)

Section PGR Tutor:

- Dr Nick Jones (Applied)
- Professor Boguslaw Zegarlinski (Pure)
- Dr Nick Heard (Stats)
- Professor Harry Zheng (Mathematical Finance)

Further information on post graduate study can be found online at:

[http://www.imperial.ac.uk/mathematics/postgraduate/](http://www.imperial.ac.uk/mathematics/postgraduate/)